Chapter 1

Algorithmic Composition Using Rhythmic Complexity and Emotion Analysis

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Abstract. Rhythm is one of the key elements for music composition. This chapter integrates both emotion and rhythm features for automated music generation. In the field of music emotion recognition, many researchers discuss the music features such as mode, tempo, harmony, and loudness, which significantly influence the human listening recognition result. Even though using rhythm complexity as one of the music features to analyze the music emotion is shown in the literature, it still lacks profound inquiry. In this work, rhythm complexity is used as the key music feature to perform statistical analysis with several musical excerpts; the result is introduced into the algorithmic composition software, which automatically generates music patterns with mathematical calculation. There are two methods of rhythm complexity applied in the research, and the result shows that rhythm complexity is statistically significant correlated with music emotion arousal. Subsequently, the multiple regression analysis result is adopted into the algorithmic composition system to generate music patterns.

Keywords: Music Emotion, Music Features, Rhythm Complexity, Algorithmic Composition

1. Introduction

The previous research shows the analysis of emotion music features theory, which can be applied to the fields of music information retrieval and psychoacoustics.

Music features including tonality, tempo, loudness, articulation, pitch range, and harmony have been analyzed by researchers to differentiate their emotion states. However, to establish a music style or emotion, the rhythm complexity may be even more important in the music composition.

The previous literature, including harmonic complexity [14, 9, 7, 13], melodic complexity [14, 5, 6], and rhythm complexity [14, 5] has shown the analytical result of the mapping relations between music and emotion. Some results reveal that music with a more negative emotion will induce higher rhythm complexity [5].

This study not only references the previous research of the rhythm complexity determination, but uses the mathematical method to automatically determine the complexity with more objective criteria.

Therefore the most distinguishing feature of this paper is to add the rhythm complexity into the music features as the criteria to identify the music emotion, and furthermore to perform algorithmic composition based on the result of the analysis.

Figure 1 shows the system architecture of this paper, which integrates the previous study of the theory in the emotion music features with the concept of automated composition.

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Fig. 4. Hesitation, Anticipation, and Syncopation (from left to right)

The rhythm complexity that this article refers to is the cognition degree of difficulty for music rhythm by humans, or the degree of syncopation shown in the music rhythm. Thul and Toussaint's research [1, 2] shows the mathematical expression method for the rhythm complexity analysis.

Livingstone and Brown's paper reveals that music rhythm is one of the important music features related to music emotion [14]. Therefore this study will use the above two methods to analyze the music rhythm complexity.

2.1 Metrical Complexity

Toussaint presented a rhythm complexity calculation method [1] which is based on the metrical hierarchy to compute the smallest unit of each measure, and then generates the weigh table for the unit position within the measure, and finally calculate the total weight value according to the note position. In the other hand Lerdahl and Jackendoff proposed the method with the consideration of different time signatures to generate various weight tables [4]. Here we integrate both methods to calculate the rhythm complexity value based on the weight table to obtain the weight summation for all of the notes within a specific measure, and then subtract this value by the maximum weight summation that the measure can generate, to eventually get the complexity eventually. For a 16-beat measure, the onset of the typical "Clave Son" Latin music rhythm can be expressed with "x", and the rest can be represented with "." symbol, and then its weight table is shown in figure 5.

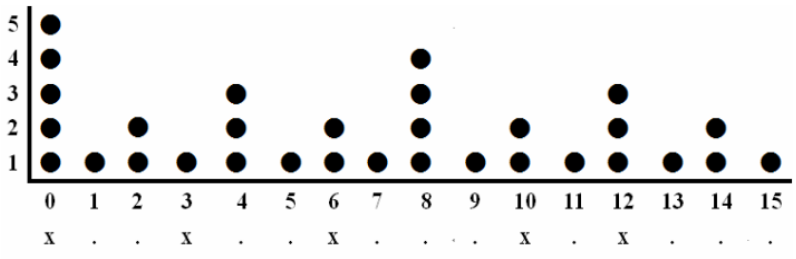

Fig. 5. Weighted Metrical Hierarchy for 16 Pulses

In this rhythmic pattern the weight summation of the note onset is (5+1+2+2+3) = 13, thus the Metrical Complexity Measure can be obtained with the maximum value of the 5-note weight summation (5+4+3+3+2) = 16 within a measure subtracting 13 which equals 3.

2.1 Weighted Note-to-Beat Distance

Weighted Note-To-Beat Distance (WNBD) is the method to measure the rhythm complexity according to the shortest distance between note attack and strong beat [3]. With comparison to other metrical structure method such as LHL and Metrical Complexity [2], this method can calculate more rhythm complexity values of subdivisions, but the algorithm is more flexible. Due to the close relationship with strong beat, this method needs to define the strong beat position within a measure in advance; therefore, quarter notes are strong beats in 2/4, 3/4, 4/4, and 6/4 time, and eight notes are strong beats in 6/8 time.

The calculation method is as follows:

1. Let e_i *and* e_{i+1} be two consecutive strong beats in a meter;
2. Assume x is the note onset;
3. Onset position can be in the position either before or after the strong beat e_i, but must be in the position before the next strong beat e_{i+1};

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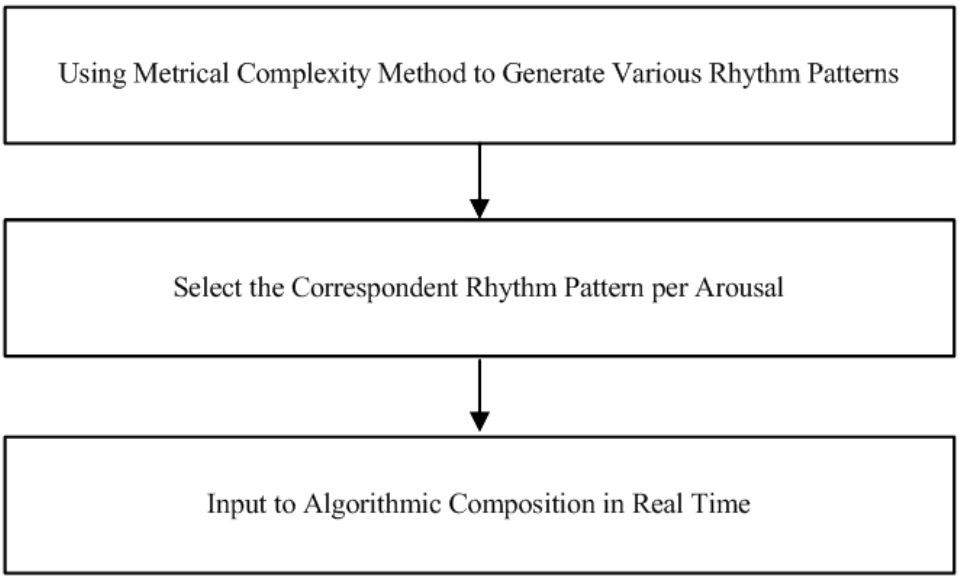


Fig. 11. The Flow Chart of the Automated Composition with Rhythm Complexity Input

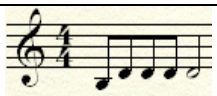
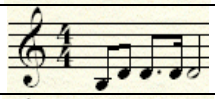
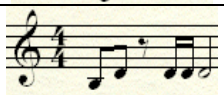
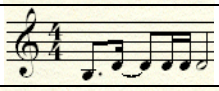
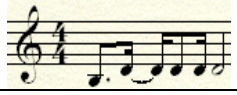
Metrical Complexity	Pattern
1	
2	
3	
4	
5	

Fig. 12. Generative Rhythm Complexity Pattern Examples

6. Conclusion

This research integrates emotion features with the algorithmic composition concept, and adds the rhythm complexity analysis result to not only enrich the computer generated music content, but also to create a novel and pioneer way to perform automated composition without complicated music parametric input, compared with the previous research. The rhythm patterns can be successfully generated according to the rhythm complexity analysis result using statistic multiple-regression method; therefore the proposed method can be used in the field of automated composition to compose a melodic line with generative pitches accordingly. In the future, other rhythm complexity methods can be used in the system, and brainwave cognitive analysis can be also applied to make the system analysis more completely.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Chapter 2

New Information Technologies: Augmented Reality as a Social Factor

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Abstract. Augmented Reality is a new information technology which provides us with an interactive connectivity without limits in real time in our world today. It has an influence on social factors as a dynamizer of free and independent thinking and on the mobile as a powerful instrument. Mobile computing has opened new possibilities for work and research for millions of people in the global village. We present a comprehensive state of the art of the new information technologies aimed at virtual reality, cyberculture and hypermedia inside real and virtual communities. Besides, we present new research sectors and development in the next years.

Keywords: Augmented Reality, Cyberculture, Hypermedia, Globalization, New Media, Emerging Technologies

1. Introduction

These words, may be idyllic nowadays, but they reflect the enthusiasm for the virtual reality in the cyberculture world, that is to say, the integration of new technologies or education through computer services, above all, the Internet.

The term comes from the classic cybernetics concept, founded by Norbert Wiener[1], who during the Second World War introduced the interest in applying data about Biology to the design of the machines– operative systems of the machines and the use of the nanotechnology based on the development of neuron nets, according to Raymond Kurzweil. The cognitive psychology and the artificial intelligence joined later. The aim was to guide the anti-aircraft guns automatically through a radar for the American Army.

Raymond Kurzweil[2] was able to predict very precisely, the influence of the Internet on our daily life, thanks to the unlimited access to international libraries, data, and information services (on top of that he managed to say that the connection would be in a wireless way). In his book "The Age of Spiritual Machines" (1998) sets out three visionary parts:

1. The evolution of the artificial and human intelligence;
2. New ways in the interpretation of calculations and data in the man-machine integration;
3. Future predictions of computing in one hundred years after 1999.

[1] Norbert Wiener applied the mathematical logic to cybernetics in order to predict the path of the bombers during the Second World War, thanks to several corrections made between the differences of the planned trajectory and real (process innovations).

[2] More information about nanotechnology and, in general, futurism and transhumanism, through Raymond Kurzweil, a technologist specializing in developing electronic devices human-machine conversation. In his book La Era de las Máquinas Inteligentes (The Age of Spiritual Machines, 1990) anticipates the demise of the Soviet Union due to new technologies such as fax and mobile phone, which would detract able to authoritarian governments.

Since the cybernetic theory the concept of information is understood as an organization and it acts as an essential element in the construction of the reality: "a map of paths and thoughts at the time of the experience have become viable" [2]. Its importance in the communications network originated the term cyberspace, a virtual reality in itself inside the IT (Information Technology) world which works as a metaphoric version of Internet. The investigations carried out in this field, impelled the concept of artificial intelligence, enhancing the theories about the formal and statistical analysis of the human behaviour in different problems, implying new systems capable of generating right automatic answers through some premises through feedback mechanisms.

Both authors, Wiener and Kurzweil, have been essential in the evolution of the cyberculture, the same as Lévy [3] and Kerckhove [4], defining it as the third era of the communication. So the alphabet is replaced by the digital language, beyond the written and oral information (universal). Thus, Steven Holtzman states that the existence of digital worlds –in the cyberspace– are artificial worlds "which emerge renewing the mental images of other worlds" [5], a virtuality which will change "the logic about the way we think now".

Cyberculture is interaction with absolute freedom and anonymity. It helps people to relate with the digital world from anywhere and through any device susceptible to be connected whithout a computer, in an autonomous way: you can say that the global world of Internet, as a circular system, is formed by a virtual active community of people with their own life –it reproduces itself– and where the information has acquired, at last, a straight away and immediate speed of transmission thanks to the exponential connection of its members. That is why it is said that it is hypermedia in a pure state.

Hypermedia is called that because the hypertext is integrated (information organized in different nods: different web pages, for example) and multimedia (sound, image, etc.) in an only language. It is in this moment when the design of information has to help the user to find what he or she is looking for in the easiest and fastest way possible, to avoid the informative load: the non-sequential reading is, from now on, one of the challenges in the era of the communicative expansion.

2. Augmented Reality: Working Examples

Thomas P. Caudell defined the word in 1990 to help the Boeing workers to assemble the wires in the planes. Among the applications of the augmented reality we can find educational projects (museums and amusement parks), surgery (viewing visual data invisible at first sight), entertainment (videogames), simulation (flights and street routes), architecture (reconstruction of buildings), publicity, etc.

Little by little it is being integrated in the daily activities through multimedia applications such as holographic screens, holodeck conferences (term used by Google to develop a cabin that would allow engineers evaluate the quality of the photographs in Street View, in order to offer a real experience as real as possible), insertion of information in the atmosphere through a mobile or GPS –Global Positioning System, publicity and virtual signs, etc. The possibilities of this technology have no limits, as you can see in the following examples. Although some of them are very advanced prototypes or ideas of future models that do not have a real application yet. The first one is The Scout. It was created by Matt Marrocco and consists of a digital compass ideal to see travellers who want to get and share local information all over the world, thanks to the GPS (figure 1). It has an AMOLED (Active Matrix Organic Light Emitting Diode) screen of water-hardened glass and the casing is made of polycarbonate and aluminium. It has a camera of 5 MP, a little scroll for the navigation and different programs (Photoshop, Illustrator, Rhino and Hypershot). We can find, too, these applications: 1. To insert of symbols to create a virtual route, kept in a database; 2. To add coloured bubbles with short information about places of interest: shops, restaurants, etc.; 3. Automatic search of users in the Net who have The Scout too.

Fig. 1. The Scout (prototype) –http://www.yankodesign.com (Modern Industrial Design News)

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architectural applications or virtual routes.

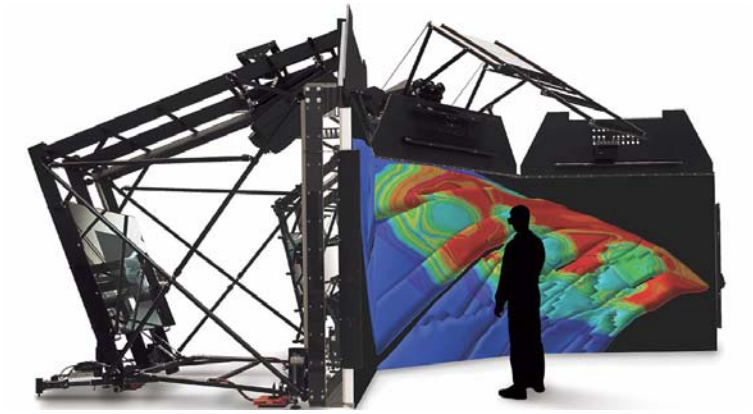

Fig. 9. MoVE Lite –http://www.barco.com

MegaCADWall is a multi-channel, stereoscopic screen based on the concept of long-distance communication (figure 10). Several sources of information are simultaneously visualized –stats, databases, memos, etc.– while being engaged in a videoconference. In addition to telematic conversation, files and images can also be exchanged from the PC, as well as, generally speaking, any document concerning one's professional activity, thanks to the inclusion of 3D video and audio stereo featured in the XDS system (also used by USA-based broadcasters such as ABC).

Fig. 10. MegaCADWall –http://www.barco.com

Another proposal is BR Center (figure 11), a curved, big sized multi-channel screen featuring high resolution and stereoscopic projection. Steering with a joystick, we can plunge into an astoundingly vivid virtual environment: for videogames, virtual visits to historical reenactments or inaccessible places from the real world, training simulations, etc.

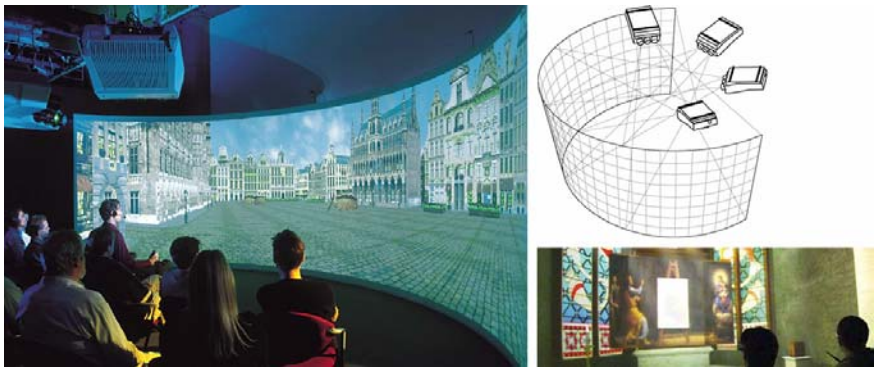

Fig. 11. BR Center –http://www.barco.com


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Fig. 13. Hypermedia systems and multimedia graphics –http://www.barco.com

In figure 13, from top to bottom and from left to right, we present:

- Visualization of solutions for the transportation of barrels in the gas industry.
- The world's biggest digital support for the promotion of commercial brands and all kinds of events (cultural, sports).
- Gigantic digital advertising integrated in an urban environment (dynamic image).
- Electronic panel featuring different promotion channels.
- Groundbreaking stereoscopic 3D technology changing the digital movie industry.
- Interactive learning in universities, events hosted by big companies, etc.

- Virtual Reality and 3D applied to the design of prototypes in the car industry, architectural simulation, research of atmospheric conditions, etc.
- Support in data control centers (street traffic, air safety, etc.).
- Training simulation for civil and army pilots in personalized settings.
- Communications control in phone and Internet companies.
- New experiences in the music industry (U2-Vertigo Tour).
- Dynamic information for big broadcasting companies (BBC, HBO, etc.).

3. Social Factors

By the end of the second section (Cyberculture), We highlighted the importance of effectively integrating non-sequential reading in the age of communicative expansion. As the Internet accumulates such a volume of hypermedia contents, it becomes necessary to have a clear concept of what we are looking for and what we want to achieve with it: an unlimited access to information doesn't necessarily imply a wide knowledge about a given matter. Nevertheless, the fluency of electronic text also offers cognitive and expressive resources that just give it the flexibility to be modified and sent immediately, irreversibly transforming the way we work and think, as well as the design of information itself. Therefore we must know how to adapt to the new ways of communication if we want to keep in touch with the real world through the cybernetic world, both intertwined and essential to evolve in a knowledge-based society.

The social and political structure of post-industrial society, which emerged after the Second World War in the USA and Eastern Europe, reflected the owning of knowledge as a source of power. After the Cold War, the polar era between the USA and the Soviet Union vanished to led directly to the globalization (Post-modernity), where the mass-media and consumption industry became centres of power in themselves: the information is intentionally superfluous because the message's content is not important anymore, only the way it is transmitted and the degree of confidence it can provide, even becoming a blatant self-contradiction.

We can check the information. The channels and sources of information spawn at a dazzling rate, but will we be able to tell the reliable source from the manipulated one? In the worst case, the receiver ends up depriving the message of all reality by transforming it in mere entertainment. Aren't we living already in a Brave New World? [16]. The ability of distinguishing reality for an adult is progressively invalidated in a process that starts in childhood, resulting in a regression in the development of their reasoning intelligence: without openly recognising it, we are kids whose only goal is to consume in order to be "useful" to the society in which we happen to live.

Far away from the totalitarian universe of George Orwell in his book "1984" [17], where the individual is put under constant surveillance by the Big Brother, our present time rather resembles a conformist and alienated society, subtly corrupted once the technology keeps us increasingly healthier and happier (in a fairly utopian fashion, war and misery don't affect us, and we lack even the smallest interest for thinking in any scope that transcends the daily life). We may be the combination of both novels –Brave New World, 1984–, or just the slaves from Plato's Cave myth –rather an allegory, it appears at the tbeginning of the seventh book of The Republic (arround 370 BC), trusting the shadows to be the absolute truth and not daring to turn our head sideways for fear of discovering a deeper, more complete new reality (in any case, we participate in the collective deception to which we are doomed).

In this sense, a social net inside the Internet constitutes a heterogeneous community of users operating under a uniform profile, inside an open system in which the whole would not exist without every single part. From an ideological perspective, we could talk about a restricted sort of democracy for the individual, while perfectly liberating for the strength of the group. This specific aspect is what motivates marketing companies to track what we do, our location and our buying habits: the Orwellian control of ideas has given way to a scrutiny of uses and modes, as shallow as consumerism itself, but far more effective.

The Internet is still growing, and depending on the use we make of it, it will have positive or negative outcomes. Maybe for the generation born under this technology comparing it to past ones does not raise any debate whatsoever, since they take it for granted, in the same way that those born under the influence of TV don't frequently compare it to the radio, which is closer to our grandparents' generation. At least, this evolution gives us several essential keys to presently understand "the logic with which we think now", as mentioned by Steven Holtzman [5]:

$$\text{IN}\text{ternet} = \text{IN}\text{tegration} + \text{IN}\text{teractivity} + \text{In}\text{stantaneous}$$

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Chapter 3

Dagger: A Tool for Analysis and Optimization of Decision Trees and Rules

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Abstract. Decision trees and decision rules are used for describing knowledge, algorithms and predictive multivariate models. Several applications require tree to have minimal complexity relative to specific complexity measures like depth, average depth or number of nodes. We consider a family of problems related to building a minimal complexity tree for a decision table. We propose a common framework for solving these problems based on extensions of dynamic programming. The basic algorithm is capable of building a set of optimal trees/rules rather than obtain a single solution. The set of solutions is described in a form of graph and makes possible sequential optimization relative to different complexity measures. Though computational complexity of the algorithm is exponential with the table size in general case, it is applicable to moderate size decision tables coming from real-life applications. The sequential optimization algorithm was implemented in KAUST as a part of software system named Dagger. The system is capable of finding an exact solution for problems of small to medium size (up to several dozens of attributes and thousands of rows). For larger scale problems it builds approximate decision trees that reduce uncertainty to a predefined threshold. For a pair of complexity measures (i.e., depth and number of nodes), the system can find a set of Pareto-optimal solutions for the bicriteria optimization problem. The work contains several experimental results obtained using Dagger.

Keywords: Decision Trees, Decision Rules, Optimization, Dynamic Programming, Time Complexity

1. Introduction

Throughout the history of software engineering, the aim has been to organize and decompose software into primary and comprehensible components. That is to say, the encapsulation of state and behaviour by means of procedures, classes, monitors, abstract types, objects. Current methods, notations, and languages concentrate on finding and composing the functional units of an application. However, as non-functional requirements have also added to the scope and complexity of current applications, obtaining and maintaining a separation of concerns through all levels of software development is still a problem.

Decision trees and decision rules are used for representing knowledge and algorithms in test theory [4], rough set theory [9, 10, 11], machine learning and data mining [3, 8]. These applications pay attention to model complexity to make it understandable and to prevent model overfitting to training data. There are several complexity measures: depth and average depth of decision tree nominally characterize work time, while number of nodes characterizes space required to store the model. Length of decision rule characterizes both space and time complexity of the model, and rule coverage is important to discover

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- *depth h* (maximum length of a path from the root to a terminal node);
- *average depth* h_{av} (length of the path $\pi(r)$ averaged by all rows of *T*);
- *number of nodes L* and its modifications: *number of nonterminal nodes* L_n and *number of terminal nodes* L_t.

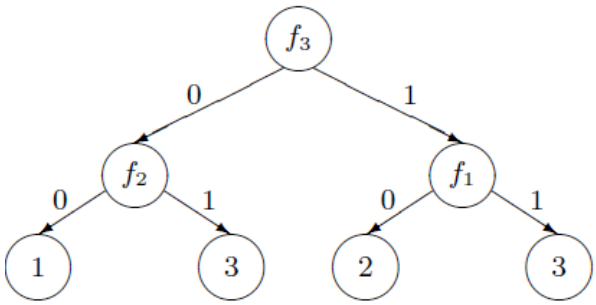

Fig.2. Exact decision tree

For the tree depicted in figure 2, the depth and the average depth are equal to 2, the number of nodes is equal to 7, the number of nonterminal nodes is equal to 3, and the number of terminal nodes is equal to 4.

One might obtain a simpler decision tree at the cost of certain imprecision of the model. Such decision trees are called *approximate*. The degree of model roughness is characterized by the *number of misclassifications* μ that is the number of rows in the table *T* for which terminal nodes in the corresponding tree paths are mislabeled. The tree depicted in Fig. 3 is an *approximate* tree. Its depth and average depth both are equal to 1, the number of nodes is 3, the number of nonterminal nodes is 1, the number of terminal nodes is 2, and the number of misclassifications is 2.

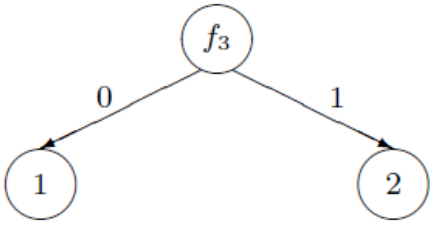

Fig.3. Approximate decision tree

In addition to the number of misclassifications, the degree of tree roughness can be characterized by maximum uncertainty of subtables corresponding to the terminal nodes. *Uncertainty* of a subtable is calculated as the number of unordered pairs of rows labeled with different decisions. For an arbitrary nonnegative integer α, we call a decision tree for the table *T* whose uncertainty is at most α, α-*decision tree* for the table *T*.

In the considered example (see figure 3), the subtable corresponding to the left-hand terminal node of the tree contains the last three rows of the initial decision table, and the subtable corresponding to the right-hand terminal node of the tree contains the first three rows of the initial table. The uncertainty of both subtables is equal to 2. So the considered decision tree is a 2-decision tree.

A *decision rule* is an expression of the form:

$$f_{i_1} = a_1 \wedge \ldots \wedge f_{i_m} = a_m \rightarrow d. \quad (1)$$

$f_1 = 1 \wedge f_2 = 1 \rightarrow 3$
$f_1 = 0 \wedge f_2 = 1 \rightarrow 2$
$f_1 = 0 \wedge f_3 = 1 \rightarrow 2$
$f_2 = 0 \wedge f_3 = 0 \rightarrow 1$
$f_2 = 0 \wedge f_1 = 1 \rightarrow 1$

$f_1 = 1 \wedge f_2 = 1 \rightarrow 3$

Fig. 4. Exact decision rules

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Table 2. Dependence of graph parameters on σ

σ	# nodes	# edges	# trees
0	115200	434338	$> 10^{39}$
0.001	5903	12607	$1.5 \cdot 10^{22}$
0.01	1338	2043	$3.3 \cdot 10^{9}$
0.1	249	293	1082
0.2	78	77	56

We found also values (see Table 2) of the following parameters related to the directed acyclic graph $\Delta_\alpha(T)$:

 # nodes: the number of nodes in $\Delta_\alpha(T)$;
 # edges: the number of edges in $\Delta_\alpha(T)$;
 # trees: the number of α-decision trees for the table *T*.

The results show that graph size is rapidly decreasing with growth of σ. As algorithm time and space complexity is proportional to the graph size, σ controls the complexity.

In the second group of experiments, for exact trees ($\sigma = 0$) we consider all possible orders of complexity measures *h, h_{av},L,* and L_t. We performed sequential optimization in the specified order and then calculated values of these functions for decision trees obtained after the last step of sequential optimization. Table 3 shows the results (in the order column the complexity measures *h, h_{av},L, L_t* are coded by 1, 2, 3 and 4 respectively).

Table 3. Dependence of tree complexity on order of optimization

order	*h*	h_{av}	*L*	L_t
1234	8	3.45	1107	795
1243	8	3.45	1107	795
1324	8	3.47	1066	764
1342	8	3.47	1066	764
1423	8	3.48	1069	759
1432	8	3.49	1069	759
2134	8	3.45	1107	795
2143	8	3.45	1107	795
2314	8	3.45	1107	795
2341	8	3.45	1107	795
2413	8	3.45	1107	795
2431	8	3.45	1107	795
3124	8	3.47	1066	764
3142	8	3.47	1066	764
3214	8	3.47	1066	764
3241	8	3.47	1066	764
3421	8	3.47	1066	764
3412	8	3.47	1066	764
4123	8	3.48	1070	759
4132	8	3.49	1069	759
4213	8	3.48	1070	759
4231	8	3.48	1070	759
4321	8	3.49	1069	759
4312	8	3.49	1069	759

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Chapter 4

Computational Intelligence Techniques for Communities of Practice Network Formation

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Abstract. Most of the algorithms using the computational techniques have specific objectives, like prediction or diagnosis, based on fixed data structure. Such algorithms are the main elements of the intelligent systems that have to select the appropriate data, to obtain information from the selected data, and then to create concepts and to reason in order to produce knowledge. In this context, a new organizational form has emerged that complements existing structures and emphasizes knowledge sharing and learning, called the community of practice. The concept has received much attention from researchers and practitioners in the management area, especially in knowledge management.

Keywords: Computational Intelligence, Community of Practice, Neural Networks, Fuzzy Systems, Genetic Algorithms

1. Principles and Challenges of Computational Intelligence

Computational intelligence offers a wide variety of computational methodologies inspired by nature to deal with and to solve complex problems in real world context. Computational intelligence includes fuzzy systems and fuzzy logic, neural networks and evolutionary computations. In addition, computational intelligence includes their various combinations such as swarm intelligence and artificial immune systems, chaos theory and multi-value logic. Computational intelligence combines learning techniques, adaptation and evolution in intelligent and innovative applications.

Computational learning theory requires an extremely rigorous mathematical approach. It seems that in cognitive sciences, both the sensorial systems and the neurons in cortex reach the equilibrium through evolutionary processes.

Intelligent systems must know how to select appropriate data, to obtain information from the selected data, to create concepts and to reason with these concepts in order to produce knowledge. Humans are flexible in finding alternative ways to solve a problem, a single solution is rarely sufficient. The human brain has resources to seek alternative solutions to the problem, selecting specialized modules. Creating a flexible system that uses modules to explore different ways of solving the same problem by proposing multiple solutions is an important challenge for the development of computational intelligence.

Most algorithms of computational intelligence have specific objectives, like prediction (using approximation) or diagnosis (using classification), based on fixed data structure. Such algorithms are essential components of intelligent systems. For example, running a neural network program implies decisions, such as: designing the network, choosing the training methods, setting the parameters, data processing, evaluating results and then repeating the process. In response, the user acts for the system as an external controller.

Even with a consistent selection of procedures for data preprocessing, selecting and transforming forms, for creating new models, optimizing these models and processing the results, the control problem is quite

complicated. The efforts of the researchers in the field of computational intelligence focus on improving individual algorithms.

2. Computational Intelligence Methods

Computational intelligence techniques include neural networks, fuzzy systems and genetic algorithms. These techniques offer a practical solution for solving complex problems. Therefore, computational intelligence determines more appropriate solutions, difficult to obtain with classical analytical methods.

2.1. Neural Networks

The term "neural network" traditionally refers to a network of biological neurons, but the modern usage of this term refers to artificial neural networks. These networks are composed of artificial neurons or nodes. McCulloch and Pitts have developed a computational model for neural networks based on mathematics and algorithms [28].

The biological neural networks are made up of real biological neurons that are functionally related to the peripheral nervous system or the central nervous system. Similar to cybernetic control loops, a neural circuit is a functional entity that comprises interconnected neurons.

The artificial neural networks are composed of interconnected artificial neurons that represent programs mimicking the properties of biological neurons. An artificial neural network is an adaptive system that changes its structure based on external or internal information obtained during the learning process. Artificial neural networks may be used to better understand biological neural networks, or to solve various problems of artificial intelligence, without creating a model of a real biological system.

The feedforward neural networks are usually organized in layers and allow only one directional flow (figure 2).

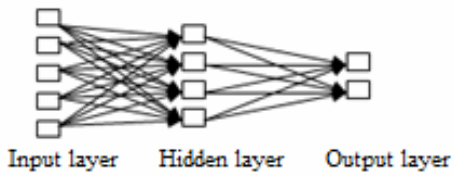

Fig. 1. The structure of a feedforward neural network

A neuron can divide only linear separated areas. In order to select just one region in *n*-dimensional input space, more than $n + 1$ neurons should be used. If more input clusters should be selected, then the number of neurons in the input and hidden layers should be multiplied accordingly. If the number of neurons in the input and hidden layers is not limited, then all classification problems can be solved using the three layer network [51].

The feedforward neural network can be used for nonlinear transformation of a multidimensional input variable into a multidimensional output variable. But there is no satisfactory method to determine the appropriate number of neurons in the hidden layers.

In general, if more neurons are used, more complicated shapes can be mapped. But on the other hand, networks with too many neurons lose their ability for generalization.

So far no rigorous methods have been developed to analyze neural networks with multiple feedback. Researchers have already confirmed the power of these systems, but more research is needed to design and analyze recurrent networks.

2.2. Fuzzy Systems

The concept of fuzzy set was introduced by Lofti A. Zadeh, in 1965. According to Zadeh, this concept provides a starting point for building a parallel, but more general, conceptual framework to the framework of ordinary sets, providing an increased applicability in different fields [54].

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4. The Computational Modelling of Communities of Practice

A genetic algorithm represents an iterative process that applies genetic operators such as selection, crossover and mutation to a population of elements. The elements, called chromosomes, represent possible solutions to the problem. Each chromosome has associated a fitness value which quantifies its value as a possible solution. The mutation operator should work with groups or communities of agents rather than with individual agents. Thus, three general strategies could be followed: shifting a small number of agents between communities, merging two existing communities or dividing a community in two new communities. The crossover operator should transfer communities by inheritance, for instance to transfer communities from parents to offspring, so that the inherited communities remain valid, exhaustive and mutually disjoint.

Genetic clustering or partitioning algorithms include selection, crossover and mutation operators, adaptations of these operators and also some totally different operators. Adaptation is essential, well defined fitness functions and suitable operators are needed to encode potential solutions and to induce the evolution towards the optimal clustering.

The community formation problem is a partitioning problem, aiming to find good partitions of a set of agents into disjoint communities. The solution of a problem must satisfy various constraints, otherwise the solution is invalid. The objective of the grouping is to optimize the fitness function.

5.1. A Genetic Algorithm for Communities of Practice Network Formation

The encoding scheme focuses on transferring the genes into relevant groups or communities. This encoding scheme ensures both the transmission of the genes from one generation to the next and a better quality estimation of the regions they occupy in the search space.

In our case, a chromosome can be represented as a set of a number of mutually disjoint communities:

$$\{a_{i_1},...,a_{i_{k(1)}}\}...\{a_{i_{n-k(C)+1}},...,a_{i_n}\} \quad (1)$$

where $k(j)$, $j = 1, ..., C$, denotes the length of the community j (the number of agents in that community) and C the number of communities encoded in a chromosome.

The most important part is to find a measurement of the suitability of an agent i into the community c based on the execution of task j. We called this measurement *intelligence score* (Table 1). The intelligence score is denoted by μ_{ij}, where $0 \leq \mu_{ij} \leq 100$.

The intelligence scores measure agents' intelligence in executing the current tasks by forming communities, combining agents with the tasks based on their intelligence.

The overall performance of a community c in respect to a task j is defined by an *intelligence index*, denoted μ_j^c.

Table 1. The intelligence scores of n agents participating in p tasks

	Task 1	**…**	***Task j***	**…**	***Task p***
Agent 1	μ_{11}	…	μ_{1j}	…	μ_{1p}
…	…	…	…	…	…
Agent i	μ_{i1}	…	μ_{ij}	…	μ_{ip}
…	…	…	…	…	…
Agent n	μ_{n1}	…	μ_{nj}	…	μ_{np}

Communities for which the intelligence of completing the task j matches exactly or exceeds the maximum value of intelligence multiplied by the number of agents minus one and all the intelligence scores are higher than the threshold 50 are valued to 1. The ones for which the intelligence does not match the necessary capacity or for which at least one intelligence score is less than threshold 50 are valued to 0. The *intelligence index* has the form:

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Table 2. The intelligence scores of 3 communities with respect to 3 tasks after applying twice the mutation operator

	Task 1	***Task 2***	***Task 3***
{2,4,5}	*62+84+79=225*	*65+90+58=213*	*79+67+70=216*
{1,7}	*60+72=132*	*64+87=151*	*83+65=148*
{6,3}	*58+37=95*	*64+22=86*	*32+75=107*

Applying the mutation operator, we have obtained the following aggregate intelligence index for each community:

$$\mu_1^1 = 1, \mu_2^1 = 1, \mu_3^1 = 1 \rightarrow \mu^1 = 1 \cdot 1 \cdot 1 = 1$$

$$\mu_1^2 = 1, \mu_2^2 = 1, \mu_3^2 = 1 \rightarrow \mu^2 = 1 \cdot 1 \cdot 1 = 1$$

$$\mu_1^3 = 0, \mu_2^3 = 0, \mu_3^3 = 0 \rightarrow \mu^3 = 0 \cdot 0 \cdot 0 = 0$$

The intelligence index of the partitioning solution (partition of 7 agents in 3 communities) reaches 0.66.

$$f = (1 + 1 + 0) / 3 = 0.66$$

Therefore, the result we have obtained after applying twice the mutation operator is better than the previous results: the intelligence index of the partitioning solution has increased from 0.33 to 0.66. The example is conclusive: to maximize the value of the intelligence index and to determine the optimal structure of the community of practice is absolutely necessary to maintain the threshold 50.

3. Conclusion

Our research is based on the theoretical approaches presented in the literature, with emphasis on genetic algorithms applications. The work proposes a genetic algorithm for community formation based on intelligence. This approach introduces the concept of intelligence index, aiming to optimal partitions of a set of agents. The mechanism highlights the relevance of intelligence in community formation and reveals the need for such mechanisms that allow large group of professionals to make decisions better than single individuals. Using intelligence, our mechanism is able to maximize the value of the intelligence index and to determine the optimal structure of the community of practice.

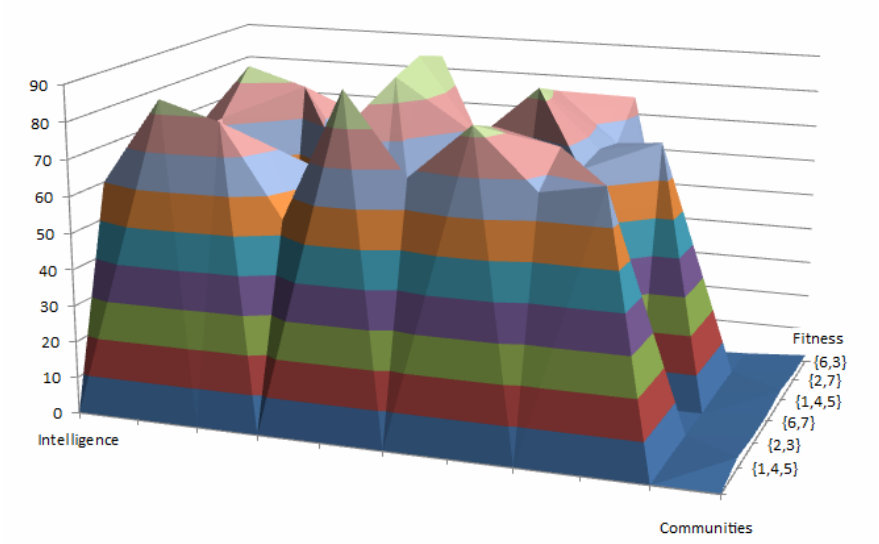

Fig. 2. Communities of practice structure optimization

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Chapter 5

Internet as a Platform for the Promotion of the Audiovisual Sector in Andalusia

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Abstract. The audiovisual sector is the key to the articulation that exists between culture and industry, with great potential both in the creation of job positions and in the volume of business it can generate. Global figures show that nations lacking a prosperous audiovisual sector are losing great opportunities in their overall development. In recent years, all over Spain –and particularly in Andalusia- institutions, companies and various organisations are conscious of this reality, and are making great improvements in the fields of production and commercialisation of Andalusia's audiovisual products. In this sense, the Internet is becoming the quintessential vehicle that allows the viewing of the work being developed in Andalusia nationally and internationally. This chapter goes through the more outstanding initiatives that – from the Internet – are permitting to bring to the world what Andalusia's audiovisual sector has the capacity to offer: The Regional Cultural Council, the Andalusia Audiovisual Foundation, *"Antena Media Andalucía"*, Andalusia Film Commission, festivals and Andalusia's Film Shows, as well as producers associations, production companies and Andalusia's local televisions associations, among many others.

Keywords: Audiovisual Industry, Audiovisual Product, Broadcasting, Internet, Online Marketing, Television

1. General Considerations

Some of the most important transformations of recent times have been generated in the communications sector and have to do with the way new technologies have incorporated themselves in all aspects of life, from the most daily ones to the more complex. Internet has propitiated the creation of a new communication scene and has extended in such a way that is capable of moulding certain ways of communications, such as habits and ways of consumption. These characteristics are promoting a radical change in the way businesses develop, eliminating commercial barriers and in consequence intensifying the competition. Nowadays practically all companies and commercial groups are forced to be present and to offer services on the Internet.

In this vein, it is undeniable, that the Internet possesses unbeatable attributes: it is a potentially open network (with no distinction of race, culture, age, etc), operates continuously, at all hours and all over the globe where there is an Internet connection, it is highly bi-media and multidirectional (allows any sender to be simultaneously sender and recipient of messages), enables swift communication, or real time, and it is a global medium, that does not possess geographical frontiers [1].

Furthermore, the Internet represents one of the fastest evolving human creations. It was an invention designed to interconnect computers and people especially in the IT (Information Technology) industry (and its application to the audiovisual media), has evolved at an exponential rate. Additionally, it has come to be one of the most distinctive examples of the benefits of sustainable investment in research and development. The access rate to the Internet has grown exponentially in recent years with an added plus: costs have maintained themselves to the extent that IT products have not become more expensive.

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Amid them is remarkable the "coordination and development of Andalusia's audiovisual sector", contemplated with other efforts like the development of information networks, the increment of digital educational contents, the development of Information and Communication Technologies (TIC for its Spanish acronym) favouring the creation of new markets (domotics. telesocial, logistics) and promoting digital networks for business cooperation in Andalusia's small and medium companies (Junta de Andalucía, 2004:96) [5].

Also the Cultural Council of the Junta de Andalucía is implementing different initiatives to strengthen and improve the cultural industries aiming to promote private involvement in activities of general interest. To this effect, a mechanism being developed is the Cultural Strategic Plan in Andalusia (PECA for its Spanish acronym) that is being drawn up with the collaboration of all parties from the diverse cultural scene and that is going to mark the coordinates where our region's cultural efforts will flow. Among the efforts derived from PECA, stands out the first Plan for the Andalusia's Cultural Industries that will count with 3.7 million euros [6].

The road to recognise the importance of developing the audiovisual sector in the region – which is reflected on these documents and plans – has being quite short. Since the disappearance of the Spanish television monopoly in the 80's, the audiovisual production market has expanded. The outlook has transformed itself notoriously with the outcome of regional channels, with the emergence of private and regional channels, and with cable and satellite broadcasting. In Andalusia, it is important to highlight two aspects. In first place, the role that the Industrial Public Agency of Andalusia's Television and Radio (RTVA for its Spanish acronym) and of the Radio and Television Broadcasting Services administered by the regional government (Junta de Andalucía), which law of creation dates from 1987. Two years later, in February 1989, Canal Sur starts its first and decisive broadcast that contributed notoriously to business development in the audiovisual sector. Lately, RTVA has diversified in new media: Canal Sur 2 (Second terrestrial television signal), Andalucía Televisión (commercial name for satellite broadcasting), Andalucía Información (currently Andalusia's Information Radio) and Canal Fiesta Radio.

In second place, it can be noted how in different government institutions of Andalusia's Autonomic Region it is increasingly popular the idea of a strong and competitive audiovisual sector that can contribute not only to the development of the region but also to their cultural making. As for the cultural scope, it underlies the idea, that if it does not promote an interlinked audiovisual industry capable of placing in the market competitive audiovisual products, a great potentiality will be lost in the region's overall development.

In this context the promotional efforts that have to take place from the administration and public institutions for the reinforcement and stimulus of an emerging sector with great perspectives, as is the audiovisual, considered by the "Junta de Andalucía" one of the strategic fields of the Autonomic Region gather more relevance. Along these lines can be mentioned Andalusia's lack of cohesion within the administration when articulating the efforts from the diverse institutions with competence to fulfil these actions, which put us in a scenario where the amplification of efforts on many occasions don't add value, but instead rest efficiency to some of the initiatives.

3. WEB Promotion Initiatives from the Andalusian Audiovisual Sector

Albeit that the basis of the success of any good promotion strategy consists in combining the tools from both equations, the traditional and the Web, with the emergence of Internet and all its potential it has been necessary to make a totally different approach than the one from traditional marketing.

The Internet has opened new opportunities to promotion for developing its goals. Through the Web it is possible to group clients in market segments creating customised advertising and, if not, a direct relationship with them. The Web's own working dynamics allows registering names, addresses, areas of interests, personal tastes, interests, etc. of clients going from a functional marketing to an integral marketing.

Next, we offer a tour through the most important promotion initiatives of Andalusia's audiovisual sector, focussing in their strategies through the WEB:

- The ***Cultural Council of the Junta de Andalucía*** [7] is the area of the Regional Government in charge of the cultural scene and also of the audiovisual sector. Among its sections there is one called Audiovisual Arts; some others can be highlighted, too, such as:
- Andalusian Film Shows. You can find all the circuits of Andalusia.
- Antena Media. An independent analysis of this section will be carried out later on.

- Andalusian Film Library. An independent analysis of this section will be carried out later on.
- Andalusian Photography Center.
- Virtual bookshop. It offers the possibility to find specific books about the audiovisual sector, although they cannot be downloaded:there are only references.
- Cultural Strategic Plan in Andalusia (PECA for its Spanish acronym). It has been developed by the Cultural Council of the Junta de Andalucía, that includes the audiovisual sector among its eight strategic areas. Four strategic objectives have been designed for the audiovisual sector [8].

With regard to announcements there is a search box on the top left corner of the web through which you can find "Funding and Subsidy" in the area of Audiovisual Arts. In the pull-down menu of "Announcements" there are also a lot of topics related to the audiovisual sector, even promotions.
In spite of the fact that there are databases of other areas such as music and flamenco, there isn´t any specific database of the audiovisual sector. Nevertheless, in the area of "Audiovisual Arts" there is an informative note about the Audiovisual Short Films Catalogue.
To sum up, it can be considered that there is a promotion of announcements regarding the audiovisual sector. However, the promotion of products is carried out by other organizations that are run by the Cultural Council of the Autonomous Government. These organizations have their own website, as will be explained through this article. The promotion of non-Audiovisual products through the Audiovisual Film Circuit must be highlighted.

Antena Media is the Public Company for the Management of Cultural Programmes. It is run by the Cultural Council of the Junta de Andalucía. Some of the sections of this Website related to the promotion of the audiovisual sector can be highlighted:

- Call for entries.
- Results.
- Training.
- News.
- Agenda.
- Links:
  - Andalusian books. Related to audiovisual topics.
  - Andalusian associations.

Fig. 1. Website www.antenamediaandalucia.com (access 20/02/2011)

With regard to calls for entries, they are addressed to producers, distributors, festival organizers, showers, European companies and organizations. They can find detailed information and full texts from the

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Council of the *Junta de Andalucía*. This portal includes the Andalusian audiovisual productions that can also be found in the Catalogue of Audiovisual Productions which has been published by the AVA Foundation since 2001. Avandalus also includes an International Co-Production section, currently featuring 35-co-production projects. The production companies are able to find partners to co-fund their projects. Avandalus and the annual Catalogues of Audiovisual Productions of Andalusia are promoted through the most important national and international markets with the help of Extenda, ICEX and FAPAE, as well as some companies from the audiovisual sector. In that way, Andalusian companies and productions are promoted in these sectorial events.

- The search tool of the Andalusian Audiovisual Guide: It is also hosted in the homepage of the AVA Foundation. This tool allows people find more than three hundred companies devoted to the audiovisual sector in Andalusia. It is considered as an enquiry service by companies and is also used to find a job by those people from the audiovisual sector who are desemployed or want to get a better job.

The figures speak themselves in terms of the role of the AVA Foundation in the online promotion of the Andalusian audiovisual sector. The Portal of International Promotion, Avandalus, in April 2011 the number of productions listed in the "Audiovisual Productions" section rose by 26,33% to over 673 Andalusian audiovisual productions, thanks to the contribution of 176 Andalusian production companies represented [9].

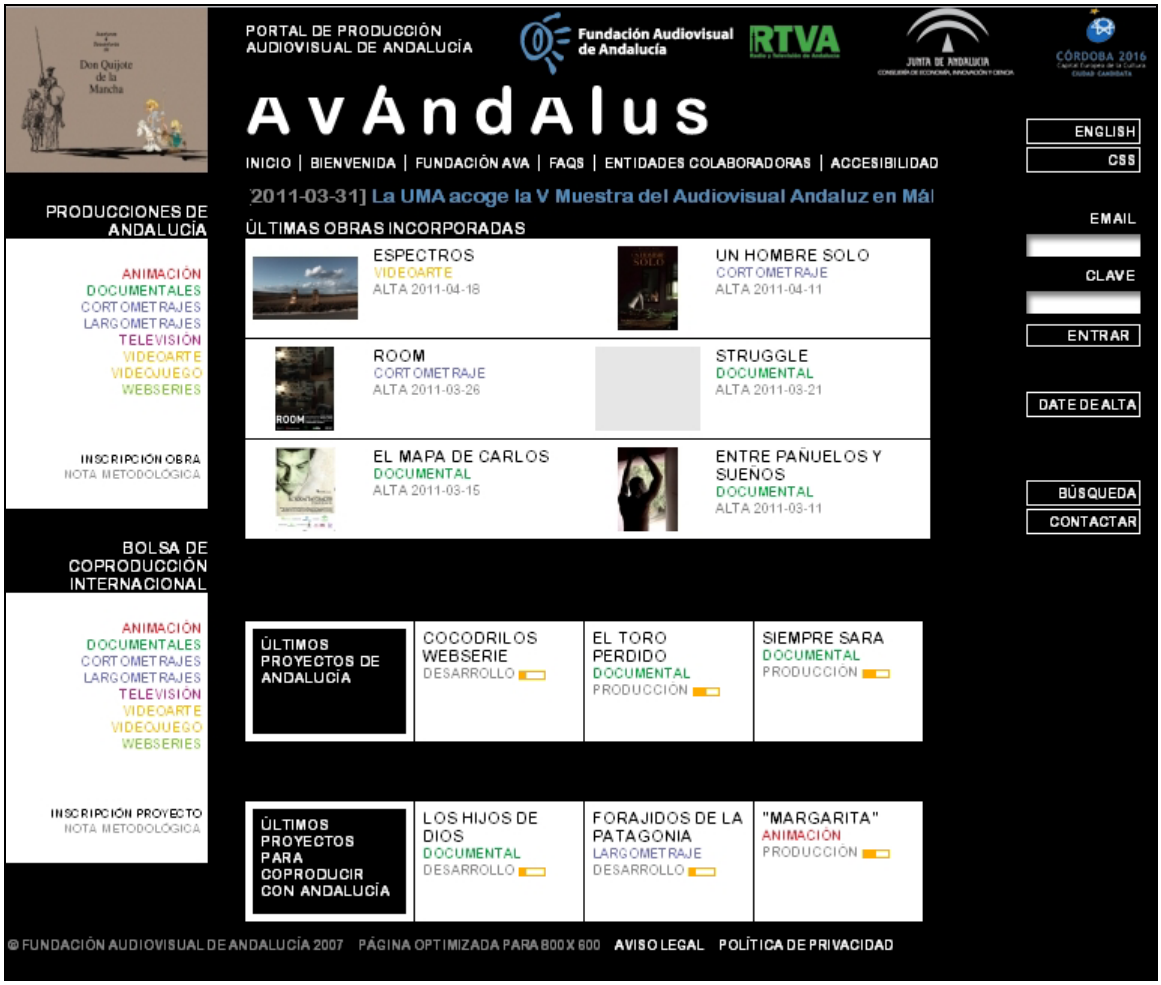

Fig. 7. Website www.avandalus.org (access 04/04/2011)

When it was launched in May 2007, the Portal contained 277 productions made since 2002, plus the information published in the catalogues for 2004, 2005, 2006 and 2007: namely, production company details, synopsis, cast and crew, stills and trailers.


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Other interesting initiative is **Animacor** [13]. It is an association for the Development of the Computer Animation Companies in Cordoba and Andalusia. There are important sections in its website such as:

- Training.
- Promotion: There is some information about meetings, conferences, etc.
- Audiovisual production: There is a wide list of Andalusian animation production companies.
- News.

There is a section devoted to announcements of training courses and meetings concerning the audiovisual sector. The promotion area plays and important role trying to inform professionals.

Fig. 12. Website www.pecaa.es (access 23/02/2011)

To complete this analysis of the promotion of Andalusian audiovisual products through the Internet, Andalusian film festivals have to be taken into account, since they are a way of showing products and professsionals:

Almería

- International Short Movie Festival "Andalucía in Short". www.almeriaencorto.es

Cádiz

- Atlantic Film Festival "Alcances". www.alcances.org
- International Independent Documentaries Festival. www.cadizdoc.org

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Chapter 6

Immersion in Computer Games

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Abstract. With the ever-increasing popularity of games, research in the area has progressed and this chapter will give an up-to-date summary of the kind and depth of research available at present on the impact of Role-Playing Games and the individuals who are involved with them. One area in which research is emerging as particularly interesting is in the concept of "immersion." Immersion is commonly understood as a "state of being deeply engaged or involved," although immersion from the point of view of an online gamer is a much richer concept. However, even though this immersion may not be well understood, it is recognised as important and it has become common in recent years for game designers to characterise their games as "immersive." Immersion has been described as "key to a good gaming experience" and it is said to be one of the main motivational factors for players when choosing a game. So what is "immersion?" This chapter will examine recent literature and present findings from the way game players talk about it, focussing primarily on particular incidences of immersive response rather than the inherent aspects of a particular game - hardware or software - which can cause an immersive experience.

Keywords: Computer Games, Immersion, Gamers, Role-Playing, Story-Telling, Realism

1. Introduction

Although Immersion is a general psychological phenomenon, this review starts by looking at the literature which attempts to define the essential characteristics of a Role-Playing Game (RPG), which is the setting in which most contemporary research on Immersion has been done – and of course, the role-playing gamer, the active participant in these activities.

In Section 3, we look at the nature of Immersion. It emerges that Immersion is usually considered to be a subjective internal response on the part of the gamer, which implies that one should take care to distinguish between features of games which may give rise to an immersive response, and the fact that an immersive response may occur in an individual playing the game – or it may not!

Section 4 looks at definitions of the Immersive Response, which is seen as an outcome of a decision to involve oneself within a game. We review some concepts which are related to the Immersive Response, and distinguish between an Immersive Response in an individual who is playing a game, and the response of an individual who is put into an alternative (perhaps virtual) reality. The degree of similarity to reality is not a determining factor in the Immersive Response.

The more theoretical and a priori accounts given by commentators are contrasted in Section 5, with the results of a qualitative study on the experiences and views of 38 experienced gamers. Two findings emerge from this study. One is a consensual definition of Immersion in the language of the gamers themselves. This emphasises the separateness of the player and the game, and contrasts this with the decision of the gamer to identify with or adopt aspects of the game. Identification occurs when an individual associates himself with the attributes or qualities of another, perhaps including their thoughts, feelings, actions and beliefs. Adoption, in this case, involves taking on these attributes and qualities as ones own, experiencing

them as if they were one's own. At the same time, the study also suggested a two-fold distinction between types of Immersion, reinforcing the opinions of some commentators who have also proposed this kind of distinction.

The issues of identification and separateness are taken up in the final section where opinions on harnessing Immersion for the good, and the possible deleterious effects of the Immersive Response are reviewed. We conclude that the Immersive Response is a real, psychological phenomenon that occurs in the context of Role Playing Games, and possibly also, as we have characterised it, beyond. Although, thus far, the strength of this subjective response has eluded measurement, we believe that this is a viable research direction; indeed a necessary one. The Immersive Response is the result of a voluntary act on the part of a gamer to involve themselves in a game. It is neither good nor bad in itself, and although it may be harnessed for other purposes, the primary subjective importance of it is to the individual experiencing it.

2. Games and Gamers

Computer games and the infrastructure based around the production and sale of these games are a multi-billion dollar industry. According to the NPD Group [1] the industry generated between $15.4 and $15.6 billion from games in 2010, as compared to $11.7 billion generated from the sale of games in 2008 [2]. It is clear that the industry is rapidly growing, as indicated by the fact that 67% of households in the United States of America have either a console or a PC for games usage, or both [3]. The genre of Role-Playing Games (RPG) was found to account for almost 6% of all video games sales in 2009 [1], up from 5.4% in 2008 [3] and RPGs account for 13.9% [1] of global computer games sales, and 19.6% of computer games sales in the USA [3].

Although Role-Playing Games originally emerged as table-top, pen and paper format games, they have expanded and with the advent of the internet this expansion has accelerated. Similarly, internet use has increased exponentially in recent times. Today, 1.97 billion individuals have access to the internet [4], up from 360 million in the year 2000. Online Role-Playing Games are played by millions of individuals each day. With a multitude of games available to choose from, Blizzard Entertainment [5] claim that an estimated 12 million individuals play the most popular online Role-Playing Game, *World of Warcraft.* So, what is a Role-Playing Game, and who are these people contributing to the industry?

2.1 What is a Role Playing Game?

Role-Playing Games (RPGs) are a genre of games in which the player takes on the role of a character and controls that character within a setting. RPGs came into being in the 1970s, developing from a background of strategy-based war-games and works of fantasy-based fiction such as Lord of the Rings [6, 7, 8]. The "world's first role-playing game" [7] was Gygax & Arneson's *Dungeons & Dragons* [9], a tabletop, pen and paper based game involving dice (henceforth, *D&D*). In the years since it was first published, *D&D* has inspired the release of numerous other Role-Playing Games which vary widely in scope, setting and theme. An indication of the success of *D&D* is the fact that the original game itself is still going strong, and currently (in 2011) in its fourth edition.

Role-Playing Games have expanded widely over the last four decades in terms of availability, variety, sophistication and participation. Beginning as a hobby and a source of entertainment, RPGs are now employed for the purposes of training, educational, skills and strategy development, and to develop and enhance teamwork and collaboration [10, 11, 12].

As their purpose has expanded, the format of RPGs has also evolved, from the original tabletop format into sophisticated graphically and auditorily enhanced formats. Role-Playing Games have advanced from the table to Live Action Role-Playing, from purely text based computer programs such as MUDs (Multi-User Dungeons) to much more sophisticated single-player and online RPGs and MMORPGS (Massively Multiplayer Online Role-Playing Games) on the computer with spectacular Graphical User Interfaces, yet the original tabletop format RPG remains popular. Tychsen et al [11] found that the original-style tabletop RPG still held more enjoyment for its players than the modern types.

Despite their undeniable popularity and despite attempts in the academic community to produce a formal definition of the Role-Playing Game [13], there has yet to emerge an agreed classification. This is due, in no small part, to the plethora of types of games and systems that have evolved. The layman's definition of a Role-playing Game is "a game in which players take on the roles of imaginary characters,

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completes a challenge of some type, but conversely experience negative feelings such as guilt or remorse if their character's action brought about an undesirable outcome.

Occasionally, when involved in a game in which players are deeply immersed, individuals fail to notice the world around them, becoming unaware of people talking to them, or of the passage of time and they become "cut off from reality" [42]. This is the immersive response. The immersive response has, on occasion, been seen to have the following features: lack of awareness of time, lack of awareness of the real world and deep involvement with a sense of actually being within the task environment –there is a definite sense of real world disassociation [53].

4. Definitions of Immersion

Games designers have, of late, begun to characterise their games as "immersive", this despite there being, as yet, no accepted definition of the concept. Immersion is seen as important and is often spoken about in online gaming circles, yet exactly what immersion is, remains elusive. Jennett et al. speak for many when they characterise Immersion as being "key to a good gaming experience" [45].

4.1 Degree of Involvement

The dictionary defines immersion as a "state of being deeply engaged or involved" or as "concentrating on one course of instruction, subject, or project to the exclusion of all others for several days or weeks; intensive" (Dictionary.com). The first definition can easily be applied to Role-Playing Games where an individual attempts to become immersed in a role, while the second definition best characterises the overall immersive experience which can come from playing MMORPGS although it is also applicable to other types of games in some situations (i.e., Strategy games, first-person shooters).

In the case of Role-Playing Games, immersion implies the level of involvement one has with the character/role that an individual has assumed. Empathising with a character is one level of engagement with a role – both in a game, and as an actor or even during passive pursuits such as reading a story or watching a film – but some individuals make a conscious effort to embody their character. When achieved, this experience is described as "immersive". Brown & Cairns [42] define immersion, simply, as "the degree of involvement with a game", while Grimshaw [54] describes the possibility that immersion is "supposed to be primarily perceptual and is manifested by a shift of perceptual focus, from an awareness of 'being in and part of' reality to 'being in and part of' virtuality such that, in the ideal case, virtuality becomes substituted for reality."

As Bartle mentioned in a comment on an online post, there is a difference in immersion between tabletop games and online games. In a tabletop game, we see the player first and then experience the character through the player's actions. In online worlds, players see the character first and experience the player of this character through his character's actions.

4.2 Can immersion be measured?

Attempts have been made to quantify immersion as experienced in computer games, both online and offline, and some methods in this vein have been tested. While these do not necessarily apply directly to the experience of immersion in playing a role, they do apply to the general experience of the immersive response.

A group of European Live Action Role-Players (n=40) were asked the question: *"Do you believe it is possible to identify so strongly with one's character that it becomes one's primary identity (i.e. does, in your opinion, "character immersion" exist)?"* [55]. 82.9% of answers were positive, with 93.8% of these stating that they had experienced immersion themselves.

Immersion and Engagement are concepts which are seen, by some, to apply separately to different aspects of computer games [56]. In this case, Immersion itself is believed to apply to the fantasy and narrative aspects of a game, while Engagement is seen as relating to the game play and challenges which arise within this play yet outside the narrative.


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However, a number of studies have attempted to split immersion into distinct types which do not lie along a continuum, for example, Mental and Physical immersion [74], Diegetic and Situated Immersion [84], Sensory, Challenge-Based and Imaginative Immersion [85], Diegetic and Non-Diegetic Immersion [56], Perceptual and Psychological Immersion [86] and Sensory-Motoric, Cognitive and Emotional Immersion [87].

These types of immersion do not necessarily encompass a higher level of immersive response than the other. The current results fit into this kind of approach: the strength of the Cognitive – Visceral distinction is that it comes from the words used by gamers themselves.

6. Immersion: Identification and Separateness

The power of immersive experiences has led, of course, to attempts to harness Role Playing for purposes of training and education. This same power gives rise to misgivings about the effects of Role Playing on the people involved. The related phenomena of *separateness* and *identification with* may raise questions as to the efficacy of Role Playing for education and its supposed ill-effects. We find that these questions are shared by many researchers and commentators.

6.1 Immersive Education

It is suggested from theory that "immersion is not inherently transformative" [88]. In other words, immersion does not necessarily involve "becoming critically aware of one's own tacit assumptions and expectations and those of others and assessing their relevance for making an interpretation" [89]. There is no clear-cut idea of what immersion stands to bring to education and indeed, it may be the opposite of learning.

If students have expectations before they engage in an online immersive experience such as in Second Life, they may look at their immersive experience from a stance of dual consciousness – in which they are not fully immersed but always thinking about grades for the class or how they will be marked depending on their online behaviour or what the other students are like in "real life" [88].

Salen and Zimmerman [78] believe that there is a dual nature and a double consciousness to play. In this state of dual consciousness, the player manipulates her avatar, yet she is constantly aware that the character is merely an artificial construct. The dual consciousness is not necessarily a negative experience; it allows for a "multi-layered experience" and makes for richer play.

Boocock and Schild [90], disagree with the possibility that the stance of role-playing and that of strategic analysis can be compatible behaviours, stating that "Role-playing and strategic analysis, rather than complementing each other, turn out to be incompatible behaviours, one requires immersion and loss of perspective, the other requires stepping back and objectivity."

If a user has to take a step back from an immersive experience in order to critically evaluate something, and in order to pay another type of attention, then immersion may be seen to play a negative role in education in some cases as without critical thought and the possibility of "stepping back", the student may be losing some of the educational benefits.

Frasca [91] also makes a differentiation between the passive pleasures of immersion and conscious, active participation. Sandford and Madill [92] agree and maintain that academics should "problematize the seamless qualities of video game play and creation and create spaces where players can step back from the powerful, immersive qualities of game play and examine values."

Immersion occurs when one is fully absorbed but sometimes when it is necessary to take a step back and consciously pay attention, this is termed *engagement*. Game playing can involve many shifts in attention, and neither level of attention should be seen as being "better" than the other. In this context, Carr ([86]; in [58]) cautions against placing a higher value on either engagement or immersion: "the two states are complementary" and believes that is what makes games compelling "because it allows the player to constantly move between the two."

While immersion is used in some educational contexts, it may be wrong to assume that immersion in itself is beneficial for learning purposes. However, there is evidence that there is a causal link between time spent learning and student achievement, and when more immersed, students may be likely to spend more time learning [93].


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Chapter 7

Video Games: Towards Total Interaction

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Abstract. Specific keys to understand, briefly, the evolution of the video game industry towards total interaction. The human body as a "console" in game development: wireless and freedom of movement. The player acts as an active element in digital entertainment. We present the evolution of the hardware and the software in the video games industry troughout the 20th and 21st centuries. The main aspects are presented from the user's point of view, with a special stress on the aspects of cognitive psychology, the communication media and ergonomics.

Keywords: Video Games, Interaction, Ergonomics, Mass Communication, Digital Entertainment, Hardware, Gamification

1. Introduction

In 1995, Sony released the Playstation, a new concept that changed the game market to this day: sophisticated stories and quality graphics for all ages without the need to play in expensive home computers.

Space Invaders and Asteroids were far back in time, and much more Pong, in 1973 (Arcade Games). The 1980s showed an expansion of playing through homes, increasingly mixing the programmer and the designer in his creation. Nowadays, "the average age of the game player is around 30, and rising slowly all the time" [1]: it's no longer a child's play. M-rated games (Mature Rated Games) are increasing among adults and today; specifically, "the average age of a video game player is a little older than you might suspect; it's 34" [2] (fig. 1, data for 2010); by gender: 60% of players are male.

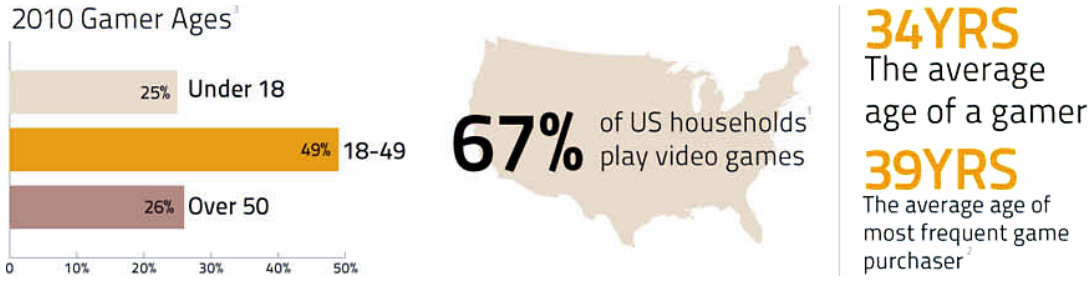

Fig. 1. The average age of a video game player –http://www.theatlantic.com

If we attend to the type of the console, there is data which highlights the importance of the Wii among female players, with an 80% (2010), a much higher participation than in the rest of the major consoles (Xbox 360, PS3). Meanwhile, the male players show clearly a more equitable distribution (figure 2, data for 2008).

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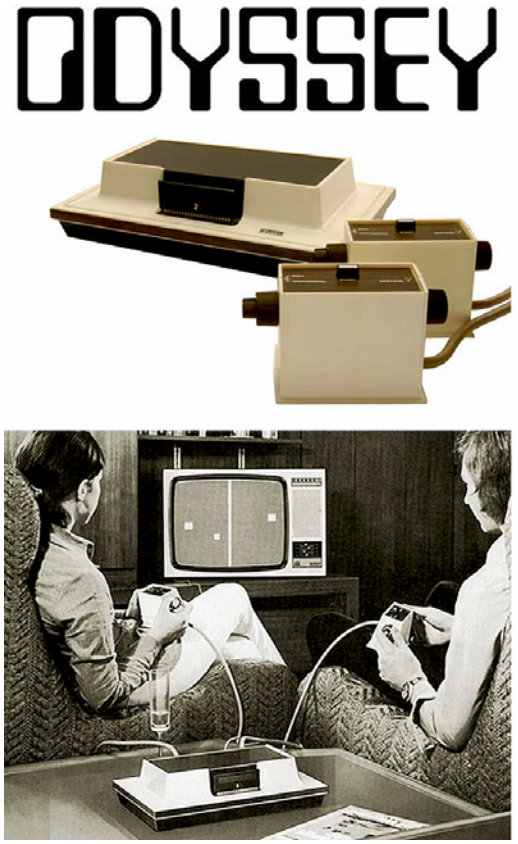

Fig. 5. Magnavox Odyssey, the first console in history (1972) –first generation, http://blogs.vandal.net

Fig. 6. Wii U (Nintendo), launch in 2012 – eighth generation, http://www.computerandvideogames.com

However, Flurry [12], the mobile research firm, published a study revealing that in 2010 in the U.S. mobile playing revenue–iPhone, smartphones, not to mention iPad with the online game *World of Warcraft* or the Web *Zynga*– was transferred to portable consoles: both Nintendo DS and PSP (although it had no effect on home consoles yet) [13]. But that is the future: mobile phones and tablet PCs. "Over 90% of smartphone users plays a mobile game at least once a week" [14] and "global mobile game market is expected to reach $7.3 billion in 2011" [15]; adding to this that these kinds of interactive support are a good tool to kill time while commuting on the subway, trains, or waiting, thanks to their portability and small size.

To summarize the evolution to the present day, F. Dille establishes some important events in mass culture, to which I add information about their origin:

- Radio: Orson Welles "H.G. *Wells's War of the Worlds*" (1938): it created a great social alarm, causing scenes of panic among the citizens of New Jersey and New York. Without a doubt, this relay highlighted the ingenuity of a public that television did not know yet.
- Comic strip: graphic storytelling (*The Yellow Kid*) and superheroes. "Graphic narrative" (Will Eisner), with great impact on advertising, design, fashion and, of course, films. In the modern sense, it dates back to the 17th and 18th centuries, thanks to the invention of the printing press, which allowed movable types and set up a separation between images and words.
- Pulp magazines and novels: from 1896 up through the 1950s, "the pulps" or "pulp fiction" have always been considered as inexpensive fiction magazines with large print runs (mass consumption).
- Films: motion picture using animation techniques or visual effects. Considered to be an important, popular entertainment and a powerful method for educating –or indoctrinating– citizens. The world's earliest film was produced using a motion picture camera: *Roundhay Garden Scene* (Louis Le Prince, 1888).
- Television. The BBC (United Kingdom) made the first public television broadcasts in 1927, followed by the CBS and NBC (U.S.) in 1930.

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Fig. 9. Kinect (Xbox 360), seventh generation –http://www.entrebits.com

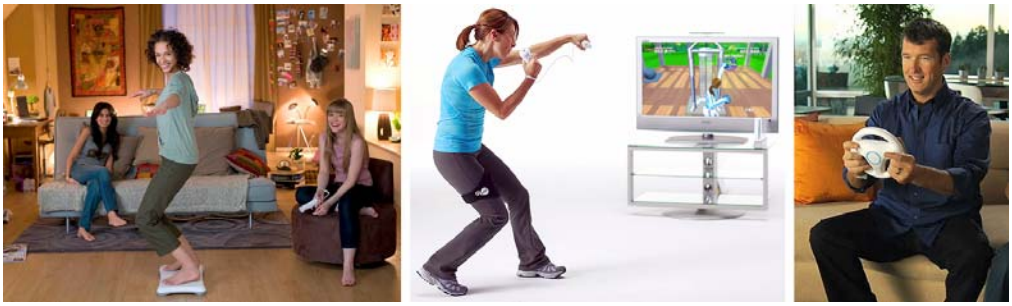

Fig. 10. Wii (Nintendo), seventh generation –From left to right: http://www.playwiibox.com, http://www.eslaultima.com, http://excitebotstrickracing.com

At University of Central Florida, we can see new researches on technological innovations, allowing great changes in videogames development [22]. The concept of 3D Gesture Recognition gains momentum with Wii Remote coupled with the angular velocity-sensible Nintendo Wii MotionPlus, together with previous studies on virtual reality and ergonomics of the user with the interface. Full Body Navigation Interfaces, RealDance (exploring spatial 3D interaction for dance-based playing and instruction) and Stereo and Tracking In Video Games [23, 24] (3D stereo as well as head and hand tracking improve a player's ability to learn to play video games), are some of the researches that are being applied to video game development (figure 11).

Fig. 11. New researches applied to video games –http://www.eecs.ucf.edu

On the other hand, John Underkoffler, a researcher at the MIT, "has been working on applying gesture recognition to the manipulation of information" [24]. He has also founded Oblong, "with the idea of revolutionizing the world of human environment interface". A forward thinking about what our daily life should be with technology:

> *The era of one human, one mouse, one screen, one machine is giving way to what's next: multiple participants, working in proximity and remotely, using a groundbreaking spatial interface to control applications and data spread across every display [25, 26].*

The gspeak platform (spatial operating environment, figure 12), through the augmented reality, is in use


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Chapter 8

Technification and Fashion Factor into Informatics Developments

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Abstract. We are frequently finding problems coming from two different aspects into the informatics developments. These are: a) the tendency of the companies operations to depend entirely on technology and, b) the development of informatics projects strictly under a determined methodology. This chapter identifies them with clear examples and offers a proposal to solve or at least diminish them with no need of acquiring additional knowledge. It will also result in giving better solutions to the companies, improving the comprehension between the informatics professionals of different periods.

Keywords: Technification, Fashion Factor, Informatics, Methodology

1. Introduction

The undeniable and continuing trend towards technification is logical and desirable, but unfortunately this leads to a dehumanization of the enterprises, and often to a disregard for their customers.

The methodologies for the development of informatics products have been changing over the years. Without specifying, it is our intention to express the strengths and weaknesses of them, but above all one of the latter, which we call the "fashion" factor.

As we are convinced that it would not be adequate to speak critically of something, whatever it is, and would not be involved with proposals, we are writing here those that we consider to be appropriate.

2. The Experience Over Time

Those that have been many years tied to the informatics profession, are able to say that the word "informatics" was not known in the past and those who worked within it were appointed as experts or professionals in computing. We prefer to use the new name, which in its broadest sense refers to information processing, with or without the use of computers.

What began as a very attractive means of life in the 1960s, into which the personal value was endorsed by the fitness linked to learning through various means, primarily through well known multinational companies and the successful application of the acquired knowledge, ended up being a profession with a university degree and adding what many always loved, teaching and transferring knowledge and experience to students for a lot of years, feeling the joy of seeing many of them become successful professionals.

3. Technification

We reject intellectually all of those professionals who had put the computer and the technique ahead of logic and the operational needs of the companies that they serve and advice, resulting so much more

frequently than desired in the unpleasant announcement “no system available”, with the usual loss of time and money for everyone.

We are convinced that the computerized environments called “non stop” do not exist. At some time and under special circumstances, more or less frequently, they all fall, regardless of UPS (Uninterruptible Power Supply), generators, alternate servers and any other type of technology involved. Proofs and examples of this abound and we doubt that someone who lives in a modern branded background has not been impaired in this regard.

We will exemplify the two preceding paragraphs with one of many own personal experiences. We have recently gone to one of the powerful multinational companies operating cell phones in Argentina, having the intention of seeing the devices that were available to replace one of a deficient performance. When we reached the “customer service” desk we expressed our wish that someone would show us models in stock, obtaining as a surprising answer that they could not do that. Why?, “no system available”. As the devices were physically there and the staff members were also sitting at their desks, we were not able to find some sanity to the response and asked if the “system” was needed for someone to show us what we wanted to see. Answer: “We must register your name”. Our offer to write it on a paper to be registered when the system came back to work met with a friendly but incredibly negative. The “system” outperformed the logic and showed us how sometimes the automation and the lack of alternative simple procedures cloud a mind and reduce the ability of business.

Imagination, logic, knowledge, design and testing of appropriate procedures and will to satisfy the customer, providing uninterrupted operation of business should be some of the most important premises of informatics professionals. There are always alternatives to critical situations and they should certainly be provided. This is not a mere statement, thus we have been successfully implemented the method in our working life and we never get tired of proclaiming it among our students.

4. Fashion Factor

Over the years, renowned authors have developed successful techniques and methodologies for building informatics systems and products [1, 2]. From traditional methodologies, through the structured ones and reaching the object-oriented, to which the reader may like to add other steps, we have gone through various forms of design, development and documentation.

Smart professionals introduced variants in each of them, having the good intention of improving their performance and certainly many did so. But into the variety of methodologies and versions lies, at least in our opinion, one of the most serious problems of the informatics developments, which is the generational lack of communication between the professionals in this speciality. Those who knew, used and documented developments under a methodology got an efficient communication only with those who knew it, but broke ties with past and future methodologies. Stages, forms, notations were in general changing and certainly improving performances, but at the same time imposing “fashions” which, like all of them, have temporary validity. For informatics developments, which are always required to have maintenance, the past documentations become less comprehensible, so this make the work difficult, except if taking the extra effort to study them.

It is true that all informatics development has limited life, but is it possible to establish how much? There are statistical studies about it, but as happens with all of them, the most frequent values tend to be the results. However there are successful developments that continue being like this, transcending the statistical time and, still considering them as obsolete, they are efficient and provide excellent performance. Who dares to fix a limit? We remember when learning the COBOL (COmmon Business-Oriented Language) programming language in the 1960s. Everything suggests that it has been forgotten, with no doubt improved and become into obsolete. Surely all of this is true, but even we have recently seen publications in newspapers asking for programmers for this language. It is valid to repeat, who dares to fix a limit?

To talk about a programming language has only served as an example for the changes that occurred in informatics and has facilitated the introduction to the main theme of this point, the “fashions” in the methodologies.

Imagine a succession of rooms, one beside the other, with a single entrance door as the only connection to the outside and a window from one to another room. Each one of them holds a different methodology, from the oldest to the newest one, and building rooms as each methodology appears.

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things to restore its operating condition will be a motive to write Emergency Handbooks, which we mention but do not describe here because it is not subject of this paper.

5.2 Regarding "Fashion" Factor

If we think about how we should make an informatics development and, in a much broader sense, solve a problem, we will recognize the traditional and logical steps, regardless of any technique or methodology. With varying degrees of openness and having in mind that a few points can be considered exclusive to a relationship of an independent professional with a client (which changes its shape but do not invalidate it), they are:

- We have a problem and want to solve it
  - Identify it and give it a name
- We internalize the details
  - Type of project
  - Objectives
  - Limits and scope
  - Place for it to be realized
  - Time constraints
  - Resources constraints
- We plan different alternatives
  - Select one of the planned alternatives
  - Identify available resources to use
  - Make a schedule
  - Certain costs (budget) to agree with the client
- We develop the solution
  - Chose methodology
  - Set up checkpoints
  - We test it
  - Obtain customer approval or adjust
  - Document it
- We install the solution
  - Train client's staff
  - Work with the client over a period of time
  - Leave the project in hands of customers
- Perform maintenance
  - Do this by a subsequent contract
  - Train as needed, client's IT staff

The ways in which all of these factors are represented varies from a methodology to a different one, with different notations and symbols, different sections and language and bigger or lower degree of relationship with the later coding. In all of this is just the root of the problems described as "fashion".

If in any way it appears that we intend to be negative about methodological advances, well on the contrary we welcome them because they are permanent contributions deriving from hard work, teams work performance and long time of research. On the contrary, our proposal is simple and we think that certainly applies to any past or future methodology. We have proven it as effective and, more importantly, it does not require any additional learning.

We have at hand what we learned from our early life, which is writing. All of those who apply the methodology they know, also know without a doubt, how to write. The proposal is to spend additional time in the making of each piece of the informatics documents, inserting brief descriptive of what they mean. For those who drew up the documentation, working with known methodology, this may be superfluous, but to facilitate the understanding of those who do not know such methodology should largely justify the time devoted to this work. This is in our opinion, a fair test of competence and professional integrity.


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Chapter 9

A Security Model for Functional Active Objects with an Implementation in Erlang

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Abstract. In this chapter we describe a language based security model for distributed computing based on functional active objects intended to build a basis for Distributed Information Flow Control (DIFC) and contrast it to earlier models in particular the prominent model by Myers and Liskov. We carefully motivate the assumptions concerning secure communication in distributed object-oriented scenarios, show that they naturally lead to *futures* as the security abstraction of object-oriented message passing, and motivate our assumptions by an example. Finally, the stepping stones to a formal foundation of the model are summarized: the notion of visibility, the security classes, and a definition of information-flow security for distributed active objects. This work further describes how the concept can be realized using the novel tool box Erlang Active Objects for functional active objects. We introduce Erlang and Erlang Active Objects, and show how our model of decentralized multilateral security can be implemented by a simple algorithm for a dynamic security check for Erlang Active Objects.

Keywords: Distributed Systems, Security, Erlang Active Objects

1. Introduction

A simple retrospective view into security history shows that classical security models have problems with distributed communicating systems. The high-watermark principle [1] was a security model prior to the Bell-La Padula and other Multi-Level Security (MLS) systems [2]. In this system, objects would just be assigned higher security classes whenever a subject of a higher level interacted with them. Eventually, as a consequence of the lifting to higher classes, the two entities end up on the same level. The problem that has been encountered with the high watermark-principle is that entities eventually all swim up and the system as a whole becomes unusable for anyone of lower security classes. The problem could not be resolved in Bell-LaPadula or any other MLS model either, since it is inherent in communication combined with hierarchical security classes where information may only flow up: any remote computation will always consist of a request and a reply. To request something we need to write, so the object that requests must be in a lower or equal security class than the object it requests from (no-write-down). The corresponding reply will also need to write. But the second write is now in the inverse direction, hence the replying object must be lower or equal than the requesting. As a result of this catch-22 situation [3][1], both, requesting and replying objects must be in the same security class which is a trivial scenario rendering the hierarchy idea useless.

In this work we advocate the use of *futures* as a distributed communication model for object-oriented systems to overcome the catch-22. A future is a promise to the reply of a method call enabling

[1] Joseph Heller's famous WWII novel coined this phrase for situations where mutual dependency causes paradoxical situations.

asynchronous computation. However, a future also binds request and reply into one unit and therefore builds the natural abstraction of method passing in catch-22 situations.

Based on this abstraction, we present a new approach to a security model for distributed systems that is a simplification of the widely adopted model for Distributed Information Flow Control (DIFC) [4]. The DIFC has recently become very popular again, for instance [6], because distributed software applications and networks grow together. However, researchers usually apply Myers' original security model unchanged to implement information flow control on networked systems although many questions remain unanswered by it. For example, how can we guarantee that adversaries in remote sites respect the DIFC policy?

The simplification we propose uses the concept of RESTful web-services [6] allowing an abstraction to stateless active object-based services. We can thus use the calculus of functional distributed objects ASP_{fun} [7] as a formal basis for the model. The contribution of this paper is a formal model for distributed security for functional active objects. After exploring some situations that explain implicit flows (Section 2) and illustrating them on the distributed scenario of a service example (Section 3), we introduce the new security model abstractly by defining visibility and security classification (Section 4). The model presented in this paper simplifies the formal definition of noninterference presented in an earlier paper [8] by using the notion of visibility. The proof of concept of the model is then provided by an implementation in Erlang Active Objects [9], an implementation of functional active objects in Erlang [10] (Section 5). We finally compare and contrast our approach to other major works and give a short outlook (Section 6).

2. Information Flow Control for Functional Active Objects

Language based security uses separation of concern to master security issues. In the following we characterize our view on this discipline elaborating the security assumptions made. One important design principle for the design of secure systems is the establishment of a security perimeter [11]. The security design is then centered on the question of how we can prevent an attacker from getting access to a layer below our protection mechanism. If we assume the security perimeter to be an operating system that supports a security-enhanced language, we can assume that the attacker is bound to the means provided by this language. In other words, the attacker cannot get to the layer below the language. For example, he cannot compromise the run-time system and gaining information can only be performed using methods provided by the language. This is the assumption that is taken in language based security – although it is usually not spelled out very clearly since it is a seemingly strong assumption. However, without this assumption we cannot hope to define a decent protection mechanism. In particular considering the above explained catch-22, even within this security perimeter given by language based security, it is still questionable whether we can arrive at a useful model for security of distributed systems.

Our model is a simplified DIFC model[2]. We take the view of a multilateral security world, in which there is not one hierarchical security hierarchy as in the classical Bell-LaPadula or multi-level security (MLS) models [2] but instead all principals have their private space that is not accessible by anyone; all principals have, however, access to a common public domain. The situation is most simply expressed graphically as in figure 1.

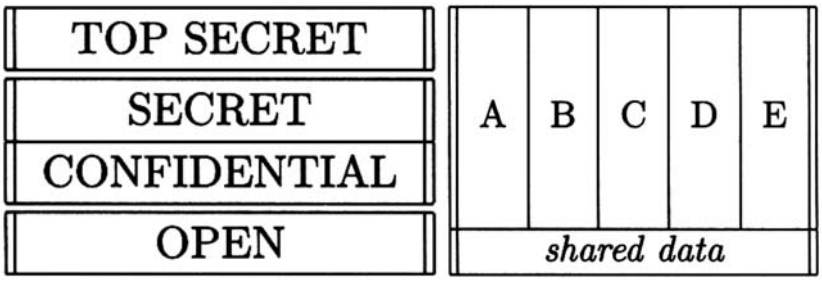

Fig. 1. Multi-level security versus multilateral security [12]

More concretely, we model distributed systems as a set of active objects that have unique identities and possess a set of public methods providing services to other active objects.

[2] For an in depth comparison of the new proposition to the classical model see Section 5.

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4. Security Model

Based on the observation of information flows in object-oriented models we can now define visibility in a functional active object model. Visibility is the pillar on which our security model is based.

4.1 Visibility and Security Classes

Visibility is defined recursively over references in methods: a method containing references to a set of activities sees all methods of these activities and (recursively) everything in the range of visibility of these methods. The base case is a method with no references whose visibility range is given by this method. The visibility range of an activity is given by the union of the visibility ranges of its methods. Figure 3 provides a simple illustration of the visibility relation.

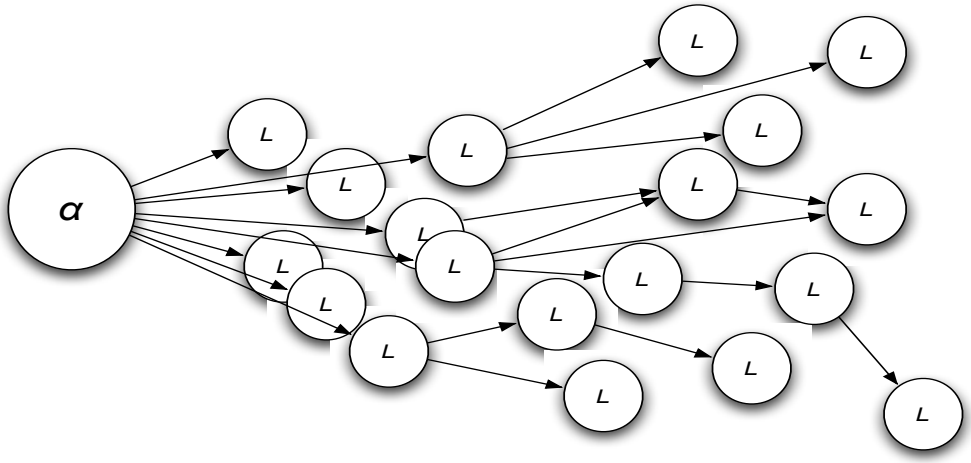

Fig. 2. Visibility relation based on public *L* parts of active objects

A formal definition of visibility range in ASP_{fun} is beyond the scope of this paper. In general, its implementation varies with the language for which we implement the security model.

Given the visibility through possible information flows in an object-oriented model, we can now integrate security classes to be assigned to the active objects, their methods and data (attributes)[1].

The security classification is on two levels, internal and global. The classification is a direct consequence of the multilateral view of the world.

Global classification The global security classification is based on the classical structure of a security lattice [2] composed of the (private/public)-level and the canonical complete lattice over the identities of the active objects. More precisely, this lattice **L** is given as

$$\langle(\{L, H\} \times \mathcal{P}(\mathcal{I}), \sqsubseteq)$$

where *I* is the set of all identities of active objects, and the ordering is defined as

$$(L_0, I_0) \sqsubseteq (L_1, I_1) \equiv \begin{pmatrix} L_0 \leq_L L_1 \\ I_0 \subseteq I_1 \end{pmatrix}$$

with

$$\leq_L = \{(L, L), (L, H), (H, H)\}$$

the ordering on the security levels. The lattice L is a complete lattice because

[1] Methods and attributes are viewed uniformly which is natural in an object- oriented world since an object's attribute is one-to-one represented by the method that returns its value.


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6. Erlang Active Objects

This section briefly introduces how Active Objects as defined in ASP_{fun} are implemented in Erlang; an implementation known as *Erlang Active Objects (EAO)* [9]. The main differences between ASP_{fun} and Erlang are that ASP_{fun} is object-oriented and uses futures as the one and only communication principle. This quite clearly obliges Erlang to implement these two features and do so transparently. That is, although futures are programmed, i.e. are provided as a library functionality, the resulting EAO provides just these features for programming active object systems. The work [9] discusses various strategies how to approximate this goal and advocates a solution that comes very close to the calculus ASP_{fun}. We will present this implementation of EAO here omitting a detailed comparison of alternatives [9] but focusing on the introduction of the main concepts to provide the foundation for the presentation of the security algorithm presented in the following section.

6.1 Activity

As informally shown in figure 2 an activity in ASP_{fun} unifies data and process. It encapsulates access to the data contained in the active object (see below). The strict data separation is the basis for distribution. An activity has a unique name.

The activity stands between a future and the methods provided by its active object. It represents the incarnation of an object into an active object. Its role is rather limited as a container for the active object. For the implementation in Erlang the most natural way to implement activities is by processes. In EAO, we can create an activity by using the command *active(s, name)* that starts a new activity process that has *s* as active object and is registered as a process under the given *name*.

6.2 Active Object

The internal active object is in ASP_{fun} a set of named methods. The first parameter *x* is always the "this" or "self" parameter. That is, using this parameter, we can refer to the surrounding object of a method. Thereby, other methods of the same object may be invoked.

There are several ways how active objects can be implemented in Erlang [9]. Apart from the possibilities of using Erlang modules and associative lists to represent the named method set that constitutes an object, there is also the possibility to again use a process to implement an active object. We chose the latter possibility although it represents an overkill: since an active object is only a set of methods, we do not normally think of it as a process. In fact, we have to artificially restrict the implementation to avoid certain features that contradict the ASP_{fun} concepts, e.g. immutability of objects.

In brief in EAO, an object is a process that nurses an associative list of methods and is bound to an activity process once the set of methods is set. Thus, the active object exists in two states: a pre-instantiation phase, in which the methods can be added and an activated state that binds the process ID of the former to the PID of an activity.

The active object is then run in a loop that receives method invocation calls. It checks whether the method is in fact directed to this activity and does exist. In the positive case, the active object retrieves the method from its associative list and spawns the following new process for the concurrent evaluation of this method call.

```
run_concurrent_method(Methods,Methodname,Arguments,RequestPID,Token)
```

The call does contain a RequestPID representing the future process (see below) to which the result of the method evaluation is to be sent. The implementation of the active object as yet another fairly active object is – although seemingly exaggerated – very handy when we want to extend EAO to automatic information flow control (see Section 5) since it represents an execution monitor [11]. This monitor can very simply be extended to control the access to methods according to a given security specification.

6.3 Future

Futures are place-holders for replies to method calls and enable parallel computation meaning in this context the asynchronous calls to methods in active objects. This concept enables the continuation of the

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Chapter 10

Software Engineering Mirages

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Abstract. The current work presents a heuristic-diachronic analysis of software engineering in the Southern Mediterranean. The study includes universities and firms directly or indirectly related to the software sector. In it are presented the notion of "the funnel fritter system" to demonstrate through real examples the consequences of the human factors inside computer science and the economic consequences for the normal functioning and the continuous growth of the information and communication technology sector. Through this notion in combination with real examples it will be made apparent that the current sector of theoretical research in software engineering in the emerging markets is in fact a mirage both in the universities and outside of them. The reason for this is that research, educational and development centres are not only far away from reality, but which constitute obsolete models or antimodels for the emerging markets or countries.

Keywords: Software Engineering, Human Factors, Digital Divide, Education, Sociology, Diachronism, Communicability, Heuristic Analysis, Quality Assessement

1 Introduction

It is important to stress that in the current research work in some cases colloquial and subjective language will be used with a few doses of humour, since we avoid to make generalizations in the face of abnormal situations which have, are and probably will gnaw away the system of university teaching of Software Engineering (S.E.) on both sides of the Atlantic. The period analyzed in the examples spreads from the 90s to our days. One of the tasks that are attributed automatically to those generators of mirages from the S.E. is the prediction of the future. Some of them are even regarded as the Delphic oracle [1]. However, with the passing of time, their predictions will end up in a thick coiled fritter of fried dough ("churros" in Spain –see Annex 1). In a colloquial way you say in Spanish that something is a fritter when the quality is very low (a sloppy job) or lower than expected.

The future contains a series of riddles. We know beforehand that the trends of software engineering are goals suggested by the research centres on both sides of the Atlantic [2, 3, 4, 5] with the intention to avoid science to get onto the the wrong paths. In this regard some claim that in the context of the early 90s there was a bidirectional relationship, which aprioristically could become divergent, but in fact were convergent, since many concepts resembled a centripetal force towards two stages: the era of quality and the era of the industry as a lab. The former position, sustained by Colin Potts [6], identifies a series of concatenated cycles in the technological evolution. That is how in 1960 you can talk of a functional era, characterized by the launching of technology in the institutions. In the 70s there is a wide spread of the development of software and it is the moment in which the stages or the cycles of models are started. It is the era of expansion. The decade of the 80s is marked by the prices factor. A drop in prices takes place, both in

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contrary, by considering the industry as a lab, we see steady connections as figure 2 shows based on empirical data and the transfer of technology is constant [6]. The communication is bidirectional and there is a guaranteed feed-back between users and researchers. A normal reality which becomes a mirage in the antimodel for example in the case of certain computer science firms, in some Lombardian textiles industries [9, 15].

2 Software Engineering in the 90s, and the Future in the Short, Mid and Long Term

Analyzing both points of view of the three authors –Basile, Musa and Potts [6, 7, 16], a set of convergent elements can be established in the research. That is, there are common denominators in relation to the problems in sight:

1. Quality is a multidimensional concept. Evidently there are important attributes of the software product such as the accuracy, the functionality and the cost. Said quality must be maintained during the whole creation process, trying to insert goals and metrical paradigms inside the quality function [17], as well as models of realistic self control. Careful planning acquires an outstanding role, added to all the components of the S.E. process. In the case of the antimodels that will be analyzed, these are antimodels and therefore not non-controllable from S.E.

2. The user and the contextual factor [18]. Since the 90s the user is the main target that must be reached. Not for nothing usability engineering, for instance, placed him/her as the focus of its research. Now the context, the market trends and the consumer have an influence on the specification and the creation of the computer products, for instance, the computing witthout processors [19]. Hence the interest in the 90s to know the market, to look for the intersection between the implicit and explicit requirements of the user – in spite of the instability in his/her demands, for the future R&D developments. However, in the last decade the statistic data of the consumer market have been unheard, especially with the momentum of the financial crisis [20, 21], thus boosting the digital gap among the population, in the alleged developed or emerged markets [22, 23]. Logically it is necessary to generate an interrelation between the researchers and the user, which requires a continuous communication to prevent ulterior failures, and keep on excahnging impressions about the advance of the project to be developed. Moreover, it is necessary to supply the user with tools and a methodology of how to use the software which are easy to learn, as Nielsen asserted in the 90s [24]. In regard to the context, one can see the existence of various perspectives inside the R&D sectors, equally in the industrial as in the consumer field. It is moreover a pressing need the concord among them. Added to the factor that each town, province or autonomous region in Southern Europe usually has its own idiosyncrasy, which must be respected at the moment of implementing a great computer system [15, 25]. For that argumentation the cognitive factors of social organization are periodically reviewed [26, 27]. This is the reason why in the 90s organization analysts along with psychologists, anthropologists, and other specialists of the social sciences were brought in to consider the human factors and examine, operations and processing methods in firms. A reality that was respected in many educational, entrepreneurial, and industrial organizations at both sides of the Atlantic.

3. The great advantage of the models is that they focus the factors of the creation of the product [28]. That's why there was a concern for the construction of descriptive models with components from several disciplines, pertaining to both the formal and the factual sciences to improve our comprehension in regard to:

   - The nature and the character of the process to be studied
   - The variations
   - Weak and strong points
   - Control and error prediction mechanisms

   Besides, the models must be closer to the reality than to theory, without neglecting the self-control systems and the quantifiable aspects. In relation to this latter statement experience shows that there is a better inclusion of reality aspects if it is based on models and is led by goals. Nevertheless, in the 90s there wasn't and there still is neither a big model that combines in a simple and structured way all these requisites.

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members from the start to the teamwork. Trying to train the professionals inside narrow local borders, as it was done for the sake of the 'purity' of S.E. since 1990 in Barcelona (Spain) has been real scientific and industrial suicide. The negative results can be appreciated in the following figure 3, with almost five million out of work, Spain's unemployment crisis rages on:

Fig 3: El Pais newspaper (www.elpais.es) –digital version (04.29.2011)

In few words, software engineering needs to interact with several disciplines in the current era of communicability expansion [46].

3 Quality: Presence and Absence

The quality of software has been present in the software projects and in all the eras of computer science, in a open or latent way [6, 7, 42]. However, with the apogee of the interactive systems, especially the evolution of the hypertext, multimedia and hypermedia, the need of generating metrics to measure the quality of the systems arises [47, 48], paralleling the lessons learned from usability engineering. Consequently, the main quality attributes of quality of multimedia system are established, along with metrics and methodologies for the evaluation and verification of the reached results. Evidently, all of that under the premise of cutting down the costs and increase the quality of the software product.

Carrying out an analysis of quality inside S.E. and in keeping with the notions stemming from Potts [6], Basili and Musa [7, 16], we find that it is a multidimensional notion. In this sense we can make three studies, bearing in mind the factors of presence and absence quality control. The first inside the S.E. proper, the second in the semiotics context, and starting from there the third which veers towards the mirage-generating human factors, for instance.

1. The multidimensional concept of the quality inside S.E. must take into account who makes the product and who uses it. For instance, in the field of the early offline multimedia systems in Barcelona the producers were so various that they were only interested in permeating the CD-ROMs market in the least possible time and getting the greatest possible profit. The user of those systems practically was not considered. The departments of languages and computer systems turned their backs to the human factors, usability engineering, database oriented design, etc. They focused on shaping professionals in S.E. inside their "caliph ghettoes" assuming that the technological society would be waiting for those professionals and their products. The consequence was the invasion of systems exogenous to Catalan reality until the marketing bubble that turned around the multimedia term in the 90s burst. This reality made the rest of the elements of the multidimensional concept inside S.E. stay totally out of kilter for five years. Some components and/or concepts were excluded:

   - The mutual influence of attributes.
   - The ultimate purpose, that is, user's satisfaction.
   - The knowledge of the user's needs, his goals and measure them to then compare them with their results.
   - The process of quality, that is, keeping and verifying the quality in each one of the production stages.
   - The need of models of development of the process, like using the system and the operations with the context.
   - The human cognitive process and the dynamic laws of society affect the quality of the software product.

   This latter component as well as the study of the human cognitive process are suffering the same problems as the educational marketing in the Catalan universities which depend on the autonomous government, created by the same audiovisuals centres. The members of those centres or college institutes in the 90s destroyed the interest in serious and innovative research in multimedia and virtual reality, in the first decade of 2000 [10]. These realities over time follow in certain regions of Southern Europe the law of energy thermodynamicse, that is energy doesn't get created or destroyed, it merely transforms itself.

2. The differentiation between scientific and colloquial language is essential to prevent mirages in the S.E. as well as to keep and even increase quality. In this sense, the linguistic and semiotic analysis of speech [45, 49], allows to determine within a few minutes whether we are dealing with a S.E. professional or a pretender ("ghosts or phantoms"). This latter word is how all those who devote themselves to the teaching of S.E. are known in Spain in colloquial terms. The main reason for the use of this noun is that the knowledge they teach does not adjust to reality. It is important to anchor the notions, not only inside a language in itself, but from the territorial and contextual point of view. Sometimes the same academic reality pertaining to S.E. may be treated in different ways in Northern Atlantic, for instance. For this reason there is a constant evolution or involution (depending on the point of view of the observer or analyst) in the university curricula of the tertiary level, i.e., masters, doctor degrees and post-doctorates. In the EU, the "Bologna plan" may be seen as synonymous of cultural interchange (i.e., Erasmus program) but it doesn't solve the current serious problem of a lack of theoretical knowledge among college students on both sides of the Atlantic, which seriously damages their professional future. It is in the bidirectional relationship between signification and signifier where the human factors originate which distort the reality in Southern Europe, for instance, Spain and Italy.
   Most of the S.E. professionals in Catalonia (Spain), prior to the software quality era, stemmed from physics, mathematics, industrial engineering, etc., In the 90s they started to introduce the notions deriving from the research in USA in the EU, practically doing a mere translation of the notions, xeroxing of foreign models and without taking into account the local computer science context, such as the training of work teams where the formal and factual sciences constantly interact. These models entail a process which involves in turn feedback, learning and the refining of the environment models. Feedback is a process which in some way resembles the cycle "plan-do-check-act" that has been used in the industry [16]. Schematically in figure 4. We can find a big exception about "plan" in Lombardy –

textile industry [15]. This is one of the reasons why in Catalan software engineering industrial engineers were placed at the highest level of public and private R&D institutions.

Fig. 4. Industrial cycle

Breaking down the "plan-do-check-act" we have [16]:

- The *plan* stage keeps a set of measures of the quality attributes as a goal to be reached.
- The *do* stage elaborates the producer in keeping with the development of the standards and the qualitative guidelines they follow.
- The *check* stage compares the product with the quality goals.
- The *act* stage contains the reports of the problems arisen during the process which are elementary when it comes to correcting the acting mistakes.
- The closing of the process is with the feedback of the system.

It is necessary in the quality improving software (QIP) to include self-control system models of the feedback of the system. Besides, QIP planning requires models of the most varied software products and quality attributes of the process and the environmental factors. For instance, the great advantage of working with models in the design of online and offline interactive systems is the use of a common language among the participants of the project, regardless of the activities that the worker develops and where he is located. This common usage of terms boosts the relationship between signifier and signification thus eradicating ambiguity and vagueness of the terms. This common language reduces mistakes and besides reduces production costs.

3. Now the human factors that entail the negative aspects of the quality of the software are to be found in the kernel of the following classical but still current graphic inside S.E. [50]:

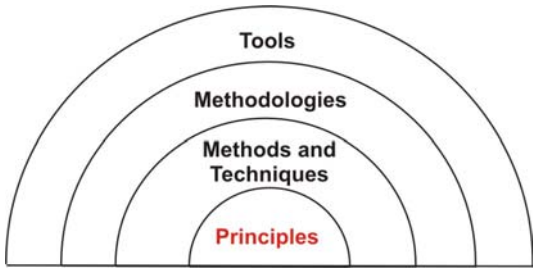

Fig. 5. The core where the S.E. pseudoprofessionals attack, or those who do not possess the necessary knowledge or experience but who devote themselves to S.E. in the Lombardian or Catalan universities.

The use of abstract language and plenty of synonyms in some Latin languages lets the "ghosts or phantoms" (pretenders) fly very high, and for a long time, fostering the mirage inside the S.E. in the E.U. thanks to the subsidies they get and the agreements among other universities. Now the key word is "principle". The distorters of reality relate automatically this word with values of a religious or moral nature. The principles applied in an educational context which is not-secular in reality, but secular inside the university mirage, makes a "ghost or phantom in S.E." (G.S.E.) with the yearning to have "trustworthy collaborators" expert a huge influence on the rest of the areas which are directly or indirectly related to S.E., such as systems and usability engineering, artificial intelligence, databases, computer graphics, etc.

An easy way to detect that way to proceed are the databases of the works that index the scientific publications. As a rule, those collaborators-to-be inside the S.E. sector once they finish their degree or engineering, they have their final project published, not their doctoral thesis, as important research works. Evidently these collaborators in Southern Europe may or may not follow third cycle studies, but they already claim to be scientists or researchers in the second decade of their lives. What is more, those publications may serve to get a steady teaching post and keep on publishing, even being tasked with the guidance of doctor thesis or masters, without having a PhD, that is, a computer or maths graduate in Italy, for instance, grown under the sheet of the "ghost" in S.E. and belonging to the breed of "reliable

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5 The Software Engineering Funnel

We understand as S.E. funnel all the knowledge about software and hardware which is used to generate distortions in content and as much as possible limit the control to those pseudo scientists, who act under the banner of S.E. This funnel may generate "fritter dough" of S.E. in record time or over the years and without a fritters maker. Next we have the following graphics as examples:

Fig. 8. A motley funnel which has been randomly generated, responding to the dictates of the non-secular foreign universities in the south European continent over the years.

Fig. 9. The Southern Europe funnel has an input by a G.S.E. to boost the formation of a breed of collaborators in who he can have a high level of trust.

Through the funnels of S.E. the formation of professor breeds in the field of software engineering, computing, systems, multimedia, usability, etc., is easily detectable. In this funnel the common denominator that the members must possess, for instance belonging to a religion and being an assiduous churchgoer, having a kind of spiritual guide inside that religion, playing some musical instrument, having joined non-governmental organizations, etc. can be seen. Things that should be banned by international law, the European constitution and each one of the Charters of its member states, but in fact those directives are not kept. However, said directives are consented not only by the European academic authorities, but even by those relatives of senators and MPs (members of parliament) who are allegedly following the precepts of Piaget [51], Morin [52], etc., (some as their former students or colleagues) impose those rules to generate mirages inside the public universities of Southern Europe. Without forgetting either the university educational classes who train with those precepts trustworthy collaborators inside the S.E. Now the generators of those funnels behave professionally in a peculiar way with other real professionals of the computing sector and its branches, such as multimedia, interface design, and in the assessment or auditing of interactive contents, for instance. This is enabled through the cloning of projects, ideas, published works, etc. It is as if they rose a kind of virtual mirror and placed it in a 90º angle, appearing side by side with the real S.E. professionals, as if they were their shadow. In other words, in the popular tradition ghosts can't see themselves in front of the mirrors, however this rule doesn't apply to the S.E. ghosts. The reason for such behaviour is that they need to rise fast to the summit of power as if they were comets, inside the context where they act daily. It is a contextual factor and the interested reader can see examples in the academic field in the following bibliography [10, 27, 53]. If we compare the contents of the funnels in the first we can see how behind it there is a group of university professors whose scope of research activity is so wide that constantly their names appear in the listings of the most disparate scientific committees all around the planet. Besides, a phantom makes the biggest nonsense or "churros" (see annex 1) when he/she starts to philosophize starting from a rhetoric question, for instance: What is software engineering? What are the research areas where to invest the taxpayers' money in the future? How can I improve the global software industry?. As a rule, these questions posed by the phantoms or ghosts are accompanied by mostly six zero-figures in subsidies to carry out projects which are paralyzed in the short or middle run. The paralysis is due to the lack of creativity or originality in approaching the issue and in finding the best solutions, in the least possible time and with low costs.

This is due to the fact that in the origins of their research lies the object-oriented programming (OOP) of the 90s [54, 55, 56, 57]. Starting from it, the design models for multimedia systems are encompassed, the databases, human-computer interface, physical hypermedia models, reusability, web information systems, ubiquitous computing, e-commerce applications, software architecture, enhance context infrastructures, web-oriented software technology, web model refactoring, metamodel, fostering groupware tailorability, web-gis, etc. Works where the S.E. ghost will appear, because by himself/herself he/she is unable to carry on with that wide spectrum of topics. Oddly enough, this is the common denominator in Barcelona, Bergamo, Cremona, Gerona, Lerida, Majorca, Milano, Valencia, Varese, Zaragoza, etc.

In the second funnel, we have a dynamic persuader [27] who in order to justify the post he/she holds in the university, thanks to the G.S.E., we find his/her name from the technical reports of the Italian religious trade unions belonging to the CISL (*Confederazione Generale Italiana del Lavoro* –Italian Confederation of Trade Unions) down to the most variegated documents of the private firms in Lombardy (dossier, leaflets, instructions guidelines, etc.) until he is taking the post that had been kept for him/her by the G.S.E.

Some examples which deserve a "non-comment" are: prices of the oil products in Italy, assessment of levees safety, model of earthquake endurance of the buildings, neural networks to indicate the flaws of decision-making patterns, signalling of monitoring systems, residues disposal management, support the safety management, model for alarm validation systems, surveillance through integration of artificial intelligence, seismic assessment of buildings, water resources, expert systems in civil engineering, artificial intelligence, interfaces, usability, multimedia, podcasting, human-computer interaction, and a long etcetera where the same contents are doubled or tripled in the publications, since writing a same content in English and Italian is worth two, for instance. In a few words, in Bergamo are the clones of Leonardo Da Vinci [58]. The difference that exists between Da Vinci and them is that the former was a genius and the latter are mere ghosts with "plugs". The word "plug" does not mean that the ghosts or phantoms are electrical. It is a colloquial term used in Spain to indicate those who hold official posts not because of their merits, but because of belonging to certain political and or religious groups. However, the great G.S.E. in a context of parochialism may gather a group of trustworthy collaborators in the same college department and for an undetermined time, even though they have spent decades working previously in private firms, taking care of all kinds of subjects, as it can be seen in those examples where subjects were taking on responsibility in the field of multimedia communication or human-computer interaction because almost all of them play a

musical instrument (see Annex 2). The consequences of these funnels in Italy can be seen in the following figure 10, which constitutes a mirror of the figure 3 referring to the Spanish reality – unemployment million.

Fig. 10. One of the consequences of the breed in the educational system stemming from S.E. is the high number of unemployed with a high rate of professionalism but whose merits are not considered by the prevailing parochialism in some European regions (www.ilsole24ore.com)

The problem in both kinds of funnels is when those S.E. pseudo professionals or G.S.E. reach certain positions in the publications of the IEEE or ACM just to mention two examples. The networks of invisible powers inside the academic sector, mainly non-secular, make them evaluate subjectively (in respect to a great number of professional or economical interests) the scientific works inside the international software sector. Evidently, there are mechanisms inside the social sciences to unmask them and eradicate them from the scientific sector, such as the analysis of speech, especially when they write negative reports on the works that are presented for evaluation. In this sense, the social aspect of communicability contains a set of instruments which may make that task easier, in the least possible time and with limited costs, in a communicability expert participates in the evaluation.

6 First Consequences of the Mirage in the Software Engineering Reality

The intensity of the mirage on S.E. reality can be measured through a diachronic analysis of what S.E. should currently be like in relation to the forecasts in the main bibliographical references made by the main

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Annex 1

In the brief listing of nonsense or "churros" that we have in this annex and printed in prestigious publications, the rhetoric questions have been omitted because of the huge length it would have reached otherwise:

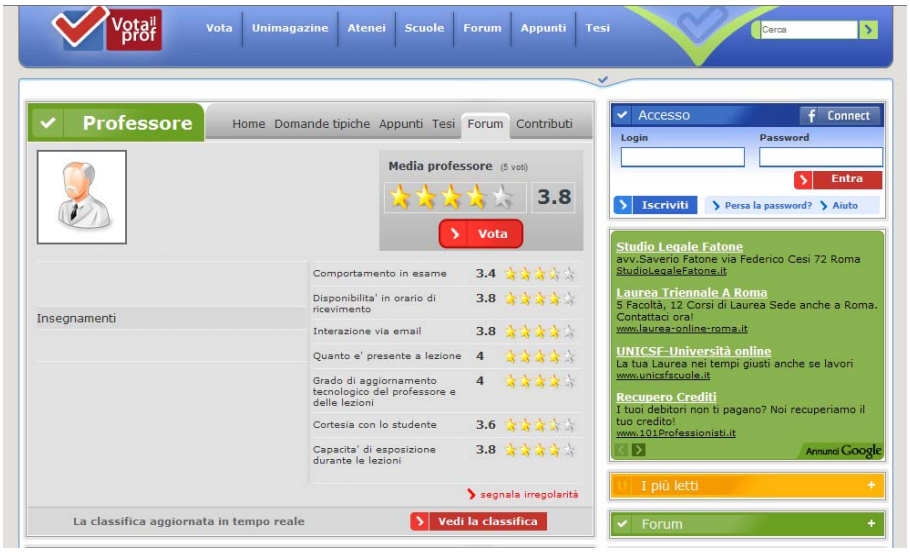
- Advantages of Approximate vs. Complete Verification
- Approach To Traceability Management
- Biological Half-Life of Software Engineering Ideas
- Complex Settings through Aesthetic Design
- Contexts in Product Line Development
- Design in a Postmodern Era
- Digital Lighting Functions
- Eliminating Trust From Application Programs
- Environmental Awareness in Service Oriented Software Engineering
- Exploring the Role of Time and Errors in Real-Life
- Formalizing Inconsistencies and Deviations in Human-Centered Systems
- Full Life-Cycle Languages
- Generalization / Specialization as the Basis for Software Specification
- Giving Life to Objects
- Homotopy in Digital Spaces
- Integrity Constraint Enforcement by Means of Trigger Templates
- It's Not Just for Applets Anymore
- Lightweight vs. Heavyweight Processes
- Mappings and Interoperability
- Modelling Non-Functional Requirements
- Quality Model for the Selection of ERP Systems
- Querying Virtual Worlds
- Representing Non-Functional Aspects with UML
- Routing Harness for the Inmos Transputer
- Statistical Tests of Significance
- Steps Toward a Software Component Industry
- Temporal Abductive Validation
- Testing Nondeterminate Systems
- Towards Affective Collages of Presences
- Towards Language-Agnostic
- Using Non-Functional Requirements in Component-Based Software Construction
- You Are What You Read

Annex 2

An example of this university educational antimodel in Lombardy –Italy with ties to Catalonia –Spain. We see how a phantom in software engineering (ghost #1) claims that he/she has "120 scientific publications" (parochialism makes everything scientific), and an excellent teacher (i.e, four stars, www.votailprof.it), etc.

120 articoli pubblicati principalmente nelle aree dell'Ingegneria del Software e delle applicazioni di Intelligenza Artificiale
50 seminari relativi ai temi sopra detti.

1990 – 2011



His/her pupil –ghost #2, in the 90s (with a degree in computing but internationally self-defined as "dottore", that is, PhD in 2001) also claims that he/she has 80 publications (in reality both are coauthors of the same technical reports/texts – ghost #1 and ghost #2 –, many of them without scientific validity), who without university experience have spend a decade "in the avalanches and earthquakes in the Alps and the Apennines" (see –62 main research interests and "the metamorphosis") has got to be an expert first in multimedia, then in interactive communication and now in human-computer interaction (2011).

Qualche pubblicazione

Sono (co)autore di una ottantina di pubblicazioni, ne riporto qui qualcuna particolarmente significativa (un elenco più completo, estratto dall'archivio del Ministero e con l'aggiunta di un congruo numero di technical reports, è **disponibile in formato PDF**):

Interessi di ricerca

I miei interessi di ricerca (passati e presenti) sintetizzati da parole chiave:
Lisp, Prolog, compilatori, macchina astratta di Warren, Warren Abstract Machine; intelligenza artificiale, sistemi esperti, sistemi basati su conoscenza; reti neurali, reti neuronali; linguaggi di marcatura, html, xhtml, ipertesti, multimedia; comunicazione multimediale, editoria multimediale, comunicazione ipermediale, podcasting, semiotica dei nuovi media, sociologia dei nuovi media, etnografia dei media; qualità del web, usabilità del web, accessibilità del web, accessibilità per i disabili, credibilità del web; informatica umanistica, informatica per le discipline umanistiche, informatica per gli studi umanistici, informatica per i beni culturali, informatica per l'archeologia, fondamenti di informatica; conservazione dei monumenti, protezione dei beni culturali, protezione ambientale, sicurezza strutturale, sicurezza ambientale, dighe, frane, sistemi di monitoraggio strutturale, sistemi di monitoraggio ambientale, interpretazione di segnali di monitoraggio; sistemi informativi territoriali temporali, GIS temporali, WebGis; didattica a distanza, tecnologie per l'istruzione, tecnologie per la didattica, didattica delle nuove tecnologie, didattica dell'informatica; comunicazione aziendale, promozione d'immagine, comunicazione pubblica; diritto d'autore su Internet, ontologia del web; Cammino di Santiago di Compostella, Camino de Santiago de Compostela, pellegrinaggio, turismo religioso.

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Carnagey, N., Anderson C.A., Bushman, B.: The effect of video game violence on physiological desensitization to real-life violence. Journal of Experimental Social Psychology, Vol. 43, pp. 489–496 (2007)
Carr, D., Buckingham, D. Burn, A., Schott, G.: Computer Games: Text, Narrative and Play. Cambridge: Polity Press (2006)
Carr, D., Oliver, M.: Second Life, Immersion and Learning. Social Computing and Virtual Communities. London: Taylor and Francis (2009)
Carr, D.: Space, navigation and affect. Computer Games: Text, Narrative and Play. Cambridge: Polity Press, pp. 59–71 (2006)
Carroll, J., Carolin, P.: Relationship between Game Playing and Personality. Psychological Reports, Vol. 64, pp. 705–706 (1989)
Chegis, I., Yablonskii, S.: Logical methods of electric circuit control. In Trudy MIAN SSSR. Vol. 51, pp. 270–360 (1958), *in Russian*
Chikalov, I.: Algorithm for constructing of decision trees with minimal number of nodes. In Proc. RSCTC 2000, LNCS, Vol. 2005, Heidelberg: Springer, pp. 139–143 (2001)
Church, A.: A Set of Postulates for the Foundation of Logic. Annals of Mathematics, Vol. 33 (2), pp. 346–366 (1932)
Cipolla-Ficarra, et al.: Quality and Communicability for Interactive Hypermedia Systems: Concepts and Practices for Design. Hershey: IGI Global (2010)
Cipolla-Ficarra, F. Vivas, E., Romo, Q.: Credibility Online: Quality Metrics for Evaluation. HCI International 2009, On Line Communities and Social Computing. Berlin: Springer, pp. 171–181 (2009)
Cipolla-Ficarra, F., Ficarra, M.: Software Manament Applications, Textile CAD and Human Factors: A Dreadful Industrial Example for Information and Communication Technology. In Proc. First International Conference on Advances in New Technologies, Interactive Interfaces and Communicability, ADNTIIC 2010. Berlin: Springer, pp. 121–131 (2011)
Cipolla-Ficarra, F., Nicol, E., Cipolla-Ficarra, M.: Research and Development: Business into Transfer Information and Communication Technology. First International Conference on Advances in New Technologies, Interactive Interfaces and Communicability, ADNTIIC 2010. Berlin: Springer, pp. 44–61 (2011)
Cipolla-Ficarra, F., Nicol, E., Cipolla-Ficarra, M.: Vademecum for Innovation through Knowledge Transfer: Continuous Training in Universities, Enterprises and Industries. Innovation through Knowledge, Transfer 2010. Berlin: Springer, pp. 139–149 (2011)
Cipolla-Ficarra, F., Villarreal, M.: Strategies for a Creative Future with Computer Science, Quality Design and Communicability. In Proc. Human-Computer Interaction, Tourism and Cultural Heritage. Berlin: Springer, pp. 51–62 (2011)
Cipolla-Ficarra, F.: Communication Evaluation in Multimedia –Metrics and Methodology. Vol. 3, Mahwah: LEA, pp. 567–571 (2001)
Cipolla-Ficarra, F.: MEHEM: A Methodology for Heuristic Evaluation in Multimedia. In Proc. 6th International Conference on Distributed Multimedia System –DMS'99. Aizu: KSI, pp. 89–96 (1999)
Cipolla-Ficarra, F.: Persuasion On-Line and Communicability: The Destruction of Credibility in the Virtual Community and Cognitive Models. Nova Publishers, New York (2010)
Cipolla-Ficarra, F.: Usability Engineering Versus Social Sciences: An Analysis of the Main Mistakes. Advances in Dynamic and Static Media for Interactive Systems: Communicability, Computer Science and Design. Bergamo: Blue Herons Editions, pp. 165–189 (2011)
Civitarese, G.: Immersion versus interactivity and analytic field. International Journal of Psycho-analysis, Vol. 89, pp. 279–298 (2008)
Clark, B.: Using the ZMET Method to Understand Individual Meanings Created by Video Game Players Through the Player-Super Mario Avatar Relationship. Unpublished Manuscript as part of MPhil Coursework, Brigham Young University (2008)
Cobley, P., Jansz, L.: Introducing Semiotics. Duxford: Icon Books (1999)
Coomans, M., Timmermans, H.: Towards a Taxonomy of Virtual reality user interfaces. In Proc. International conference on information visualisation (IV91), London (1997)
Cope, D.: An Expert System for Computer-assisted Composition. Computer Music Journal, Vol. 11 (4), pp. 30–46 (1987)
Cope, D.: Computer Modeling of Musical Intelligence in Experiments in Musical Intelligence. Computer Music Journal, Vol.16 (2), pp. 69–83 (1992)
Cope, D.: Experiments in Music Intelligence. San Francisco: Computer Music Association (1987)
Cope, D.: Virtual Music: Computer Synthesis of Musical Style. Cambridge: MIT Press (2004)
Costa, J.: La Esquemática. Barcelona: Paidós Estética, pp. 83 (1998)
Craig, I. Object-Oriented Programming Languages: Interpretation. Berlin: Springer (2007)
Crawford, C.: Chris Crawford on Interactive Storytelling. Berkeley: New Riders (2005)
Csíkszentmihályi, Mihály: Beyond Boredom and Anxiety. San Francisco: Jossey-Bass (1975)
Csíkszentmihályi, Mihály: Flow: The Psychology of Optimal Experience. New York: Harper & Row (1990)
Curran, N.: Stereotypes and Individual Differences in Role-Playing Games. International Journal of Role-Playing Games, Vol. 2 (2011)
Davis, A.: Fiftee Principles of Software Engineering. IEEE Software, Vol. 11 (6), pp. 94–101 (1994)
Denning, D.: Lattice model of secure information flow. Communications of the ACM, Vol. 19 (5), pp. 236–242 (1976)
DeRenard, L., Kline, L.: Alienation and the Game Dungeons and Dragons. Psychological Reports, Vol. 66, pp. 1219–1222 (1990)
Dery, M.: Velocidad de Escape, la Cibercultura en el Final del Siglo. Madrid: Siruela, pp. 15 (1998)

Despain, W.: Writing for Video Game Genres: from FPS to RPG. Massachusetts, A K Peters, pp. 3 (2009)
Dille, F.: The Ultimate Guide to Video Game Writing and Design. New York: Skip Press, pp. 11–15 (2007)
Dillon, C., Keogh, E., Freeman, J., Davidoff, J.: Aroused and immersed: the psychophysiology of presence. In Proc. of Presence 2000. Third International Workshop on Presence, Netherlands: Technical University of Delft (2000)
Douse, N., McManus, I.: The Personality of Fantasy Game Players. British Journal of Psychology Vol. 84, pp. 505–509 (1993)
Dray, S., Siegel, D., Kotzé, P.: Indra's Net: HCI in the Developing World. Interactions, Vol. 10 (2), pp. 29–37 (2003)
Dubberly, H.: Toward a Model of Innovation. Interactions, Vol. 15 (1), pp. 28–36 (2008)
Dunn, R.: Software Quality: Concepts and Plans. New Jersey: Pretince Hall (1990).
Ermi, L., Mäyrä, F.: Fundamental Components of the Gameplay Experience: Analysing Immersion. In Changing Views: Worlds in Play, Selected Papers of the 2005 DiGRA's Second International Conference, pp. 15–27 (2005)
Fidock, J., Carroll, J.: Why Do Users Employ the Same System in So Many Different Ways? IEEE Intelligent Systems, Vol. 26 (4), pp. 32–39 (2011)
Fielding, R.: Architectural Styles and the Design of Network-based Software Architectures. PhD thesis, University of California, Irvine (2000)
Fleck, A., Kammüller, F.: Implementing privacy with erlang active objects. In 5th International Conference on Internet Monitoring and Protection, ICIMP'10. New York: IEEE Computer Society Press (2010)
Fleck, A.: Erlang Active Objects –Implementierung und Konzipierung eines ASPfun-Interpreters in Erlang. Diplomarbeit, Technische Universität Berlin (2011)
Foley, J.: Technology Transfer from University to Industry. Communications of ACM, Vol. 39 (9), pp. 30–34 (1996)
Frakes, W., Isoda, S.: Success Factors of Systematic Reuse. IEEE Software, Vol. 11 (5), pp. 14–22 (2010)
Frasca, G.: Videogames of the Oppressed: Critical Thinking, Education, Tolerance and Other Trivial Issues. In First Person: New Media as a Story, Performance and Game. Cambridge: MIT Press (2004)
Fraser, A., Burnell, D.: Computer Models in Genetics. New York: McGraw-Hill (1970)
García, P., Gómez, A.: Fundación Audiovisual de Andalucía. Memoria (2002/2007). Seville: Fundación Audiovisual de Andalucía (2008)
Garrido, P.: Business Sustainability and Collective Intelligence. The Learning Organization, Vol. 16 (3), pp. 208–222 (2009)
Gause, D.: Why Context Matters –And What Can We Do about It? IEEE Software, Vol. 22 (5) pp. 13–15 (2005)
Georgescu, V.: Evolving Coalitions of Task-Oriented Agents via Genetic Algorithms to Foster Self-Organization in Digital Business Ecosystems. In Proc. of the International Conference on Modeling Decision for Artificial Intelligence (2007)
Giulianelli, D. et al.: Reducing Digital Divide: Adult Oriented Distance Learning. In Proc. First International Conference on Advances in New Technologies, Interactive Interfaces and Communicability, ADNTIIC 2010. Berlin: Springer, pp. 62–72 (2011)
Goguen, J., Meseguer, J.: Security Policies and Security Models. Symposium on Security and Privacy, SOSP'82, pp. 11–22, New York: IEEE Computer Society Press (1982)
Goldberg, D.: Genetic Algorithm in Search, Optimization and Machine Learning. New York: Addison-Wesley (1989)
Gollmann, D.: Computer Security. New York: McGraw Hill (2008)
Gomez, F., et. al.: Mathematical measures of syncopation. In BRIDGES: Mathematical Connections in Art, Music and Science, pp.73–84, Banff (2005)
Gomez, P., Danuser, B.: Relationships Between Musical Structure and Psychophysiological Measures of Emotion. EmotionAmerican Psychological Association, Vol. 7 (2), pp. 377–387 (2007)
Griffiths, M. Davies, M., Chappell, D.: Online computer gaming: a comparison of adolescent and adult gamers. Journal of adolescence, Vol. 27, pp. 87–96 (2004)
Grimshaw, M.: Sound and Immersion in the First-Person Shooter. Proceedings of CGAMES'2007. University of Wolverhampton: School of Computing and Information Technology (2007)
Gros Salvat, B.: De la Cibernética Clásica a la Cibercultura: Herramientas Conceptuales desde donde mirar el Mundo Cambiante. Salamanca: Ediciones Universidad de Salamanca (2001)
Grundy, D.: The Presence of Stigma among Users of the MMORPG RMT: A Hypothetical Case Approach. Games and Culture. London: Sage Publications (2008)
Gruszczyk, W., Kwasnicka, H.: Coalition Formation in Multi-Agent Systems –An Evolutionary Approach. In Proc. of the International Multiconference on Computer Science and Information Technology, pp. 125–130 (2008)
Guizani, M., Rayes, A., Khan, B., Al-Fuqaha, A.: Network Modeling and Simulation –A Practical Perspective. West Sussex: Wiley (2010)
Gupta, A. et al.: IT Infrastructure in Emerging Markets: Arguing for an End-to-End Perspective. IEEE Pervasive Computing, Vol. 5 (2), pp. 24–31 (2006)
Gupta, M.: Fuzzy-neural computing systems: Recent developments and future directions. Computational Intelligence Theory and Applications, LNCS 1226, pp. 82–91 (1997)
Gurbaxani, V.: The New World of Information Technology Outsourcing. Communications of ACM, Vol. 39 (7), pp. 45–46 (1996)

Gygax, G., Arneson, D.: Dungeons & Dragons. Wizards of the Coast, TSR, Lake Geneva, Wisconsin (1974)
Hall, A.: Investigation into the value of FRPGs as a strategy in developing children's creative writing. University of Nottingham: Unpublished honours paper (1988)
Hall, M., Padua, D., Pingali, K.: Compiler Research: The Next 50 Years. Communications of the ACM, Vol. 52 (2), pp. 60–67 (2009)
Halstead, R.: Multilisp: A language for concurrent symbolic computation. ACM Transactions on Programming Languages and Systems (TOPLAS), Vol. 7 (4), pp. 501–538 (1985)
Haragadon, A., Douglas, Y.: The Pleasure Principle: Immersion, Engagement, Flow. In Proc. of Hypertext '00 the eleventh ACM on Hypertext and Hypermedia. New York: ACM Press (2000)
Harauz, J., Kaufman, L.: A New Era of Presidential Security: The President and His BlackBerry. IEEE Security & Privacy. Vol. 7 (2), pp. 67–70 (2009)
Harris, W., Jha, S., Reps, T.: Difc programs by automatic instrumentation. In Proc. of the 17th ACM Conference on Computer and Communications Security, CCS '10, pp. 284–296, New York: ACM Press (2010)
Harviainen, J.T.: Information, Immersion, Identity: The Interplay of Multiple Selves during Live-Action Role-play. Journal of Interactive Drama, 2, Vol. 1 (2007)
Hassenzahl, M., Tractinsky, N.: User experience –A Research Agenda. Behaviour and Information Technology, Vol. 25 (2), pp. 91–97 (2006)
Hassenzahl, M.: The Thing and I: Understanding the relationship between user and product. Funology: From Usability to Enjoyment, pp. 31–42, Norwell: Kluwer Academic Publishers (2003)
Haywood, N., Cairns, P.: Engagement with an interactive museum exhibit. Proceedings of HCI 2005, Vol. 1, Berlin: Springer-Verlag (2005)
Heim, M.: Virtual Realism. New York: Oxford University Press (1998)
Heller, J.: Catch-22. London: Random House/Vintage, pp. 1961 (1994)
Henrio, L., Kammüller, F., Lutz, B. Aspfun: A typed functional active object calculus. Science of Computer Programming (2011), *in printer*
Herbelin, B. et al.: Using physiological measures for emotional assessment: a computer-aided tool for cognitive and behavioural therapy. In Proc. 5th International Conference on Disability, Virtual Reality & Associated Technologies, Oxford (2004)
Heylighen, F.: The Global Superorganism: an evolutionary-cybernetic model of the emerging network society. Journal of Social Evolution and History, Vol. 6 (1), pp. 58–119 (2007)
Hildreth, P., Kimble, C., Wright, P.: Communities of practice in the distributed international environment. Journal of Knowledge Management, Vol, 4, (1), pp. 27–38 (2000)
Hiller, L., Isaacson, L.: Experimental Music. New York: McGraw- Hill (1959)
Hitchens, M., Drachen, A.: The many faces of Role-Playing Games. International Journal of Role-Playing Games, Vol. 1 (2009)
Holland, J.: Adaptation in Natural and Artificial Systems. University of Michigan Press (1975)
Holtzman, S.: Digital Mosaics: The Aesthetics of Cyberspace. New York: Touchstone Edition (1998)
Hutchins, E.: Organizing work by adaptation. Organization Science, Vol, 2, (1), pp. 14–39 (1991)
Huxley, A.: Un Mundo Feliz (Brave New World). Barcelona: Plaza & Janés (2000)
Iandoli, L., Zollo, G.: Organizational Cognition and Learning: Building Systems for the Learning Organizations. Hershey: INFOSCI (2008)
Ibáñez, M.: Pop Control. Crónicas Post-industriales. Barcelona: Glénat (2000)
Ince, S.: Writing for Video Games. A&C Black: London, pp. 6 (2006)
Itami, H., et. al.: Dynamics of Knowledge, Corporate Systems and Innovations. Heidelberg: Springer (2010)
Ivory J., Kalyanaraman, S.: The effects of technological advancement and violent content in video games on players; feelings of presence, involvement, physiological arousal, and aggression. Journal of Commmunication, Vol. 57, pp. 532–555 (2005)
Jennett, C., Cox, A., Cairns, P., Dhoparee, S., Epps, A., Tijs, T., Walton, A.: Measuring and defining the experience of immersion in Games. International Journal of Human-Computer Studies, pp. 66, 641–661 (2008)
Johnson, J.: Managing Knowledge Networks. New York: Cambridge University Press (2009)
Junta de Andalucía: Plan de Innovación y Modernización de Andalucía. Sevilla: Consejería de Innovación, Ciencia y Empresa (2004)
Juriado, R., Gustafsson, N.: Emergent communities of practice in temporary inter-organizational partnerships. The Learning Organization: The International Journal of Knowledge and Organizational Learning Management, Vol. 14, (1), pp. 50–61 (2007)
Juul, J.: Time to play: An examination of game temporality. In First Person: New Media as Story, Performance, and Game. Cambridge: MIT Press (2003)
Kammüller, F.: Privacy enforcement and analysis for functional active objects. In Data Privacy Management, DPM'10, Fifth International Workshop. Satellite Event to ESORICS 2010, Vol. 6514, LNCS. Berlin: Springer, (2011)
Karwowski, W., Soares, M., Stanton, N.: Handbook of Human Factors and Ergonomics in Consumer Product Desing. New York: CRC Press (2011)
Kautz, K.: Making Sense of Measurement for Small Organization. IEEE Software, Vol. 16 (2), pp. 14–20 (1999)
Keith, E. et al.: Advancing the State of Home Networking. Communications of ACM, Vol. 54 (6), pp. 62–71 (2011)
Kendall, L.: 'The Nerd Within': Mass Media and the Negotiation of Identity Among Computer-Using Men. Journal of Men's Studies, Vol. 7 (3), pp. 353–69 (1999)

Kerckhove, D.: Inteligencia Conectada y Mente Colectiva. Revista de Occidente (206), pp. 32–34. Madrid: Ed. Fundación José Ortega y Gasset (1998)
Khan, M.: A Study of First Class Futures: Specification, Formalisation, and Mechanised Proofs, PhD Thesis. Université de Nice (2011)
King, B., Borland, J.: Dungeons & Dreamers: The Rise of Computer Games Culture from Geek to Chic. New York: McGraw-Hill Osbourne Media (2003)
Kishore, R. et al.: A Relationship Perspective on IT Outsourcing. Communications of ACM, Vol. 46 (12), pp. 86–92 (2003)
Klein, G., Wiggins, S., Deal, S.: Cognitive Systems Engineering: The Hype and the Hope. IEEE Computer, Vol. 41 (3), pp. 95–97 (2008)
Kohavi, R., Longbotham, R., Walker, T.: Online Experiments: Practical Lessons. IEEE Computer, Vol. 43 (9), pp. 82–85 (2010)
Kouzes, R. et al.: The Changing Paradigm of Data-Intensive Computing. IEEE Computer, Vol. 42 (1), pp. 26–36 (2009)
Krovi, R.: Genetic Algorithms for Clustering: A Preliminary Investigation. In Proc. of the 25th International Conference on System Sciences, pp. 540–544 (1992)
Kurzweil, R.: The Age of Intelligent Machines. Cambridge: The MIT Press (1992)
Lægran, A.S., Stewart, J.: Nerdy, Trendy or Healthy? Configuring the Internet Café. New Media Society, Vol. 5, pp. 357 (2003)
Lave, J., Wenger, E.: Situated Learning. Legitimate Peripheral Participation. Cambridge: Cambridge University Press (1991)
Lerdahl, F., Jackendoff, R.: A Generative Theory of Tonal Music. Cambridge: MIT Press (1983)
Li, Z., Zhu, T., Lai, W.: A Study on the Knowledge Diffusion of Communities of Practice based on the Weighted Small-World Network. Journal of Computers, Vol. 5 (7), pp. 1046–1053 (2010)
Liebowitz, J.: The quick basics of knowledge management. Boca Raton: CRC Press (2010)
Livingston, S., Brown, A.: Dynamic Response: Real-Time Adaptation for Music Emotion. In Proc. of the Australasian Conference on Interactive Entertainment, pp. 105–111, Sydney (2005)
Livingstone, S., et. al.: Changing musical emotion: A computational rule system for modifying score and performance. Computer Music Journal, Vol. 34 (1), pp. 41–64 (2010)
Louridas, P.: Up in the Air: Moving Your Applications to the Cloud. IEEE Software. Vol. 27 (4), pp. 6–11 (2010)
Luck, M., McBurney, P., Preist, C.: Agent Technology: Enabling Next Generation Computing –A Roadmap for Agent Based Computing. Agent Link (2003)
Macedonio, M., Parsons, T., Digiuseppe, R., Weiderhold, B., Rizzo, A.: Immersiveness and Physiological Arousal within Panoramic Video-Based Virtual Reality. CyberPsychology & Behaviour, Vol. 10 (4), pp. 508–515 (2007)
Mackay, D.: The Fantasy Role-playing Game: A New Performing Art. Jefferson: McFarland & Company, Inc. Publishers (2001)
Mărieş, I., Scarlat, E.: Enhancing the Computational Collective Intelligence within Communities of Practice Using Trust and Reputation Models. Transactions on Computational Collective Intelligence, Vol. 3, pp. 74–95 (2011)
Mărieş, I., Scarlat, E.: Modeling Trust and Reputation within Communities of Practice. IEEE International Conference on Systems, Man, and Cybernetics, pp. 2192–2199 (2010)
McConnell, S.: Professional Software Development. New York: Addison-Wesley (2004)
McCulloch, W., Pitts, W.: A Logical Calculus of the Ideas Immanent in Nervous Activity. Bulletin of Mathematical Biophysics, Vol. 7, pp. 115–133 (1943)
McMahan, A.: Immersion, Engagement and Presence: A Method for Analysing 3-D Video Games. The video game theory reader, pp. 67–86 (2003)
McNeese, T.: Salvador Dali –Great Hispanic Heritage. New York: Chelsea House Publications (2006)
Meyer, L.: Emotion and Meaning in Music. The University of Chicago Press (1956)
Mezirow, J.: Learning as transformation: Critical Perspectives on a Theory in Progress. San Francisco: Jossey-Bass (2009)
Miles, I., Rush, H., Turner, K., Bessant, J.: I.T. – Information Technology. Bologna: Baskerville (1993)
Mitchell, J.: Concepts in Programming Languages. New York: Cambridge University Press (2002)
Montola, M.: The Invisible Rules of Role-Playing: The Social Framework of Role-Playing Process. International Journal of Role-Playing, Vol. 1 (2008)
Moravec, H.: Mind Children: The Future of Robot and Human Intelligence. Harvard University Press (1990)
Mori, M.: Bukimi no tani (The Uncanny Valley). Energy, Vol. 7, pp. 33–35 (1970), *in Japanese*
Morin, E.: On Complexity. New York: Hampton Press (2008)
Moshkov, M., Chikalov, I.: On algorithm for constructing of decision trees with minimal depth. In Fundamenta Informaticae, Vol. 41, pp. 295–299 (2000)
Moshkov, M., Zielosko, B.: Combinatorial Machine Learning: A Rough Set Approach. In Studies in Computational Intelligence, Vol. 360, Heidelberg: Springer (2011)
Moss, J.: Power and the Digital Divide. Ethics and Information Technology, Vol. 4 (2), pp. 159–165 (2002)
Muller, P.: Reputation, trust and the dynamics of leadership in communities of practice. Journal of Management and Governance, Vol. 10 (4), pp. 381–400 (2006)
Murray, J.: Hamlet on the Holodeck. Cambridge: MIT Press (1997)
Myers, A., Liskov, B.: A decentralized model for information flow control. In Proceedings of the sixteenth ACM Symposium on Operating Systems Principles, SOSP '97, pp. 129–142, New York: ACM Press (1997)

Myers, A.: Jflow: Practical mostly-static information flow control. In 26th ACM Symposium on Principles of Programming Languages, POPL'99 (1999)
Nacke, L., Grimshaw, M., Lindley, C.: More than a feeling: measurement of sonic user experience and psychophysiology in a first-person shooter game. Interacting with Computers Vol. 22, pp. 336–343 (2010)
Naphade, M.: Smarter Cities and Their Innovation Challenges. IEEE Computer, Vol. 44 (6), pp. 32–39 (2011)
Nielsen, J.: Usability Engineering. London: Academic Press (1993)
Nissen, M., Levitt, R..: Agent-based modeling of knowledge flows: Illustration from the domain of information system design. In Proc. of 37th Hawaii International Conference on System Sciences (2004)
Nissen, M.: An extended model of knowledge flow dynamics. Communications of the Association for Information System, Vol. 8, pp. 251–166 (2002)
Nissen, M.: Harnessing Knowledge Dynamics: Principled Organizational Knowing & Learning. London: IRM Press (2006)
Nonaka, I., Toyama, R., Hirata, T.: Managing flow –A process theory of the knowledge-based firm. Hampshire : Palgrave Macmillan (2008)
Ortega, A., Alfonso, R., Alfonseca, M.: Automatic composition of music by means of grammatical evolution. In Proc. of the 2002 Conference on APL: Array Processing Languages: Lore, Problems, and Applications, pp. 148–155 (2002)
Orwell, G.: 1984. Barcelona: Ed. Destino (1983)
Oxford English Dictionary: Oxford University Press (2003)
Padol, L.: Playing Stories, Telling Games: Collaborative Storytelling in Role-Playing Games. RECAP Publications (1996)
Page, F., Wooders, M.: Endogenous Network Dynamics, CAEPR Working Paper Number 002 (2009)
Pawlak, Z.: Rough Sets –Theoretical Aspects of Reasoning about Data, Dordrecht: Kluwer Academic Publishers (1991)
Penrose, R.: The Emperor's New Mind. Oxford University Press (1989)
Perlman, B., Varma, R.: Bridging the cultural chasm: Improving collaboration and cooperation between the computer and social sciences. In Proc. International Symposium on Technology and Society –ISTAS 2001. New York: IEEE Press, pp. 19–27 (2001)
Piaget, J.: The Language and Thought of the Child. London: Routledge (2001)
Pierre, L.: Sobre la Cibercultura. Revista de Occidente (206), Madrid: Ed. Fundación José Ortega y Gasset, pp. 29 (1998)
Pohjola, M.: Autonomous identities - immersion as a tool for exploring, empowering and emancipating identities. In Beyond Role and Play. Helsinki: Ropeconry, pp. 81–96 (2004)
Pór, G., Van Bekkum, E.: Liberating the Innovation Value of Communities of Practice. Amsterdam (2004)
Potts, C.: Software Engineering Research Revisited. IEEE Software, Vol. 10 (5), pp. 19–28 (1993)
Pressing, J.: Cognitive complexity and the structure of musical patterns. In Proc. of the 4th Conference of the Australasian Cognitive Science Society, Newcastle (1997)
Pressman, R.: Software Engineering: A Practitioner's Approach. New York: McGraw Hill (1992)
Provenzo, E.: Video Kids: Making Sense of Nintendo. Massachusetts: Harvard University Press, pp. 64–65 (1991)
Randel, D. The Harvard Dictionary of Music. Harvard University Press (1986)
Revista Cultura y Encuentros. Vol. 3, (2), pp. 16 (2007)
Rosenthal, G., Soper, B., Folse, E., Whipple, G.: Role-Play Gamers and National Guardsmen Compared. Psychological Reports, Vol. 82, pp. 169–170 (1998)
Rutkowski, L.: Computational intelligence – Methods and techniques. Heidelberg: Springer (2008)
Ruzycki-Shinabarger, A.D.: Kicking Butt up and down DM3: The Discourse of Grrrl Online Computer Gamers. In Proc. of the Tenth Annual Symposium about Language and Society, Texas Linguistic Forum, Vol. 45, pp. 139–151 (2002)
Sabelfeld, A., Mantel, H.: Securing communication in a concurrent language. In Static Analysis Symposium, SAS'02, Vol. 2477 of LNCS. Berlin: Springer (2002)
Sádaba, I., Roig, G.: Internet: Nuevos escenarios, nuevos sujetos, nuevos conflictos. In Cultura Popular, Industrias Culturales y Ciberespacio, Madrid: Universidad Nacional de Educación a Distancia (2003)
Salen, K., Zimmerman, E.: Rules of Play. Cambridge: MIT Press (2004)
Sandford, K., Madill, L.: Understanding the Power of New Literacies through Video Game Play and Design. Canadian Journal of Education, Vol. 30 (2), pp. 432–455 (2007)
Saussure, F.: Course in General Linguistics. New York: McGraw-Hill (1990)
Sawamoto, J., Mutoh, K., Tsuji, H., Koizumi, H.: Evaluation of Multi-agent Model for Community Formation in Network Society. In Proc. 18th International Conference on Advanced Information Networking and Applications, pp. 131–136 (2004)
Scarlat, E., Maries, I.: A Genetic Algorithm for Community Formation based on Collective Intelligence Capacity. In LNCS 6682, pp. 271–279, Heidelberg: Springer (2011)
Scarlat, E., Maries, I.: Simulating Collective Intelligence of the Communities of Practice Using Agent-based Methods. In LNAI 6070, pp. 305–314 (2010)
Schalkoff, R.: Artificial Intelligence: An Engineering Approach. Mcgraw-Hill College (1990)
Schick, L.: Heroic Worlds: A history and guide to role-playing games. New York: Prometheus Books (1991)

Seah, M., Cairns, P.: From Immersion to Addiction in Videogames. In Proc. of the 22nd British Human-Computer Interaction Group Annual Conference on HCI 2008: People and Computers XXII: Culture, Creativity, Interaction,Vol. 1 (2008)
Sherman, W.R., Craig, A.B.: Understanding Virtual Reality: Interface, Application and Design. San Francisco: Morgan Kaufmann Publishers (2003)
Shmulevich, I., et. al.: Perceptual issues in music pattern recognition: Complexity of rhythm, and key finding.Computers and the Humanities, Vol. 35 (1), pp. 23–35 (2001)
Shmulevich, I., Povel, D.: Complexity measures of musical rhythms. In Rhythm Perception and Production, pp. 239–244, Lise: Swets and Zeitlinger (2000)
Shneiderman, B.: Computer Science Education and Social Relevance. ACM SIGCSE Bulletin, Vol. 3 (1), pp. 21–24 (1971)
Simon, A.: Emotional Stability Pertaining to the Game of Dungeons & Dragons. Psychology in the Schools, Vol. 24 (4), pp. 329–332 (1987)
Simon, H., et. al.: Economics, Bounded Rationality and the Cognitive Revolution. Northampton: Edward Elgar Publishing (2008)
Singh, S.: Computing Without Processors. Communications of ACM, Vol. 54 (8), pp. 46–54 (2011)
Sjøberg, D.: Confronting the Myth of Rapid Obsolescence in Computing Research. Communication of ACM, Vol. 53 (9), pp. 62–67 (2010)
Skowron, A.: Rough sets in KDD. In Proc. 16th IFIP World Computer Congress. Beijing: Publishing House of Electronic Industry, pp. 1–14 (2000)
Slater, M., Usoh, M., Steed, A.: Depth of presence in virtual environments. Presence: Teleoperators and Virtual Environments, Vol. 3, pp. 130–144 (1994)
Slater, M., Wilbur, S.: A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. Presence: Teleoperators and Virtual Environments, Vol. 6 (6), pp. 603–616 (1997)
Slater, M.: Measuring presence: A response to the Witmer and Singer presence questionnaire. Presence: Teleoperators and Virtual Environments, Vol. 8, pp. 560–565 (1999)
Smets, N. et al.: Assessing Human-Agent Teams for Furture Space Missions. IEEE Intelligent Systems, Vol. 25 (5), pp. 46–53 (2010)
Smite, D., Wohlin, C.: A Whisper of Evidence in Global Software Engineering. IEEE Software, Vol. 28 (4), pp. 15–18 (2011)
Smith, G.: Dungeons and dollars. Fortune, pp. 137–142 (1980)
Sommerville, I.: Software Engineering. New York: Addison-Wesley (2011)
Stam, R.: Film Theory. Oxford: Blackwell (2000)
Straus, J.: Introduction to Post-Tonal Theory. Englewood Cliffs: Pretince-Hall (2009)
Supper, M.: A Few Remarks on Algorithmic Composition. Computer Music Journal, 2001, Vol. 25 (1), pp. 48–53 (2001)
Taylor, L.: Video Games: Perspective, Point-of-view, and Immersion. Masters Thesis, University of Florida (2002)
Thimbleby, H.: User Interface Design: ACM Press Frontier Series. Boston: Addison-Wesley (1990)
Thul, E., Toussiant, G.: Analysis of Musical Rhythm Complexity Measures in a Cultural Context. In Proc. of the Canadian Conference on Computer Science and Software Engineering, pp. 1–9, Montreal (2008)
Thul, E., Toussiant, G.: On the Relation between Rhythm Complexity Measures. In Proc. of the Canadian Conference on Computer Science and Software Engineering, pp. 1–9, Montreal (2008)
Tocci, J.: The Well-Dressed Geek: Media Appropriation and Subcultural Style. In Proc. of Massachusetts Institute of Technology. Cambridge: MIT Press (2007)
Tollmar, K., Demirdjian D., Darrell, T.: Gesture + Play. Exploring Full-Body Navigation for Virtual Environments. Cambridge: MIT Artificial Intelligence Laboratory (2009)
Torres, E., Conde, E., Ruiz, C.: Desarrollo Humano en la Sociedad Audiovisual. Madrid: Alianza Editorial, pp. 117–118 (2002)
Turoff, M., Hiltz, S.: The Future of Professional Communities of Practice. In LNBIP, Vol. 22, Heidelberg: Springer (2009)
Tychsen, A., Hitchens, M., Brolund, T.: Motivations for play in computer Role-Playing Games. In Proc. of the 2008 Conference on Future Play: Research, Play, Share. New York: ACM Press (2008)
Tychsen, A., Newman, K., Brohund, T., Hitchens, M.: Cross-format analysis of the gaming experience in multi-player Role-Playing Games. Authors and Digital Games Research Association, (ADGRA) In Proc. for DIGRA 2007, Tokyo, pp. 49–58 (2007)
Vieillard, S., et. al.: Happy, sad, scary and peaceful musical excerpts for research on emotions. Cognition & Emotion, Vol. 22 (4), pp.720–752 (2008)
Vygotsky, L.: The Role of Play in Development. In Mind in Society. (Trans. Cole, M. 1978). Cambridge: Harvard University Press (1934)
Wallace, P.: The Psychology of the Internet. New York: Cambridge University Press (1999)
Walthur, J.: Computer-Mediated Communication: Impersonal, Interpersonal and Hyperpersonal Interaction. Communication Research, Vol. 23 (1), pp. 3–43 (1996)
Wang, C., Yang, H., Chou, S.: Using peer-to-peer technology for knowledge sharing in communities of practice. Decision Support Systems, Vol. 45, pp. 528–540 (2008)
Warren, J.: Unencumbered Full Body Interaction in Video Games. MFA Design and Technology. New York, Parsons School of Design (2003)
Weber, R.: Basic Content Anslysis. London: Sage Publications (1990)
Weiss, G.: Prologue –Multiagent Systems and Distributed Artificial Intelligence. In Multiagent Systems, A Modern Approach to Distributed Modern Approach to Artificial Intelligence, Cambridge: MIT Press, pp. 1–24 (1999)
Weissmann, C.: Security controls in the ADEPT-50 timesharing system. In Proc. AFIPS Conference, pp. 119–133. FJCC, (1969)


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