Towards a New Digitalized Knowledge Paradigm

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Abstract:- We propose a new Digitalized Knowledge paradigm that takes into consideration the People's intelligence as users of Cyber space. If the discipline that actually handles Knowledge is KM, Knowledge Management, our aim is to create the basement of an enhanced management system that handles (K + K') instead, where K corresponds to the actual formal established knowledge and K' corresponds to the actual "informal" People's knowledge. We discuss in this document a set of Basic Conjectures to build a body doctrine that enables us to define symmetries in both cognitive domains, namely the Establishment Domain and the People's Domain, in order to facilitate the building of an enhanced and evolutionary Human intelligence.

As a first step an intelligence skeleton is proposed for the K side that enables us to see order in the huge reservoirs of Knowledge documents, as the triad: Logical Tree of the Human Knowledge, Thematic Thesaurus of the Human Knowledge, and documents. As a second step we try to define an equivalent and symmetric triad for the other side K'.

To check our conjectures we have built under a Cooperation Agreement between Intelligent Agents Internet Corp, an American Research and Development firm, http://www.intagsolutions.com, and an Argentine university, Universidad CAECE, http://www.caece.edu.ar from Argentina, a Prototype (hosted in http://www.intag.org) that "prima facie" demonstrates that this new paradigm works well in the Web space performing the (K + K') logical addition process that involves a continuous equilibrium between K and K' enabling the transfer of intelligence from one domain to the other, and vice versa. The communication between K and K' is performed throughout an *e-membrane*, functionally resembling a bio membrane with and endoderm, a mesoderm and an ectoderm.

The Digitalized K Domain is well known but on the contrary, the K' Domain as depicted in this document is almost undefined today; as we only have people interacting against K, and now suggest a set of conjectures under which (K + K') would work. Under this new paradigm the progressive creation of the K' triad is feasible, providing us a new way to enhance knowledge management. Examples of this enhancement will be: the building of high resolution search engines with the capability to locate precisely almost everything hosted in the Establishment Domain in a few queries; to know as much as possible the people's behavior patterns, what they need and what they want; and at the same time to know as much as possible about the K' intelligence as a whole entity. Both sides interacting and communicating harmoniously could strive towards a human welfare utopia.

The field of applications of *e-membranes* under this new paradigm is too wide, namely: super search engines providing users efficient YGWYW You Get What You Want interfaces in a few clicks; inherent automatic intelligence retrieval from huge reservoirs, as for instance the Web Thesaurus; detection and classification of people's pattern behaviors in Portals and networks of high volume of man-machine interactions; recovering of inherent intelligence dispersed in databases; differential real time Data Mining on inflow data; automatic generation of Human Knowledge Maps; evolutionary match making interfaces in B2B and B2C, and many others derived from (K+K') scenarios.

*Key-words:-K*nowledge management, Knowledge maps, Digital epistemology, Web thesaurus, Knowledge paradigm, Human pattern behavior, Learning systems, E-membrane, Thematic thesaurus, Data mining.

1 Introduction

We are going to refer to the part of *Knowledge* contained and flowing inside digital media, basically speaking, a collection of zeros and ones. Knowledge is an asset [1] [7] that resides within people, be it physical or juridical persons, and on documents. There are persons considered "Authorities" as well as documents considered as such because their contents have been created or guaranteed by them.

People constantly experience knowledge simply by living, being alive and active and express it as a subtle form of energy closely related to information. A craftsman that creates furniture implicitly irradiates knowledge by the simple fact of building a wooden box, and somehow synthesizing all possible description, features, and opinions about that particular piece of furniture. Works "speak for themselves". A dancer can transmit through a mere gesture not only emotion but also knowledge. In Oriental Arts, this is how knowledge transmission occurs in "master_to_students" sessions, and particularly in "master_to_disciple" mode, as masters used to say "from heart to heart", where practically without words knowledge is precisely transmitted by gestures.

Another form of knowledge that we must consider are *"people's opinions"*. People are continuously issuing opinions almost about everything. These opinions are listened to, amplified, distorted and broadcasted according to the importance assigned to them by people and to the authority of those who express them.

2 Information as a basic nutrient

Man needs information as a basic nutrient to satisfy his curiosity, to grow in knowledge, for his welfare and to survive. Let us see how he achieves his purpose. When a nutrient is needed and the environment doesn't offer it, man must look for it outside and find it. The purpose of academic institutions is to satisfy in an orderly way a set of basic cognitive needs. Once the human being nurtures itself from these knowledge fountains, normally in his early years, he obtains further knowledge from books, massive broadcasting media, conferences, other institutions and authorities. People express their needs or curiosity through gestures or by speaking. Leaving gestures aside (for the moment, at least), let us see how this need is expressed through "words".

People have cognitive needs according to their society roles [3] [11]. Let us imagine a medical doctor, specialized in gastroenterology, is following an IT course. As a medical graduate he is interested in anything related to gastroenterology and related topics at its deepest level meanwhile as an IT student he is interested in basic knowledge on computers. But suppose he is also a University Professor in his specialty and a member of his corresponding Professional College. The concepts expressed within his classes, as an authority, are surely structured in a syllabus of his discipline and supposedly he is convinced and sure of what he is teaching. Something similar occurs in his role as a professional. If for an instant we were enabled to "see" the sequence of his reasoning while he teaches we would observe that it is quite lineal and foreseeable. If, on the other hand, we imagine him as a computer student, attending classes in a classroom or virtually with distance learning, we would observe a rather chaotic and unforeseeable sequence of reasoning.

Note: This vision should be understood statistically asking oneself which would be the probability an experimented observer could define the process observed as lineal and predictable.

3 Cognitive Integration

Whoever inquires to satisfy his curiosity or to integrate knowledge is building his own cognitive edifice [2], according to his background, his vocation and his needs. In our previous example, we had a gastroenterologist for whom computers would be just a tool. What he incorporates as knowledge will depend on his formation and his natural talents such as his capacity of abstraction.

The most we can infer is that the person who satisfies his informative needs through questioning does so in a convergent way, as much as possible, diminishing his uncertainty until he is completely satisfied. If for a question A he obtains, lets say, an uncertainty of 10000 (measured in amount of possible answers to his needs), he will elaborate a second question B that will probably reduce his uncertainty to, for example, 1000 and so forth until he finds a satisfactory answer of an uncertainty equal to 1 that indicates certainty: he finally found what he was looking for.

Human beings develop with time their own *"search strategies"* to satisfy their cognitive needs. These strategies are dependent of the individual and can change along the time. To find the same information a person won't always use the same strategy; it can vary according to the flow of questions and answers of that specific questioning process, or even according to his current mood. *Search strategies in K' domain would behave like keywords in K.*

4 Opinions – Subjects

When we consider opinions, people's reasoning looks equally complex. If people act reflectively, answering elaborate questions according to a determined and established order, and somehow under some external surveillance their opinions will be conditioned to a certain degree. People express opinions freely inside intimate circles or when they consider it a right or a duty. Many times people don't express their opinions verbally but act consequently and opinions can be inferred from attitudes.

What opinions do people express?: We said in our introduction that people express opinions about anything, which seems quite ambiguous. We can be more precise saying that people express opinions on specific "subjects", topics or affairs [4].

A subject is a matter of interest, i.e. it is a concept, but not every concept is a subject. Subjects are either subjective or collective. For example, "keywords" are concepts and as such are perfectly definable. A knowledge discipline can be represented by its keywords and by its subjects, both intimately related to each other. As we shall see, documents of a specific discipline can be imagined as a linear sequence of keywords and "words of common use", belonging to a specific "Jargon". Perhaps the most suitable acceptation for keyword would be concept and it could be defined as a sequence of one or more words, common and uncommon that by convention has acquired a special meaning. For example, parallel and process are both common words, but "parallel process" can acquire special meaning within computer-related disciplines. Any uncommon word, like for instance a name, is a keyword.

Previously we sustained that subjects are keywords that acquire special significance according to the interests they awaken. When referring to interest we speak of the interest for people, in their role of person or authority. Authorities and the documents they edit refer to subjects expressed as authorized (formal) opinions. Subjects, that are also keywords, can be new keywords or can be made up of one or more existing keywords. Subjects tell people about some "ability", some special talent they are interested to know, to master!.

Let's clarify this with examples. "Parallel Processing in Distributed Networks" is a subject, made up of the keywords "Parallel Processing" and "Distributed Networks". We could, on the other hand, define it by an acronym as "Propardist" that defines a new keyword. Keywords generally have precise definitions, while a subject is a matter of opinion.

5 Subject Trees – Logical Trees

Subjects are normally ordered within each *Discipline* or *"Major Subject"* of knowledge. We may imagine knowledge opened into different disciplines that cover it completely with a certain degree of overlapping amongst them, and we may equally consider each discipline opening into several subordinate disciplines. This is equivalent to sustaining that human knowledge – seen on the side of *Established Order*- could be abstracted as a *Logical Tree* with hierarchies decreasing from root to leaves. This is not always true; however it can be a reasonable convention as were the Dewey Decimal Classification Systems, and the Linnaeus System for the animal kingdom.

It would be more accurate to say that knowledge and its disciplines could be depicted at any moment as a dense interrelated Graph that according to the relative importance people assign to its major subjects, dominant trees and pseudo trees appear as highlighted. In this evolutionary model we can observe that subjects and keywords tend to highlight and fade different from time to time. At time passes by progressive changes of the Graph are experimented such as branches that ascend in its relative importance or hierarchy, branches on the other hand that descend in hierarchy or start depending of other branches, branches that become leaves or leaves that become branches and even new roots (as is the case of Genetic Engineering within Biology or Nanotechnology within Physics).

6 Level of Specificity

"Keywords_whithin_subjects" are generally assigned in a *specific way* where specificity refers to its level within the tree. If a subject is near the root of the discipline we must suppose that the all authority-documents indexed at that level will use keywords accordingly. It's something like saying that books that introduce a discipline, as for example General Economy, treat economy at a global level, understandable to all those who want an overall view of the discipline and using keywords specifically related to such level. On the other hand, if we speak of an authority-document of a subordinate and very specific subject, it is expected that the author/s use keywords that unequivocally corresponds to this level, and that eventually could be properly defined within the document.

If we would have at hand all the keywords of a given discipline and all its subjects ordered as a tree, and a significant sample of authorities dealing with the discipline at a certain degree of redundancy, we could envisage an assignation algorithm that retrieve keywords from those documents first and then makes the "specific" assignation of keywords to subjects, level by level. Each level should have assigned the keywords that originate specifically in this level, neither upwards nor downwards. This specificity suggests a feedback to editors, authorities and "agents": avoid/disregard as much as possible the use/mention of upper levels (too general/too trivial) and lower levels keywords (too specific/unnecessary detail).

7 Thematic Thesauri

The set of keywords of a discipline and its related logical tree is called a *"Thesaurus"*. We make reference to "*Thematic Thesauri"*, and not to the classical Thesauri, that are collections of words and their synonyms. *The Thematic Thesauri are, as we shall see, the inherent intelligent structures of the Content Reservoirs of different disciplines or collection of documents that treat specific topics of importance.* A Catalog of automobile or airplane parts (components) is an example of a topic of great importance that should be associated to a Thematic Thesaurus.

Knowledge could be represented by the Triad [*Thematic Thesaurus, Logical Tree, and a Sample Collection of Authority Documents*] in an acceptable level of quality and completeness at a given moment. Evidently Formal Knowledge is more than that [7], depending on the meaning of "acceptable level of quality and completeness". Just as a way to clarify these ideas, let us play a bit with numbers. Let be Medicine with a Thesaurus that contains 100.000 keywords, associated to a tree of 1.500 branches and leaves. If we are looking for a significant sample of medicine in English, possible selection criteria would be to find 10 authorities for each subject of the discipline's tree where we would have 15.000 documents. Not bad for a non repetitive library of 15.000 books, essays, and technical publications!.

Yet, this is not enough to speak of an evolutionary Knowledge representation. To do so it is necessary to have access to "All" possible authorities expressing pros and cons about any established subject at a given moment. This is perfectly possible if "All" or "a substantial part of" that digitalized "All" is accessible.

8 Access to knowledge

Once the inherent intelligent structure of a given established order is known, we can easily access any meaningful piece of it. How? Finding *"similar documents"*, defined as those documents that for each subject, in a similar literary style, share the same technical jargon, and above all, the same *"fingerprint"* –set of keywords or nuclear subset of them *("core keywords"*)-. This is still a conjecture to be proved. Nonetheless, experience shows that this is a powerful discriminating criterion. In effect, for a discipline like Medicine or Computing covered by 50 million Web references, there are very few documents that share the same fingerprint for any of their subjects, at the most some tenths.

We would have then a K Domain structured and identified by its Thematic Thesaurus. Documents, being authorities or not, could be indexed versus this Thematic Thesaurus that has about 10 million keywords correlated to a cluster of 200 Logical Trees. We have now in the Web space nearly 8,000 million documents and an undetermined but comparable volume hosted in huge private and public data reservoirs.

9 New model of e-Knowledge

To this relatively stable knowledge hosted in K Domain, with highly stable disciplines like Philosophy and Religion, and other highly volatile like Arts and Entertainments, we may imagine opposed a Domain K' essentially unstable, fluid, transient, fuzzy, noisy, where people interact. If these two digitalized domains were always opposed and in equilibrium, we may imagine a semi permeable interface, a sort of digital intelligent membrane, or *e-membrane*, between them enabling that knowledge flows freely in both senses. With this e-membrane in between K and K' we may think of an evolutionary knowledge that takes into account K and K' domains collective talents.

Formal knowledge K is, at large, a multiple person entity, somehow representing the global knowledge of authorities as physical and juridical persons. K' knowledge is essentially a collective knowledge entity that follows other rules. The term collective is not used here as opposed to individual. Individual and collective responsibility remain as usual at both sides but our approach points to know more and better the different traits and behavior of both domains.

In the *"Cognitive K Domain"* we already defined the Thematic Thesaurus, stated as *pairs [keyword, subject]*. If we may define similar pairs [keyword, subject] in the other *"Cognitive K' Domain"* we would be in the presence of an interesting symmetry that enables us to extend methodologies and algorithms that works well in one domain to the other, and vice versa.

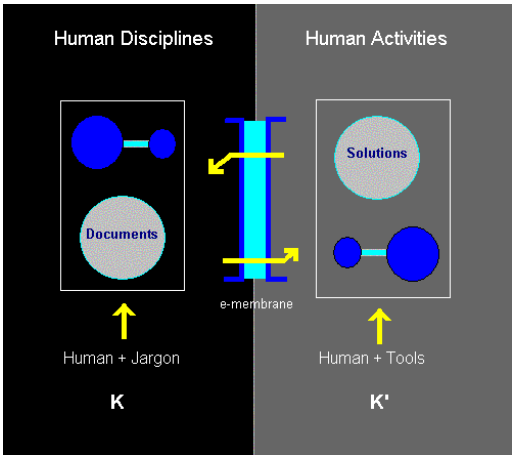

Fig. 1

If the knowledge in one domain is K and K' in the other our purpose is to state the basis of a new paradigm (K + K') that overcomes K and that enables us the analysis and management of traffic K => K', and K' => K, and their equilibrium conditions. See Fig. 1.

E-membrane physiology: At "establishment" side we talk of Human Disciplines meanwhile we talk of Human Activities at the "people's side". The symmetry could be imagined as follows: Thematic Thesaurus and its corresponding Logical Tree at K side integrate with core documents the inherent intelligent K triad. Symmetrically at the other side we found the inherent K' Triad: Users' Areas of Interest and its corresponding Users' Thesaurus, being solutions equivalent to documents. This is understood as follows: Humans plus a given Jargon in a given language edit authoritative documents. On the other side people performing their activities provide solutions to the society aided by tools (and machines). People at K' side issue search strategies meanwhile side K answers with the necessary information to provide solutions at K' side. Everything operates throughout the e-membrane.

Endoderm makes K evolve, mesoderm manages traffic in both senses, and *ectoderm detects and classifies people behavior patterns and search strategies.*

10 Users' Query Strategies

As seen from inside - mesoderm

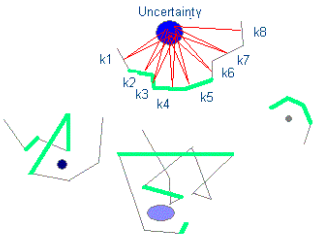

Fig. 2

In fig. 2 we depicted a set of users' query strategies. Each user has his/her own "uncertainty", ignorance about something he/she wants to know, represented by circles and ovals where colors and sizes would represent different levels of relative uncertainty and

"skills" to locate what they "need". The user that appears on top has held a *"session"* of 8 questions, k1, k2, k3, k4, k5, k6, k7, k8.

We, as "observers", normally ignore how many "searches" a user performs, that is the same as to say that we ignore how many "needs" he/she is trying to satisfy in each session: for instance k1, k2, could be issued to satisfy need1, k3, k4, k5, k6 to satisfy need2, and k7, k8 to satisfy need3. Let's take a closer look at his/her possible reasoning mechanic. In red we were trying to represent this brain reasoning track: Given one need he/she issues (through a complex reasoning we are not going to analyze here, depending of the knowledge this user has, his/her temper and state of mind, and many other individual and contextual factors) keyword k1. Once the *Cognitive Offer* existent at the other side of the *Cognitive "e-membrane"* (see *Darwin-FIRST*) gives its answer, it is receipted by the user's brain, analyzed and pondered whether the "need" has been thoroughly satisfied or not. If it has not been yet satisfied user proceeds issuing another keyword k2, and so on and so forth either till satisfaction or to the end of session.

11 Free Flow of interactions

As our premise is an absolute open and free communication scenario [8] [9] users will never be questioned about their needs. So at the *"owners' side"* the real users' needs and users' satisfactions, in the absence of an intelligent screening mechanism, will be ignored. Owners are only allowed to know strings of k's. That will be the only available intelligence they are enabled to retrieve in order to infer what users are really looking for. However owners may know many interesting things about their *"users' behavior"* considered as a rather homogeneous group of people, namely *"market"*. For that it's important to make some suppositions under the form of *"Conjectures"*.

We were talking along our reasoning about people questioning, either explicitly or implicitly, by pairs [k, s] where k stands for keyword and s by subject, namely by "acceptations" or meanings for a given keyword. So a search query strategy has the form of a string of pairs [k, s] instead of k's. To make the things close to reality pairs could pertain to different disciplines instead of running within a single one.

12 Auxiliary Conjectures

We make reference to a set of auxiliary set of communication conjectures to differentiate them from the Darwin-FIRST set of Conjectures that make this methodology adequate to manage the new (K + K') paradigm.

- Auxiliary Conjecture 1: usually people search one need at a time via "search strategies".
- Auxiliary Conjecture 2: as a corollary of Auxiliary Conjecture 1, search strategies are a sequence of pairs [k, s].
- Auxiliary Conjecture 3: we (at the people's side) have no way of knowing when and where a search strategy starts and when and where it ends.
- Auxiliary Conjecture 4: the massive presence (detected at the people's side) of certain strings suggest behavior patterns.
- Auxiliary Conjecture 5: the higher the presence (of strings) the higher the probability to pertaining (the strings) to a common search to satisfy a common need.
- Auxiliary Conjecture 6: the higher the pairs' heterogeneity (pertaining to different disciplines) the higher the probability to be the string a behavior pattern.

Note: These set of conjectures lead us to detect and differentiate collective search strategies. From our experience strings of three or more keywords have a high probability to be a behavior pattern.

13 How the K' Domain looks like

Let's go now a little farther concerning how people knowledge is organized in our society. We live in an era of intensive and extensive "micro specialization". The trend is a society of professionals and artisans with well defined "licensed" activities. Each license is characterized by a set of prerequisites and/or benchmarks to be filled by candidates, and a set of permitted activities or applications of the licensed talent, at large a combination of knowledge and practical mastering of it. Each person may play different roles, as professional, as a family member, as a citizen, as belonging to religious and political groups, etc.

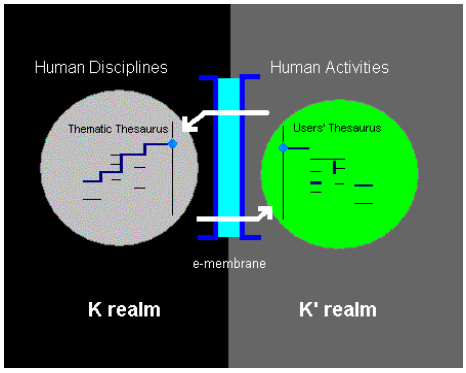

Fig. 3

Fig. 3 depicts both Knowledge Domains as interchanging information throughout an e-membrane. At Establishment side we have the K Domain of Human Disciplines with its Thematic Thesaurus. At the other side, we have the K' Domain of people with its Users' Thesaurus. People issue queries under the form of keywords strings (threads), and K deliver their corresponding answers. Threads are related to Human Activities. At K side the Thematic Thesaurus is well defined and stable meanwhile at the users' side the users' Thesaurus looks unstable.

14 K' Domain of Activities

Let's take a look at the "Homo Faber" role, that is to say the universe of Professions, Arts and Crafts and Industrial and Services labor activities. It is a huge graph of thousands of working activities and for each one we may imagine a Tree of Subjects, being a subject something the worker has to master in order to wisely perform his/her work. A Medical doctor learns in a university where a formal knowledge was successfully transferred to him/her but in order to work as a medical doctor in the real life he/she has to know a lot of some other things, for instance medical services, praxis rules, marketing, doctor-patient relationship, insurance matters, treatment protocols, etc. Even concerning his/her medical specialty he/she have many information and knowledge needs, and uncertainties. Many of these subjects –"*Areas of Interest"*- are pretty well typified in each specialty but much of them are identified but not typified.

Let's go with another example. Boy scouts need to master some abilities like making knots, how to pitch a tent, how to live and survive in the wild, how to preserve nature, how to make signals outdoors, and many other things. All these military type abilities are precisely documented and arranged as logical trees as well. Activities to be ruled also need of certification protocols structured as logical trees. Some activities like those derived from rural economy, may look like apparently unstructured even though they are rigorously coded.

Now people have to face the following problem in order to satisfy their information needs. The establishment, where the formal knowledge is held, works via keywords as we have seen till here. When someone looks for information about some ability the search must be performed via keywords.
The establishment data is organized by subjects that differ from users' Areas of Interest (people subjects). Users issue search strategies (as strings of keywords) to locate useful information about their interest subjects.

In open and free communications environments, on the owners' side, users' activities in the sense discussed hereto are "a priori" ignored [12] [13], being at last an intelligent task to perform. The only perception about how users are trying to satisfy their information needs would be the knowledge of their search strategies, under the form of "n-ads" strings of keywords. These threads of one, two, three… n keywords "should" be related to the users' Areas of Interest mentioned hereto. Here we get to a crucial problem: how do we make that correlation?. When the K's Domain be truly known we will have access to all People's Activities Logical Trees and in that case the correlation would be facilitated. However whether K' Domain be truly known or not we may still gain some insight. Let's see how.

Once we –on the owners' side- have at hand a thread suspected of becoming a users' pattern behavior, a human being could establish possible correlations to possible well known users' activities (or Areas of Interest).

Note: This "anthropic" weak link could be afterwards replaced by a special agent. One way to accelerate this exploring task is to progressively pervading the K' Domain facing users, ethically and respectfully with a message inviting them to integrate a private and autonomous PAG, Potential Affinity Group Forum, to interchange experiences and communicate with people that "prima facie" have similar areas of interest..

So we have defined a certain type of symmetry between K and K' as was our purpose. In K we have a Thematic Thesaurus related to a Logical Tree as the structural core of the intelligence of the Establishment. On the other side, we would have a Users' Thesaurus of "threads" (search strategies) that

behaves like pseudo keywords and Users' Logical Tree of activities for each human role. Initially both, Thesaurus and Logical Tree at users' side, are empty.

15 The Symmetric Cognitive Triad

Let's go back to the figure that described how the model of Digitalized Knowledge works because we are in condition to fully understand it. People are socially organized in activities. Humans play different roles and in each role their aim is to provide *solutions* (remember that solutions in K' are equivalent to documents in K) throughout activities. Activities are performed by making use of specific talents corresponding to specific areas of interest. The graph or Logical Tree of any activity depicts the talents and/or abilities of it. People look for information to enhance their abilities via "threads" of keywords belonging to K Thesaurus, as "search strategies". Users' Thesaurus is defined as a collection of threads that point to the Users' Areas of Interest.

16 Conclusions

The field of applications of *e-membranes* under this new paradigm is too wide, namely: super search engines providing users efficient YGWYW You Get What You Want interfaces in a few clicks; inherent automatic intelligence retrieval from huge reservoirs, as for instance Web Thesauruses; detection and classification of people's pattern behaviors in Portals and networks of high volume of man-machine interactions; recovering of inherent intelligence dispersed in databases; differential real time Data Mining on inflow data; automatic generation of Human Knowledge Maps; evolutionary match making interfaces in B2B and B2C, and many others derived from (K+K') scenarios.

The first operating e-membrane created under these conjectures was built by an agreement between the American R&D firm, *Intelligent Agents Internet Corp* and the *CAECE University* from Argentine. It was the interface of an Expert System served by a family of agents and its mission was: 1) to retrieve from the Web a Thesaurus for a given discipline; 2) to retrieve a set of significant authorities for that discipline; 3) to maintain and upgrade its content autonomously and continuously; 4) to detect and to classify users' behavior pattern.

The chosen discipline was Information Technology. Agents automatically retrieved a 53,000 keywords Thesaurus related to a Logical Tree of 1,600 subjects and the knowledge significant sample was a Virtual Library of 6,000 authorities. This prototype is operating at http://www.aunmas.org.

17 Basic Set of Conjectures

Conjecture 0: the triad Logical Tree, Thesaurus, and Cognitive Objects unquestionably identifies any type of Knowledge
Conjecture 1: Website Owners "speak" and "think" rationally in terms of their objectives and in terms of their matchmaking policies.
Conjecture 2: Users "speak" and "think" rather chaotically in terms of their passions, desires, their necessities at large.
Conjecture 3: Users' interactions along sessions are strings of semantic molecules of two types, users' keywords, and navigation instances. The sessions' strings are the representation of the users' strategies to satisfy their needs.
Conjecture 4: Cognitive Objects, documents, are expressed as strings of two semantic molecules, Common Words, belonging to a given Jargon, and keywords.
Conjecture 5: It is possible to enable a Full Duplex Type communication between Websites and their users throughout an e-membrane, enabling the free flow of content and its associated intelligence between them.
Conjecture 6: Intrusions in communications cause serious troubles that go deeper and further than a local perturbation. The slightest intrusion may invalidate not only the session but prevent users from communicating freely. They distort the static statistics and the users' strategies as well.
Conjecture 7: concerning Human Knowledge-: Human Knowledge is bounded.
Conjecture 8: Given a LT we may generate automatically its related TH
Conjecture 9: Given a Historical Reservoir we may generate its related TH and a collection of its main Subjects and Themes.

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