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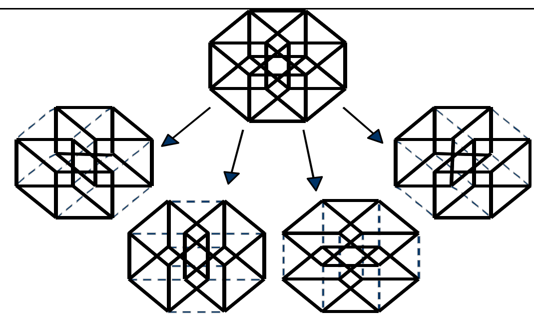

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No. Edited by: Dr. Oscar Castillo
Dr. Patricia Melin

EDITORIAL

Dear members:

In this edition of the newsletter we present two featured articles, the first one on "Dimensional Analogies" by Ricardo Perez-Aguila of UDLAP and the second one on "Fault Tolerant Intelligent Agents" by Arnulfo Alanis et. al. of Tijuana Institute of Technology. We invite you to participate in the main event of the Chapter the "International Seminar on Computational Intelligence ISCI 2006", to be held in Tijuana Mexico on October 9-11 this year. We include a detailed call for papers of ISCI 2006 in this issue. Also, we invite you to participate in the IFSA 2007 World Congress to be held in Cancun next year. We also include a detailed call for papers and special sessions for IFSA 2007 in this issue of the newsletter. We renew the invitation to all members of the chapter to send us their contributions to be included in the next edition of the newsletter, which will be the September 2006 issue.

ARTICLE

DIMENSIONAL ANALOGIES: A METHODOLOGY FOR INTRODUCING THE STUDY OF HIGHER DIMENSIONAL SPACES TO COMPUTER SCIENCE STUDENTS

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1. INTRODUCTION

This work pretends to describe the Method of Dimensional Analogies in order to aboard the study of Higher Dimensional Spaces. Basically the method considers the contemplation of an analogy between 1D and 2D spaces, as well as between 2D and 3D spaces, then (through some extrapolation) between 3D and 4D spaces; and so forth. We will describe two didactical examples of the application of the methodology: The

Bragdon's method for obtaining the 4D Hypercube and the Aguilera & Pérez method for unraveling the 4D Hypercube.

2. THE METHOD OF DIMENSIONAL ANALOGIES

As stated in the previous section, a definition or a property related to the four dimensional space can be seen as an extrapolation of an analogous one in the three dimensional space. This way of analysis has its procedural foundations in the Method of the Dimensional Analogies (Carl Sagan called them "Interdimensional Contemplations" [10]). *Flatland* [1], written by E.A. Abbott, tells the story of *A.Square*, a polygon living in a 2D universe, which is visited by a 3D being. When we are trying to visualize and understand the 4D space, the situation is similar for *Flatland*'s inhabitants (*flatlanders*) trying to visualize and understand 3D space. Due to this, it results very useful to consider the analogous situations with a reduced number of dimensions [12]. For example, try to answer the following question: What is a 4D being able to see in the 3D beings? In order to get the answer, first it must be referenced the interaction between a 3D being with a 2D being. *A.Sphere* is the 3D being that makes contact with *A.Square* in *Flatland*. From his 3D space, *A.sphere* can visualize the *Flatland* polygons' boundary, but additionally, he is able to see their interior (and therefore, their internal organs, if they have them). But in Flatland it is also referred *Lineland*, a 1D universe. *Lineland*'s inhabitants were segments whose interior was visualized by *A.Square*. By analogy, we can expect that a 4D being, interacting with our 3D universe, could visualize our "boundary" (the skin), but furthermore, he could visualize our internal organs (in other words, the 4D being's vision could work as the systems of X rays, tomography or magnetic resonance [9]).

Fundamentally, the method of the analogies considers the contemplation of an analogy between 1D and 2D spaces, as well as between 2D and 3D spaces, then (through some extrapolation) between 3D and 4D spaces; and so forth. In this way the expected results can be suggested (a hypothesis is established) [13]. Once the hypothesis is demonstrated, it is possible to suggest a generalization of the characteristic that has been proved in n-dimensional space.

At this point, the relation between the method of the analogies and the scientific method arises [13]:

- Analysis: Observation of analogies between 1D and 2D spaces; and between 2D and 3D spaces.
- Hypothesis: Proposal of an analogy between 3D and 4D spaces.
- Synthesis: Selection of a mechanism to demonstrate the analogy.
- Validation: The process of demonstration.
- Argumentation: The proposal of an n-dimensional generalization based in the analogies previously observed and the proof already achieved.

In the following sections we will discuss two illustrative didactical applications that will show the way that the Method of Dimensional Analogies provides us properties about the 4D space.

3. TWO DIDACTICAL APPLICATIONS

3.A The Bragdon's Method and the Hypercube

In [14] is presented the Claude Bragdon's method to define a series of figures which are called the ***parallelotopes*** [5]. Now, we proceed to describe it.

Figure 1. *Generation and final 1D unit segment.*

First a 0D point is taken and moved one unit to the right. The path between the first and the second new point produces a 1D segment. The first dimension, represented by the X-axis, has appeared (**Fig. 1**).

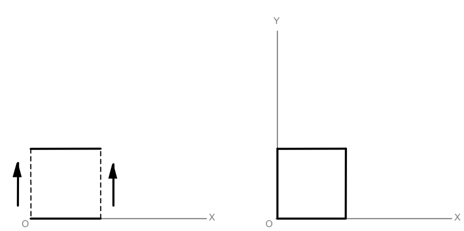


Figure 2. *Generation and final 2D unit square.*

The new segment is then moved one unit upward. The path between the first and the second new segment produces a 2D square (a parallelogram). The second dimension, represented by the Y-axis, has appeared (**Fig. 2**).

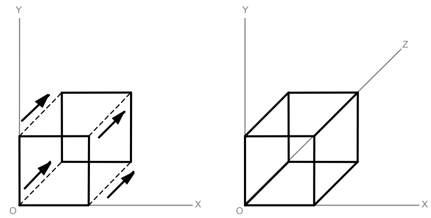


Figure 3. *Generation and final 3D unit cube.*

The new square is then moved one unit forward out this paper. The path between the first and the second new square produces a 3D cube (a parallelepiped). The third dimension, represented by the Z-axis, has appeared (**Fig. 3**). Because we are working over a 2D surface (this paper or the computer's screen), a diagonal between X and Y-axis represents the Z-axis, however it should be interpreted as a line perpendicular to this 2D surface.

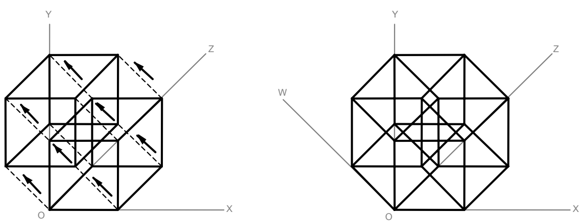


Figure 4. *Generation and final 4D unit hypercube.*

We know that the fourth dimension has a direction perpendicular to the other three dimensions; in this case the W-axis is presented as a perpendicular line to the Z-axis. Then the cube is moved one unit in direction of the W-axis. The path (six cubes perpendicular to the first one) between the first and the second new cube produces the 3D boundary of a 4D hypercube (a 4D parallelotope). The fourth dimension has appeared (**Fig. 4**).

The Bragdon's method can be continued in order to obtain and visualize the 5D hypercube and so on. We invite to the reader to continue the sequence described in **Figures 1 to 4** in order to visualize these interesting objects.

3.B. The Aguilera & Pérez Method for Unraveling the 4D Hypercube

A cube can be unraveled as a 2D cross. The six faces on the cube's boundary will compose the 2D cross (**Fig. 5.a**). The set of unraveled faces is called the unravelings of the cube.

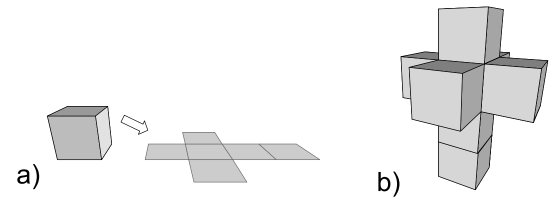


Figure 5. *a) Unraveling the cube. b) The unraveled hypercube (the tesseract).*

In analogous way, a hypercube also can be unraveled as a 3D cross. The 3D cross is composed by the eight cubes that form the hypercube's boundary [8]. This 3D cross was named tesseract by C. H. Hinton (**Fig. 5.b**). Before going any further, the cube's boundary faces can be grouped into three pairs of parallel faces, where their supporting planes define two 2D-spaces parallel to each other. Each pair can be obtained by ignoring all those edges parallel to each main axis (X, Y and Z), see **Fig. 6**.

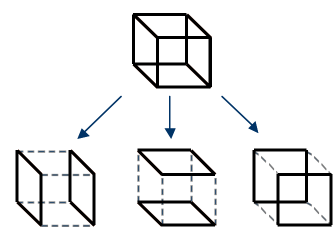


Figure 6. *Viewing the cube's boundary faces.*

It is interesting to analyze the hypercube using its analogy with the cube and the visualization methods above described. Hilbert [6] determined that a hypercube is composed of sixteen vertices, twenty-four faces and eight bounding cubes (also called cells or volumes). Similarly, and as shown in **Fig. 7**, all these volumes can be grouped into four pairs of parallel cubes, moreover, their supporting hyperplanes define two 3D spaces parallel to each other [5].

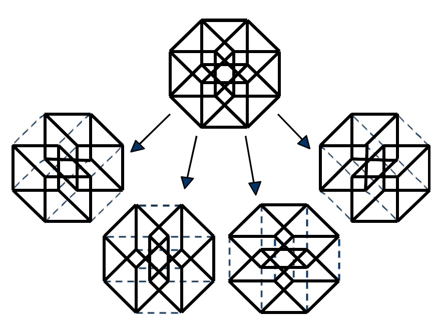


Figure 7. *Viewing the hypercube's boundary volumes.*

Coxeter [5] points that each face is shared by two cubes not in the same 3D space, because they form a right angle through a rotation around the shared face's supporting plane. These properties are visible through Bragdon's projection (**Fig. 4**).

We will describe the Aguilera & Pérez method [2] for unraveling the hypercube and getting the 3D-cross (tesseract) that corresponds to the hyper-flattening of their boundary. The transformations to apply include rotations around a plane (See [7] for details about the topic).

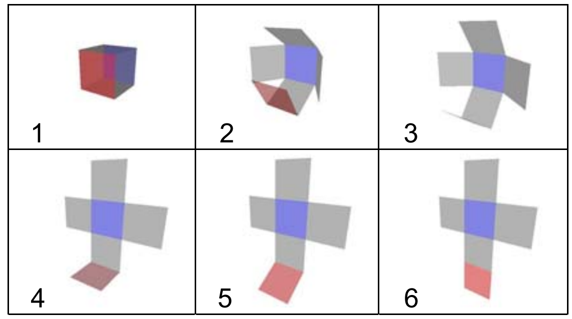
3.B.1. Cube's Unraveling Methodology

Although this process is absolutely trivial, it is included here to underline some key points that will be very useful when extending it to the 4D case. The unraveling process for a cube can be summarized in the following steps:

1. Identify a face that is "naturally embedded" into the plane where all the cube's faces will be positioned. This face will be called "central face". Because the central face is "naturally embedded" in the selected final plane (for example, the XY plane), it will not require any transformation.
2. Identify those faces that share an edge with the central face. There are four of such faces and they will be called "adjacent faces".
3. After the identification of the central and adjacent faces there will be a face whose supporting plane is parallel to central face's supporting face. This face will be called "satellite face" because its movements will be around an edge that is shared with any arbitrary selected adjacent face.
4. The adjacent faces will rotate around those edges that share with the central face.
5. When the central, adjacent and satellite faces are identified, it must be determined the rotating angles and their directions. All four adjacent faces will rotate right angles, however two opposite adjacent faces will have opposite rotating directions; otherwise, one of them will end in the same position as the central face.

Table 1 presents some snapshots from the cube's unraveling sequence. In snapshots 1 and 2, the applied rotations are 0° and ±30° (the rotation's sign depends of the adjacent face). In snapshot 3, the applied rotation is ±53°. In snapshot 4 the applied rotation is ±90°; the adjacent faces have finished their movements. In snapshots 5 to 6, the satellite face moves independently and the applied rotations are +60° and +90°.

Table 1. *Unraveling the cube (the red face is the satellite face and the blue one is the central face).*



3.B.2. Hypercube's unraveling methodology

The hypercube's position in the 4D space will define the rotating planes used by the volumes to be positioned onto a hyperplane. One vertex of the hypercube will coincide with the origin, six of its faces will coincide each one with some of XY, YZ, ZX, XW, YW and ZW planes and all the coordinates will be positive (see [4] for a methodology to get the hypercube's coordinates). See **Table 2**.

Table 2. *Hypercube's coordinates.*

Vertex	X	Y	Z	W	Vertex	X	Y	Z	W
0	0	0	0	0	8	0	0	0	1
1	1	0	0	0	9	1	0	0	1
2	0	1	0	0	10	0	1	0	1
3	1	1	0	0	11	1	1	0	1
4	0	0	1	0	12	0	0	1	1
5	1	0	1	0	13	1	0	1	1
6	0	1	1	0	14	0	1	1	1
7	1	1	1	0	15	1	1	1	1

The hypercube's position in the 4D space is important, since it will define the rotating planes to use. The situation is the same for the selected hyperplane, because it is where all the volumes will be finally positioned. Observing the hypercube's coordinates we can see that eight of them present their fourth coordinate value (W) equal to zero. This fact represents that one of the hypercube's volumes (formed by vertexes 0-1-2-3-4-5-6-7) has W=0 as its supporting hyperplane. Selecting the hyperplane W=0 is useful because one of the volumes is "naturally embedded" in the 3D space and it won't require any transformations. It is useful to identify the hypercube's volumes through their vertices and to label them for future references. Until now we have one identified volume, it is formed by vertexes 0-1-2-3-4-5-6-7, and it will be called volume A. See **Table 3**.

Table 3. *The hypercube's volumes*

Volume	**Vertices (Refer to Table 2)**
A	0-1-2-3-4-5-6-7
B	0-1-2-3-8-9-10-11
C	0-2-4-6-8-10-12-14
D	0-1-4-5-8-9-12-13
E	8-9-10-11-12-13-14-15
F	4-5-6-7-12-13-14-15
G	1-3-5-7-9-11-13-15
H	2-3-6-7-10-11-14-15

We described volume A as "naturally embedded" in the 3D space, because it won't require any transformations. Volume A will occupy central position in the 3D cross and it will be called "central volume".

From the remaining volumes, six of them will have face adjacency with the central volume. Due to this characteristic they can easily be rotated toward our space because their rotating plane is clearly identified. Each of these volumes will rotate right angles around the supporting plane of its shared face with central volume. In this way we guarantee that their W coordinate will be equal to zero. They will be called "adjacent volumes". Adjacent volumes are B,C,D,F,G and H. The remaining volume E will be called "satellite volume". The direction and rotating planes for each adjacent volume are presented in **Table 4** (the central volume is also included in each image as a reference for the initial and final position of the volume being analyzed). At this point, we have seven of the eight hypercube's volumes placed in their final positions (volumes A,B,C,D,F,G and H). Volume E, the satellite volume, will perform a more complex set of transformations.

In order to determine the needed transformations for the satellite volume, we must first select the volume which will share a face with it. Any volume, except the central one, can be selected for this. In this work, volume D will be selected to share a face with satellite volume through the hyper-flattening process. The set of movements to be executed for the satellite volume are summarized in the **Table 5** (Central volume and volume D are shown too).

Table 4. *Applied transformations to the adjacent volumes.*

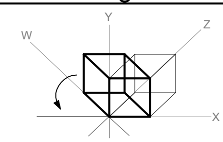
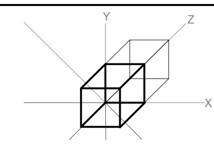
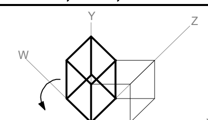
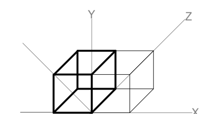
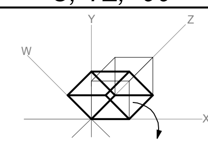
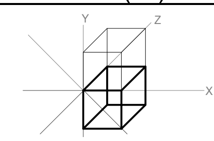
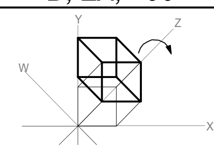
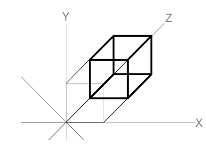
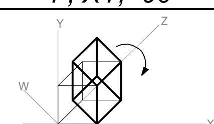
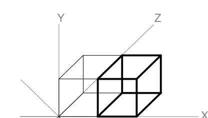
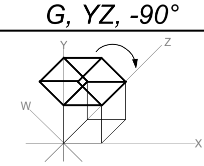
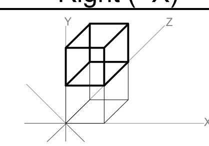
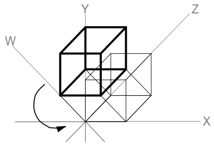
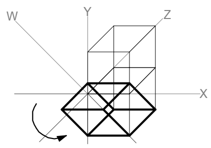
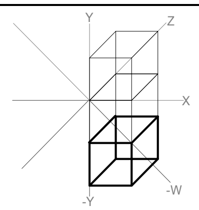
Adjacent volume (previous to rotation), rotation plane and angle	Position in the 3D space and in the tesseract after rotation
 B, XY, +90°	 Front (-Z)
 *C, YZ, -90°*	 Left (-X)
 *D, ZX, +90°*	 Down (-Y)
 *F, XY, -90°*	 Back (+Z)
 *G, YZ, -90°*	 Right (+X)
 *H, ZX, -90°*	 Up (+Y)

Table 6 presents some snapshots from the hypercube's unraveling sequence. In snapshots 1 to 6, the applied rotations are ±0°, ±15°, ±30°, ±45°, ±60° and ±75° (the rotation's sign depends on the adjacent volume). In snapshot 7, the applied rotation is ±82°; the satellite volume looks like a plane --an effect due to the selected 4D-3D projection. In snapshot 8, the applied rotation is ±90°; the adjacent volumes finish their movements. In snapshots 9 to 14 the satellite volume moves independently and applied rotations are +15°, +30°, +45°, +60°, +75° and +90°.

***Table 5.** Associated transformations to satellite volume.*

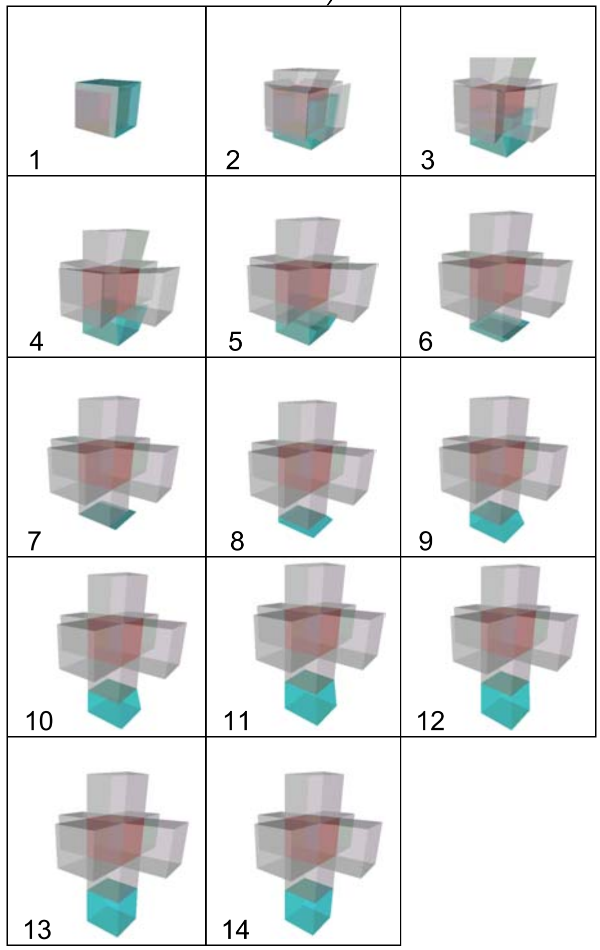
Current position	Transformations
	Rotation of volumes D and satellite around the plane ZX (+90°).
	Volume D is in its final position. Rotation of satellite volume of +90° around the shared face with volume D (parallel plane to ZX).
	Satellite volume in its final position (inferior position in the 3D cross on Y axis).

3.B.3. The n-Dimensional Hyper-Tesseract

Observing the unravelings for a square (a 2D cube), a cube and the 4D hypercube and the fact a nD parallelotopes-family share analogous properties [5] we can generalize the ***nD hyper-tesseract*** (n≥1) as the result of the (n+1)-D parallelotope's unraveling with the following properties [2]:

- The (n+1)-D hypercube will have 2(n+1) nD cells on its boundary [4].
- A central cell is static in the unraveling process.
- 2(n+1)-2 cells are adjacent to central cell. All of them will share a (n-1)-D cell with central cell.
- A satellite cell won't be adjacent to central cell because their supporting hyperplanes are parallel. It will be adjacent to any of the adjacent cells (it will share a (n-1)-D cell with the selected adjacent cell).
- All the adjacent cells and satellite cell during the unraveling process will rotate ±90° around the supporting hyperplane of the (n-1)-D shared cells.

***Table 6.** Unraveling the hypercube (satellite volume is shown in blue and central volume in red).*



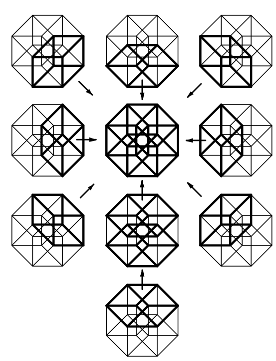


***Figure 8.** The possible adjacency relations between the 4D hyper-tesseract's central hypervolume and adjacent hypervolumes.*

For example, the 4D hyper-tesseract is the result of the 5D hypercube's unraveling. The 4D hyper-tesseract will be composed by 10 hypervolumes, where one of them will be the central hypervolume (static), eight of them are adjacent to central hypervolume (they share a volume) and the last one will be the satellite hypervolume (it shares a volume with any of the adjacent hypervolumes). See **Fig. 8**. The adjacent hypervolumes and the satellite hypervolume will rotate around a volume or a hyperplane during the unraveling process.

4. A NOTE ABOUT THE METHOD

Coxeter [5], Hilbert [6], Banchoff [4], Sommerville [11], among other authors, consider that the approach based in the Method of Dimensional Analogies is very fruitful in suggesting what results should be expected. However, they point out, the results obtained should be verified formally through algebraical or axiomatic methods [5], because incorrect results could be obtained. For example, consider the following example: The circumference of a circle is $2\pi r$, while the surface of a sphere is $4\pi r^2$. Then, by analogy, one could expect that the hyper-surface of a 4D hyper-sphere to be $6\pi r^3$ or $8\pi r^3$. By means of algebraical computations we can get the correct expression: $2\pi^2 r^3$ (see the Apostol book [3]).

5. THE METHOD OF DIMENSIONAL ANALOGIES AS A DIDACTICAL TOOL AND CONCLUSIONS

In spite of the previous comment, we can not ignore the application of the Method of Dimensional Analogies in order to introduce the students to the study of Higher Dimensional Spaces. Recent interest has been growing in studying multidimensional polytopes (4D and beyond) for representing multidimensional phenomena in the Euclidean n-dimensional space. Some of these phenomena's features rely on the polytope's geometric and topologic relations. In this sense, the Computer Science field has a very important relation with these studies. Moreover, Banchoff [4] motivates us to think about two important questions: Is it possible to visualize a polytope to know how it looks like? And if we can't see it, how can we be sure about the proper understanding of its relations and properties? The answer is that the task of visualizing and analyzing polytopes in the fourth and higher dimensions belongs to fields such as Computer Graphics and Computational Geometry. Because the method is intuitive in some cases, it provides students some results to expect and motivates them to verify that results by a formal way.

ACKNOWLEDGEMENTS

The method for unraveling the hypercube was originally presented in WSCG 2002 by Antonio Aguilera, PhD (UDLAP) and the author. I thank him for his valuable comments and suggestions.

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ARTICLE

INTERACTION OF FAULT TOLERANT INTELLIGENT AGENTS (AITF) WITH WHATSUP GOLD® (WSG) IN the COMPANY SONY STE"

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Abstract. Intelligent Agents have originated a lot of discussion about what they are, and how they are different from general programs. We describe in this paper a new paradigm for intelligent agents. This paradigm helped us deal with failures in an independent and efficient way. We proposed three types of agents to treat the system in a hierarchic way. A new way to visualize fault tolerant systems (FTS) is proposed, in this paper with the incorporation of intelligent agents, which as they grow and specialized create the Multi-Agent System (MAS). The MAS contains a diversified range of agents, which depending on the perspective will be specialized or evolutionary (from our initially proposal) they will be specialized for the detection and possible solution of errors that appear in an FTS). The initial structure of the agent is proposed in [1] and it is called a reflected agent with an internal state and in the Method MeCSMA [2].

1 Introduction

At the moment the approach using agents for real applications, has worked with movable agents, which work at the level of the client-server architecture. However, in systems where the requirements are higher, as in the field of the architecture of embedded industrial systems, the idea is to innovate in this area by working with the paradigm of intelligent agents. Also, it is a good idea in embedded fault tolerant systems, where it is a new and good strategy for the detection and resolution of errors.

A study of the scenes is made, possible, with the simulator INTERACTION OF FAULT TOLERANT INTELLIGENT AGENTS (AITF), to the results obtained with the Whatsup, in the Sony plant, to visualize his evolution changing its initial states.

1 Agents

Let's first deal with the notion of intelligent agents. These are generally defined as "software entities", which assist their users and act on their behalf. Agents make your life easier, save you time, and simplify the growing complexity of the world, acting like a personal secretary, assistant, or personal advisor, who learns what you like and can anticipate what you want or need. The principle of such intelligence is practically the same of human intelligence. Through a relation of collaboration-interaction with its user, the agent is able to learn from himself, from the external world and even from other agents, and consequently act autonomously from the user, adapt itself to the multiplicity of experiences and change its behaviour according to them. The possibilities offered for humans, in a world whose complexity is growing exponentially, are enormous [1][4][5][6].

2 WhatsUp

WhatsUp Gold is a graphical network monitoring system designed for multi-protocol networks. WhatsUp Gold monitors your critical devices and services and initiates visual and audible alarms when it detects a problem. In addition, WhatsUp Gold will notify you remotely by beeper, alphanumeric pager, e-mail, or telephone. WhatsUp Gold runs on Windows 2000 (SP2 or later), Windows NT 4.0 (SP 6A or later), Windows 98, Windows ME or Windows XP on Intel platforms[6].

3 What is fault-tolerance?

Fault tolerance means either that a system has a well defined failure behavior or that it has the ability to mask failures to the user. A well defined failure behavior is a failure behavior that follows some well defined pattern. Masking failures means that the system somehow is able to provide the required service even thought a failure has occurred.

4 Results

This I articulate is been from an investigation project that developed, consisted in the study of the servants of the network in the Sony Company of Tijuana this to incorporate it of the system of Fault tolerant Intelligent Agents. In such a way that when detecting a fault on watch in some servant, this is boarded immediately to repair it of automatic form without intervention of users or administrators. WhatsUp Gold is a solution of mapping, miniaturization, notification, and information of yield for networks that helps to the engineers and network administrators to quickly detect and to solve the problems of the network. The system of WhatsUp Gold must be analyzed for the objective of this project since SONY of Tijuana This has built-in this technology in its enterprise network. SONY of Tijuana This, is a corporation leader in electronics and of entertainment, In SONY of Tijuana This, they count on different areas, such as it manufactures, design, investigation and development, sales, service.

The Center of Design of SONY of Tijuana This develops three areas: Software, Hardware and Mechanical Engineering. Within the Group of Design it is where one worked for the study and analysis of his network. The network counts on an ample number of servants, which was very complicated to include it to all in the project, but the study focused the servants who greater index of failures presents/displays in the services that this must offer and be active. The problem object of the project is the tolerance to failures of the servants within the network. A Fault tolerant System is that that has the internal capacity to preserve the correct execution of the tasks in spite of the occurrence of failures in hardware and software. In them, the presence of the failures is masked using redundancy (in any level).

The objective is to avoid the failure of the system, even in the presence of failures. The method that is desired to incorporate in the network of the center of design of SONY for detection and correction of faults is by means of an intelligent system. The Artificial intelligence (IA) tries to include/understand the principles of the intelligent behavior and thus to specify methods to design intelligent systems or to construct machines that make things that would require intelligence if they were done by human beings. At the moment in the IA a new paradigm known like "paradigm of agents" has arisen. This new paradigm approaches the intelligent development of organizations that can act of independent and reasoned form or. Within the IA is as study area the Intelligent Agents. An agent is everything what she can consider itself that perceives its atmosphere by means of sensors and that responds or acts in so acclimates by means of effectors. In the development of the project I specify myself like is that the paradigm is taken from Intelligent Agents to face the problematic one of Tolerance failures to be incorporated a model in the center of Design (central point of the administration of the network) of the Sony company of Tijuana.

From the results of the Whatsup, take a sample for the study, table 1, and was come to the capture of some data of the WhatUp program, which are next., and we took the value from variable Cosay the Error of the Winsock, from which single we took the 3 first data.

Table 1. Date of Whatsup

From: "WhatsUp" <whatsup@%l>				
Subjects: %c %n %v %u at %t				
#	Name to unfold	UP DOWN EVENT NAME SVC	Direction IP	Present Time
1	DVI-PC3/DVI-2TA8 Wireless	DOWN	43.130.168.70	2:23:03 PM
Date	line 1 of information	low Services	State of WhatsUp Gold	Cosay the Error of the Winsock
Friday, April 16, 2004			Timed Out	11010

4.1 Simulation of the System Dvi-pc3/dvi-2ta8 Wireless.

Initially all their values are extents of any error, see fig 1.

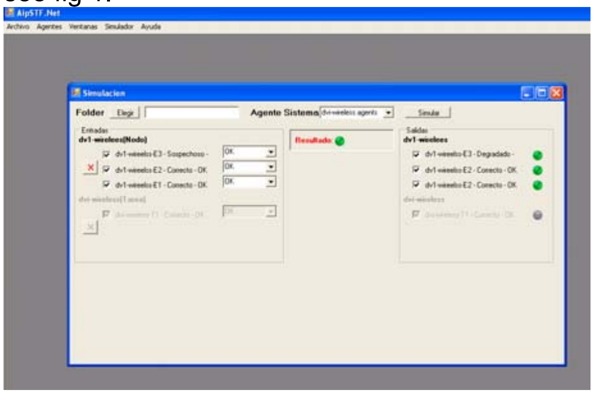

Fig 1 free simulation of error

A state of entrance to Degraded State is modified, see fig 2.

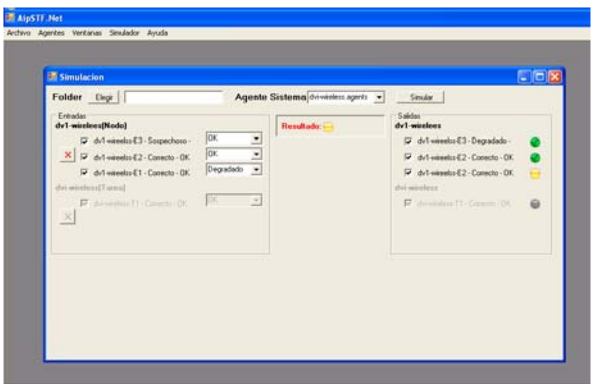

Fig 2 Degraded final State of the System Dvi-pc3/dvi-2ta8 Wireless.

Modification of 2 of the state of entrance to Degraded State and Error, fig 3

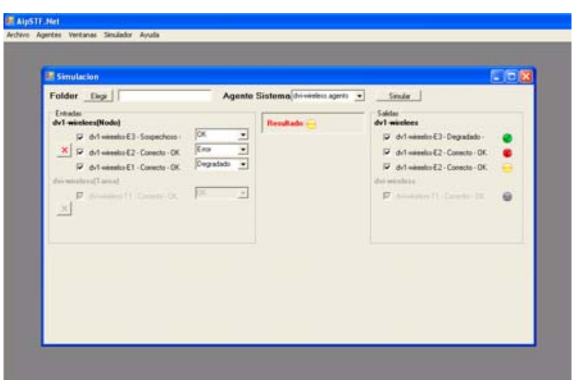

Fig 3 Degraded final State of of the System Dvi-pc3/dvi-2ta8 Wireless.

5 Conclusions

We described in this paper, the development and evaluation of the simulator..., in the Sony plant this, for processes of client servant, firstly analyzed with whatsup, and immediately showing several scenes of possibilities of error, and good results were obtained, which, to the company I help them, to be able to plan methods of solution.

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ONGOING THESES

Intelligent Control of an Autonomous Mobile Robot Using Type-2 Fuzzy Logic

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Abstract. We develop a tracking controller for the dynamic model of unicycle mobile robot by integrating a kinematic controller and a torque controller based on Type-2 Fuzzy Logic. Computer simulations are presented confirming the performance of the tracking controller and its application to different navigation problems. Simulation results are compared with a type-1 fuzzy controller to establish the conditions under which a type-2 fuzzy controller can have advantages over a traditional fuzzy controller. A mobile robot in uncertain environments is better suited for type-2 fuzzy control.

Monitoring and Diagnostics with Intelligent Agents Using Fuzzy Logic

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Abstract. We describe in this paper a new paradigm for intelligent agents. This paradigm helped us deal with failures in an independent and efficient way. We proposed three types of agents to treat the system in a hierarchic way. A new way to visualize fault tolerant systems (FTS) is proposed, with the incorporation of intelligent agents, as they grow and specialize create the Multi-Agent System (MAS). The MAS contains a diversified range of agents, which depending on the perspective will be specialized or evolutionary (from our initially proposal) they will be specialized for the detection and possible solution of errors that appear in an FTS). The present work is based on the idea that with the help of the paradigm of intelligent agents, we may be able to handle fault tolerant systems, in the modality of embedded systems. The idea is to detect errors and to try to correct the failures that could happen in industrial control by monitoring and diagnosis.

Type-2 Fuzzy Logic as a Method of Response Integration in Modular Neural Networks

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Abstract
We describe in this paper the use of neural networks and type-2 fuzzy logic for pattern recognition. In particular, we consider the case of speaker recognition by analyzing the sound signals with the help of intelligent techniques, such as the neural networks and fuzzy systems. We use the neural networks for analyzing the sound signal of an unknown speaker, and after this first step, a set of type-2 fuzzy rules is used for decision making. We need to use fuzzy logic due to the uncertainty of the decision process. We also use genetic algorithms to optimize the architecture of the neural networks. We illustrate our approach with a sample of sound signals from real speakers in our institution.

A Hybrid Approach with Modular Neural Networks and Fuzzy Logic for Time Series Prediction

Omar Blanchet, Martha Ramirez, Maribel Gutierrez, Jassiny Quintero, Alejandra Mancilla and Patricia Melin
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Abstract
We describe in this paper the application of several neural network architectures to the problem of simulating and predicting the dynamic behavior of complex economic time series. We use several neural network models and training algorithms to compare the results and decide at the end, which one is best for this application. We also compare the simulation results with the traditional approach of using a statistical model. In this case, we use real time series of prices of consumer goods to test our models. Real prices of tomato in the U.S. and Mexico show complex fluctuations in time and are very complicated to predict with traditional approaches.

CALL FOR PAPERS

International Seminar on Computational Intelligence 2006
IEEE CIS- Chapter Mexico
October 9-11, 2006, Tijuana, Mexico
Hosted by: Tijuana Institute of Technology

General Chair: Prof. Dr. Patricia Melin, Tijuana Institute of Technology –Mexico
Program Co-Chairs: Prof. Dr. Oscar Castillo, Tijuana Institute of Technology –Mexico
Prof. Dr. Eduardo Gomez-Ramirez La Salle University, Mexico,
www.hafsamx.org/cis-chmexico/seminar06

The International Seminar on Computational Intelligence will be held this year in Tijuana, Mexico, October 9-11, 2006. The Seminar is supported by the IEEE Computational Society, Chapter Mexico, and by the Hispanic American Fuzzy Systems Association (HAFSA). Sponsorship of the Seminar is by the Tijuana Institute of Technology and the National Research Council of Mexico (CONACYT). The Seminar will consist of Distinguished Lectures, Invited Lectures, regular paper presentations and student paper presentations. The first day of the Seminar, for the opening ceremonies, Prof. Witold Pedrycz will give a Keynote presentation, under the IEEE Distinguished Lecture Program, entitled "Human-Centric Constructs of Granular Computing and Fuzzy Logic". After this keynote presentation, several invited speakers, coming from Mexico and USA will give interesting lectures on their respective areas of research. A technical program of regular and student paper presentations will follow. Also, a workshop on "Hybrid Intelligent Systems" will be organized by members of HAFSA on the second day of the seminar. For the students, a Best Paper Competition will be organized, and awards for the best three papers will be given to the students. The awards will consist on Books, and Journals given by International Publishers and Certificates of Achievement.

Important Dates

Paper Submission deadline:	June 30, 2006
Acceptance of papers:	July 31, 2006
Registration	August, 26, 2006
Publication (CD format):	October 9, 2006

Registration
There will be no official cost of registration to the International Seminar. However, registration is strongly encouraged, as space will be limited to 50 participants in this seminar. For more information visit the web page:

www.hafsamx.org/cis-chmexico/seminar06

IFSA 2007 World Congress
HAFSA Association
June 18-21, 2007, Cancun, Mexico
Hosted by: Tijuana Institute of Technology
General Chair: Prof. Dr. Oscar Castillo
Tijuana Institute of Technology –Mexico
Program Chair: Prof. Dr. Patricia Melin, Tijuana Institute of Technology –Mexico
www.hafsamx.org/ifsa2007

The IFSA 2007 World Congress will consist of papers describing research work that deals with Computational Intelligence (CI) methodologies for the development of hybrid intelligent systems. CI methodologies at the moment include (at least) Fuzzy Logic, Neural Networks, Genetic Algorithms, Intelligent Agents, and Chaos Theory. The use of intelligent techniques, like neural networks, fuzzy logic and genetic algorithms, for real-world problems is now widely accepted. However, still the performance of any of these techniques can be improved, in many situations, by using them in conjunction with other techniques. For example, genetic algorithms can be used to optimize the design of a neural network for time series prediction, or fuzzy logic can be used to combine the information from expert neural modules, just to mention two cases. Also, mathematical methods, like the ones from Chaos and Fractal Theory, can be used in conjunction with intelligent techniques to improve the performance of hybrid systems for real-world applications. The international conference will consist of papers addressing these hybrid approaches and similar ones, either theoretically or for real-world applications. Also, distinguished internationally recognized invited speakers will give lectures on the main areas of CI. The conference is intended primarily for researchers and graduate students working on these research areas

Call for Papers:

1 Successful new applications to real-world problems of CI techniques that are found to achieve better results than conventional techniques. In this case, special attention should be given to the metrics used to compare CI techniques with conventional ones.
2 Developments of innovative hybrid methods combining CI techniques and conventional techniques. In this case, the problems to be considered in these papers may not be as complex as the ones in the previous point, but the authors have to explain very carefully how their proposed method could be used, in the future, to solve real-world problems.
3 Papers considering original research on new CI architectures, models or techniques are also welcome, but the authors would have to make a detailed description of how their proposed approach is compared with other related approaches.

Specific Topics of interest (not limited to)

- Fuzzy Logic Theory
- Fuzzy Control
- Fuzzy Logic in Pattern Recognition
- Type-2 Fuzzy Logic
- Intuitionistic Fuzzy Logic
- Fuzzy Logic Applications
- Neural Networks Theory
- Neural Network Control

Neural Networks for Prediction
Neural Networks for Pattern Recognition
Modular Neural Networks
Neuro-Fuzzy Models and Applications
Evolutionary Computing Theory
Genetic Algorithms for Applications
Genetic Algorithms for Neural Network Optimization
Genetic Algorithm for Fuzzy System Optimization
Genetic Fuzzy Systems
Genetic Neural Systems
Neuro-Fuzzy-Genetic Approaches
Intelligent Agents
Swarm Intelligence
Chaos Theory and Fractals

Call for Special Sessions and Panel Discussions

The IFSA 2007 Program Committee also solicits proposals for special sessions and panel discussions within the technical scope of the congress. Special sessions or panel discussions are organized by internationally recognized experts, and aimed to bring together researchers in a focused topic. Papers submitted for special sessions or panel discussions are to be peer-reviewed with the same criteria used for the contributed papers.

Researchers interested in organizing a special session or a panel discussion are invited to submit a formal proposal by e-mail to Program Chair Prof. Patricia Melin, pmelin@tectijuana.mx.

Special session or panel discussion proposals should include the session title, a brief description of its scope, motivation, and its appeal to the attendees of this conference, organizer names, contact information, and brief CVs of the organizers.

Important Due Dates

Special Session and Panel Discussion Proposals:	*8 September, 2006*
Acceptance of Special Session and Panel:	*18 September, 2006*
Paper submission:	*16 October, 2006*
Decision Notification:	*15 December, 2006*
Camera ready copy due	*29 January, 2007*
Conference dates:	*18-21 June, 2007*

For more information visit the web page: www.hafsamx.org/ifsa2007

Contributions For The Next Issue

We invite all members of the chapter to send us their contributions for publication in the next edition of the newsletter, which will be the September 2006 issue.

The information that you can send are: Articles, Conference Report, Call for Papers, Conference Calendar, and all other news that you consider can be of interest for chapter members.

For your contribution send an e-mail to pmelin@tectijuana.mx , before August 18, 2006.