Web and AI Convergence: Society Intelligence through Web Intelligence

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Abstract

The information age is reality - new media and interactive media such as the World Wide Web are so engaging as to almost be worthwhile just for their own sake. But the technology is only a tool, and is only as useful as the information that it carries. Thus, any society must continually be aware of the need for content (information). A hierarchy of information has been proposed, from bottom to top, as follows: data, information, knowledge, intelligence, and wisdom. The societies already hold the national wisdom. The question is, can their wisdom be translated into data and information in a way that preserves its essence, while allowing us to take advantage of the modern technologies that are available to distribute and share this wisdom in the form of data, to make a real difference in the future of humanity. The term Society Intelligence is here to cover information-communications systems filled with overall knowledge and information networked in the unique web of smart artificial biosystems based on information technology capable of autonomously take off intelligent actions upon inside or outside stimulation.

Keywords: information-communications systems, artificial intelligence, web intelligence, society intelligence

Introductory Remarks: Web Development

The new generation of the Web, backed by increased network capacity, extremely powerful server farms, and sophisticated user browsers, may offer unprecedented interaction capabilities for any member of information society. However, web services and applications have yet to show intelligent and fruitful ways to enhance user experience, due to their 'classical' and deterministic implementations. Web-enabled systems have continuous learning features that allow them to integrate bits of information (single user actions) into a global model, and optimize it to user requirements. Intelligent web system can adapt to its user community, knowing and anticipating their needs. New web services may be used to deliver innovative services to users, such as anticipating user actions and easing them, activating help functions when less expert users are encountered, predicting search keywords of interest to the user and proactively presenting search results, customizing navigation links to user preferences.

The evolution of computer science can be viewed as an evolution of data-representations towards ever-greater comprehensiveness and quality. This timeline will try to reconstruct what classes of data were being processed at each point, starting with the earliest prehistory, and how changes in representation allowed new classes, and new styles of processing. In general, representations in each area of knowledge will be expected to follow an approximate progression from pre-verbal intuitions to nonverbal images, from words and symbols to *sorted* symbols, from counting and measurement to algorithmic relationships and full-

urement to algorithmic relationships and full-scale simulations.

In the process of Web management development, searching and indexing are the most used techniques for information consumption within the current Web environment. Indexing is used as reverse engineering the search process, selecting keywords to embed in meta-tags, in an effort to help information users locate the content they're looking for. One key to successful searching/indexing is to find good discriminator terms - that is, terms that *most uniquely* identify a given Web content. The more common a word is, the worse it is as a discriminator term, precisely because it is so common. Selecting good discriminator terms is a difficult process due to the sheer size of the Web and the search tools that are available today. This notion aims e-business organizations to find new ways in doing information activities within Web environment more effectively.

This new paradigm makes a shift in Web utilization from procedural usage to functional usage. That is, a reduction in a cognition of, and manipulation of the retrieval systems replace them with a corresponding concentration upon the essential task of knowledge discovery. To achieve that goal, the following tasks should be done

- gather evidence of an information-need from a user in a query-less and passive manner
- combine and utilize the gathered evidence in manner that would most effectively predict which information objects to offer the user
- design a searching environment that hides completely from the user any internal representation and retrieval techniques

With the current state of the Web information resources and used information technology, there are existing two cooperated methods of information delivery and of gaining full (broader, at least) information about Web documents. These techniques are correlated with the use of directories that ask for human editors, and intelligent agents/search engines that replace human editors with the computer programs. In the real life, search engines take less human efforts on the content management but they are in the same time, very primitive in the cognitive and conceptual meanings of the Web content. This notion is thus very meaningful for any member of information society, be the citizen or e-business organization, in the present situation where many technology improvements make the Web more difficult to manage and to explore. Telecommunications and information services are more and more resided on the Web technology giving the new scenarios for information activities.

The result in information development of the Web is the Web Content Space where information users and intelligent agents can directly tap the latest relevant information in linked and related information resources. This would help free information users from having to search for information source by source, and from relying on directories and search engines. It will result in the techniques that could outfit information users with personal information portals and search/intelligent agents tailored to their particular information needs. These information appliances will be configured to learn and respond to personal details with the help of artificial intelligence techniques. Hence, the development of the Web horizon includes both the information and the functional architecture where the appropriate Web modeling technique and language is needed.

The rich variety of knowledge available on the Web makes it an attractive target to not only data mining but also contextual meaning processing. Linguistic methods are employed often to measure the similarity between Web pages since the central information conveying media on the Web is still text. Thematic relations existed among a group words are generated once a text has been tagged, which describes the meaningful trend of the text. The meaningful trend of the text is termed as theme. Themes are connotative emotions separated or contained in the textual units, which are difficult to represent quantitatively and properly. Thus, Context Web content is converted into plain text then as the input to the system to be tokenized and then tagged to make representation of each Web document context. Context Web em-

powers information society's organizations to focus on their core competency of creating and distributing high impact content to their user bases. It also uses advanced contextual targeting technology to extract the key themes on a page to deliver highly relevant and targeted information.

Context Web makes the base for information-communications systems to provide a new class of document management services in which storage, organization and retrieval of information is based on contextual meaning made by rich and active meta-data. It enhances the access to existing Web information resources by making it more proactive, mobile and context-aware that is premise for e-society of today. The flexibility and the platform independence provided by the data model makes it suitable for expressing meta-data about documents. This is done in information design process. Information design is the detailed planning of specific information that is to be provided to a particular Web audience to meet specific user needs and objectives. The information designer may or may not have available (or may create) an information architecture that defines the overall pattern or structure that is imposed on the information design and an information plan that defines information units and how they are to be completed. Information design ideas can often be tested in a usability laboratory by observing surrogate users trying to use the designed information and getting their feedback. The practice of information design invites questions into how people learn or prefer to learn and how they use information. It also raises questions about how to design information for different cultural and other contextual differences in the audience. Since information is now delivered using Context Web with new possibilities for user interaction, information designers should become user interaction designers, too. These notions call for new solutions in the field of Artificial Intelligence in order to make entire and future Web space more reliable and tailored to human-based type of information usage and communications forms that are capable to make interchange of whole knowledge that exists within Information Society.

Artificial Intelligence in Relation to InCo Systems

While intelligence plays a dominant role in learning and problem-solving, it is what gives us the workable patterns we use to shape our lives and the coherence that makes sense of all the pieces. Intelligence sculpts congruence between the patterns of the world and the patterns in our minds. It does this outwardly by helping us shape the real world according to our understandings and dreams. So intelligence can be viewed as a feedback loop between the real world and our minds. Based on that understanding, the most useful definition of intelligence is the capacity to respond creatively, appropriately and successfully to varied (or varying) circumstances. This sort of intelligence is not a single aptitude or cluster of aptitudes, but rather a broad functional capacity that has helped many organisms survive and evolve in changing environments. Our predicament arises because knowledge is power, and a little knowledge is a dangerous thing. Our fragmented intelligence has produced powerful and unbalanced knowledge, technologies, structures and practices that divide us from each other and from the larger, interconnected natural and human communities we inhabit and depend on. With overall information technology development, the term of artificial intelligence is evolving.

The Artificial Intelligence is in its primary definition, the systems or procedures that behave like humans. The term includes:

- programming computers to play games
- programming computers to make decisions in real-life situations (for example, some expert systems help doctors diagnose diseases based on symptoms)
- programming computers to understand natural human languages
- systems that simulate intelligence by attempting to reproduce the types of physical connections that occur in brains

- systems that simulate human capability to *see* and *hear* and react to other sensory stimuli

Currently, no computers or system exhibit full artificial intelligence (that is, are able to simulate human behavior, knowledge in full). The current technology development promises new age in Artificial Intelligence (Dupuy, 2000). It is based on neural net technology that make inter-machine correspondence as well as inter-system dialogue thus interchanging information and knowledge the situations when entire system lacks of valuable information.

Intelligent systems and agents through the Internet and partially through computers, form the new software generation, the intelligent systems generation. While this generation still lacks true human intelligence and consciousness, the primitive network intelligence emerges consisting of intelligent assistants capable of autonomous and social activities. In the current context, it is interesting to mention the relation of cybernetics to other relevant disciplines also preoccupied with the study of the brain and the mind. Cybernetics' main tenet was that the mind was a manifestation of physics and was susceptible to being studied by the methods of physics. Cyberneticians were accused of infatuation with their own creations. The very concept of a model started to reveal the ambiguity in the everyday use of the word: a model as the imitation of something else, a model as something to be imitated. Models turned into legitimate objects of study with the idea: goals rather than means. Cybernetics contributed key concepts to other fields, whereas Artificial Life is, for the moment, most likely to contribute innovative methods such as evolutionary simulation modeling. Today's computing resources dwarfs the technical power behind cybernetics.

What lies ahead for Artificial Intelligence isn't just fancier productivity software – the goal is to make a profound revolution in human self-understanding, followed by a parallel revolution in human self-government within new information-communications systems environment. Expert systems are Artificial Intelligence-based systems that are the best predecessors of Web intelligence, although they lack of intensive knowledge interchange within current Web environment. Their construction has normally been a one-off affair, and each one must be built from scratch by a labor-intensive process of knowledge extraction and knowledge representation. They did not solve the problems of representing human mental (and emotional) states. The natural way to represent these mental states, and their laws, is in the form of *stories* that are generated from all Web points involving in recent contextual deployment.

Since every calculating device can be modeled by a program, this means that Artificial Intelligence system is the set of programs, working as a step device and living in a kind of world. At each step it receives information (from the world) and influences (at the world) by the information it works out. The computers will not be programmed but educated and trained, and interconnected within Web environment. Artificial Intelligence by information-communications systems webbed into universe of knowledge and wisdom, may create virtual worlds. There's a common fallacy that 'virtual worlds' could be built entirely out of the basic laws of physics so that the path of each particle in the world would be traced independently, by some super-super-supercomputer doing millions of math calculations each nanosecond. But this isn't even practical for a billiards simulator! What's needed, instead, is an inventory of 'particle stories' which are qualitatively distinct, which is likely how the brain itself does most of its physics predictions. Computer planning of these states is in a very primitive age. The normal models require that the computer do a thorough search of a large number of combinations of plan-steps, looking for the most efficient one. This might be compared to searching a large rectangular field, one row at a time. An alternative model might be compared to a widening spiral pattern, where the first circular pass returns some extremely coarse proposal, and successive passes refine it further and further. The advantage here is that in real life one may not have enough time to complete the thorough search, so the 'spiral' model allows one to abandon the search at any point without ending up empty-handed. This spiral approach once again requires prioritizing the elements of the planning domain. This is the place for Artificial Intelligence implementation into information-communications systems.

The successes of science make it possible for us to raise the banner of cybernetic immortality. The idea is that the human being is, in the last analysis, a certain form of organization of matter. This is a very sophisticated organization, which includes a high multilevel hierarchy of control. What we call our soul, or our consciousness, is associated with the highest level of this control hierarchy. This organization can survive a change of the material from which it is built. Most of the knowledge acquired by an individual still disappears at biological death. Only a tiny part of that knowledge is stored outside the brain or transmitted to other individuals. It is a great mistake to forget things even though we know how to store huge amount of information in computers and access them in split seconds.

The biggest feature of the networked knowledge infrastructure is not its ability to connect computers. That is merely the physical manifestation of the fact that the network connects minds - regardless of distance and location. Might we, in the future, be able to download/upload our emotions, thoughts, desires, wants, longings on the Web? Will we be able to share those of others? So, if we agree that thoughts and ideas being freely exchanged have led to progress, then the next logical step is to look at the medium of exchange. This, too, has been in a state of evolution. First, before the invention of the written word, there was only verbal communication. This restricted the circle of effective communication to the village. The written word and books brought about a revolution, and entire countries or regions were brought under the same ambit. The printing press, television and radio were primarily one-way media, not interactive. The key word here is interactivity. Interactivity implies a dialogue of some kind, a changing response based on changing stimuli. There is much talk of 'interactive' Web sites, but even the best of these choose from a pre-programmed set of possibilities to give the illusion of being 'interactive'. You have interactivity in a face-to-face dialogue. You have very slow interactivity in the exchange of letters. The power of the information-communications system is that it permits *simultaneous* interactivity with thousands, millions of people worldwide. This is a first in the history of mankind. The increasing popularity and prevalence of the Internet has caused huge amounts of information to become available in networked form. A networked information space is an infrastructure, where pieces of information are presented as nodes, which are linked to other nodes by certain forms of associations. An obvious example of a networked information space is the World Wide Web, where the nodes are Web pages, linked together by hyperlinks. Other examples are citation graphs, where nodes represent papers, associated by links of one paper citing another, or dictionary graphs, where nodes represent words that are linked by various kinds of synonymity and similarity relationships. An important feature of networked information spaces is that a lot of information is conveyed by the link structure itself. In the World Wide Web graph, a node with a lot of links pointing to it is likely to be important, and a set of nodes with many links between them are likely to form a Web community.

Applying Artificial Intelligence structure over the net, it is possible to make Distributed Artificial Intelligence systems that are cooperative systems where a set of agents act together to solve a given problem. These agents are often heterogeneous (e.g., in Decision Support System, the interaction takes place between a human and an artificial problem solver). Its metaphor of intelligence is based upon social behavior (as opposed to the metaphor of individual human behavior in classical Artificial Intelligence systems) and its emphasis is on actions and interactions, complementing knowledge representation and inference methods used in classical Artificial Intelligence systems.

Web Intelligence

There are many techniques, methods, tools that claim to take control of the vast amount of information across the Web and improve information quality. Many of these approaches are simply the current proprietary solutions that will not substantially resolve information disparity or improve information resources quality. The only real solution is to implement a worldwide common information architecture within which all information can be thoroughly understood and fully utilized.

Currently, two cooperated methods of information delivery and of gaining full information about Web documents should be overcomed in order to make information development of the Web, successfully. Telecommunications and information services are more and more resided on the Web technology giving the new scenarios for information activities that open the place for knowledge acquiring process development.

Knowledge is yet widespread presented in the Web environment and the Web becomes the Information space. This space is large and it grows fast, while it lacks of referential integrity with diversity of content and unpredictable use scenarios for the knowledge existed in huge amounts of information sources. All of these notions force the appropriate Web environment that can fully utilize entire knowledge bases and the wisdom of society. Here is the evidence point for Web Intelligence as the solution to make the use of new information-communications systems more effectively (with more intelligence).

Web Intelligence is the environment that exploits Artificial Intelligence and advanced information technology through the Web space and services (Figure 1.). It is also combination of Artificial Intelligence and information technology with applications of Artificial Intelligence on the Web. Web Intelligence concerns the design and implementation of intelligent systems in new Artificial Intelligence-based Web environment. These trends open the way for development of Intelligent Web Information Systems that are characterized by thinking and acting (as human or rationally).

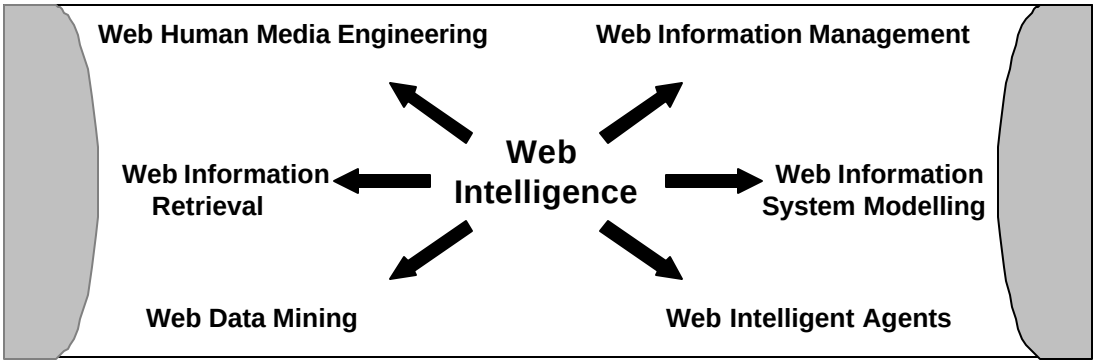

Figure 1. Web Intelligence environment

In the field of basic and applied research on psychology, cognitive, motivational, and emotional processes are related to the world in different ways. Cognitive processes concern the acquisition and representation of knowledge and have a representative relation to the world of objects and facts. Motivational processes refer to goal states of the organism and have an actional relation to the world. Emotional processes are based on the acceptance or rejection of objects and facts and have an evaluational relation to the world. Emotions, interacting with cognitive and motivational processes, are a unique component of human mental states, experiences, and behavioral expressions. Emotions may initiate, terminate, or disrupt information processing. They may result in selective information processing or they may organize recall.

Web content is thus oriented toward new vision of human reasoning, too. The earlier Web content structures were defined by markup and the processing of markup by systems that support monotonic reasoning and binary (vs. probabilistic) truth-values. Such structures and technology support a wide array of intelligent agents, categorization of content, etc. However, it is evidently that they are not enabling individuals and organizations with collaborative cognitive support. This notion is tightly connected with the cognitive structure need where new form of Web content structure is done by Cognitive Web.

A significant component to successful Cognitive Web design is to recognize that there may be no single document that provides the information needed. Thus, parts of different documents and information from databases may need to be synthesized into a virtual document, created precisely to satisfy a particular user's needs at the time. It stresses the need to match on partial documents, taking into account the structure of the documents, and the need to extract information from databases and express it in natural language. After all is done, there is the need to deliver this information in virtual documents created from all components taken from various information sources. A Cognitive Web is content structure that supports non-monotonic reasoning, probabilistic (or pseudo-probabilistic) truth-values, and explicit support for negation. An application of such systems would be sharing mental models concerning a domain. In particular, these structures are involved in applying such models to facilitate collaborative reasoning about knowledge, uncertainty, the value that individuals and organizations attach to their goals, and plans to realize those goals.

For the Semantic Web system functionality, networked Web applications must have an access to structured collection of information and specialized inference tools that they can use to conduct automated reasoning. Knowledge representation models, as the part of artificial intelligence research, are the vehicles for Semantic Web development. Separate Artificial Intelligence tools and applications should be linked into global system in order to serve Semantic Web functionality. Traditional knowledge representation systems are, in general, centralized systems requiring every user to share the same definition of common concepts. But central control increases the size and scope of such systems with the development of new knowledge-based applications and with new Web content. This new huge set of information opens up the new problem of system possibility to encompass unanswerable questions. In order to solve such problem in Semantic Web implementation, the design techniques include the special idiosyncratic set of rules for making inferences about information that exists in entire Web environment. Design process is based on language for the rules making Web system to reason as widely as needed for information processes.

From Human to Society Intelligence

Our new kind of society, information society, because of new information-communications technologies, increasingly requires intelligence to run it. In order to cope with the term information society, we could defined society as a system, composed of many parts, that are members of a society, and which are intelligent systems or societies themselves. Since the basic building block of societies is the intelligent system, it has all the properties of an intelligent system. It may have other properties, since it is composed of many intelligent systems. Its objectives are the common objectives of its members. The life span of its members is appreciably shorter than that of the society or subsociety to which they belong.

Some notions on possible ways in splitting entire society into the intelligent, and the less intelligent (Herrnstein & Murray, 1994) show that besides human intelligence, society intelligence should be also encountered. But, what should be stated as society intelligence in contrast to human (individual) intelligence that is under various measure methods and tests defined by variations in test scores. Scientists distinguish carefully between conceptual variable and its operational definition, i.e., the way it is measured. Most intelligence tests do not measure just one thing. Instead, intelligence tests are made up of a number of component subtests, in which human is asked to perform different cognitive tasks. The test score is supposed to measure the common thread that runs through performance on the subtests. Due to the huge amount of data sets collected during human life, human intelligence exposed human activities, is dividing into three dimensions:

– *Fluid intelligence* – as the ability to develop techniques for solving problems that are new and unusual from the perspective of the problem solver

- *Crystallized intelligence* – as the ability to bring previously acquired, culturally defined problem-solving methods to bear on current problems
- *Visual and spatial reasoning* – as the ability to use visual images, objects, abstraction in problem solving.

All of these three dimensions are applicable to both human and society, although only the third dimension stated as visual and spatial reasoning is much more human specific. Development of the intelligence on the individual (human) basis increases overall intelligence of entire society, although practical methods in use are not same.

Apparently to these notions within information society environment, cognitive process is withdrawing from human brain to computer systems. Cognitive process is the process of creating mental representations of the current problem, retrieving information that appears around entity and manipulating the representations in order to obtain an answer. The problem, its solution and some of the methods need to solve it, are stored in databases for later references. The key point in this process is creating the representation in order to recognize and understand the data involved in current process. It is assumed to require a temporary, working memory (storage servers) capability, which requires a lot of memory space. When problems are once encountered, the process of building an appropriate representation become more difficult, because previously acquired information from networked data bases and problem-solving techniques from intelligent agents can be used.

Human and society intelligence interrelation is obvious when we make an analogy between computing power, programs and communications systems for data access and information retrieval/exchange with cognitive functions of being able to process ideas quickly and accurately. Cognitive capabilities are clearly part of fluid intelligence; knowing key factors, risk assessment, cultural and social variables are part of crystallized intelligence; having acquired problem-solving techniques is part of both crystallized and fluid intelligence. Hence, society intelligence as the stipulation of individual human intelligence, is determined by interaction between (mental) processing power (computer), knowledge of how to use that power (knowledge bases and intelligent agents), and access to required data (computer/communication network). When we are looking on current state of information-communications technology development, we can find that all of these three categories are interconnected through convergence into information-communications systems that are visible by Internet-based networks, services and content.

Society Intelligence by Web and AI Convergence

Digital market, information technology, cybergeneration, virtual groups/organizations is the part of the terms that describes new information society paradigm – more and more human social and business activities are correlating with information technology in some way, The key factors fostering this scenario were undoubtedly personal computers and Internet. But, ongoing process of new information technology solutions and users' demand tending to create new post-computer society without domination of PCs and computer-based Internet services. We are facing with the innovations in the use of new information appliances instead of PCs and universal communication network (uninet) instead of the computer-based Internet.

Although personal computers and Internet will come invisible or disappear from the information technology scene, these technologies tend to stipulate new technology and services – the current side effect of opening Internet services to all, including computer illiterates, is the consumerization of the Internet while the computing moves to becoming entertainment centric in most services and applications. The trend is also visible with the miniaturization of applications systems existing on today's Internet based global services - it is resulted in home systems that must be tailored for the individual use suited to per-

sonal interest and demand. That is the point where today's Web solutions are not yet prepared to work out this task.

The new communications technology makes possible new kinds of communities, and provides the possibilities for a certain level of cohesion among a dispersed community which may be necessary for any kind of movement to form and assert itself. Web Intelligence environment creates new centers of authority, relocating authority away from traditional authority structures toward more ambiguous and fluid confluences and place of authority. Thus territoriality is not more nearly as important in the creation of feelings of community. That is, dispersed communities can form and remain cohesive a lot easier with advent of mobile phones, the Internet, e-mail, communications satellites, cable nets. Such communications capabilities might aid them in various self-determination activities, by being able to exchange information, strategize, and expand the body through access to communications technology. As Castells stated, the basic unit of economic organization is not a subject (such as the entrepreneur or the entrepreneurial family) or collective (such as the capitalist class, the corporation, the state). The unit is the network, made up of variety of subjects and of organizations, relentlessly modified as networks adapt to supportive networks and market structures (Castells, 2000).

Thus, the information society is growing up through the triple revolution

1. Digital Revolution – Information and Communications Technology
2. Economic Revolution - the New e-Economy
3. Social Revolution – the new forms of social, group and personal behavior and activities

During information society development process, four forces are creating convergent trends in the networked utility industries: digital information technology, energy utility economics, deregulation, and consumer demand. This involves convergence in electricity and gas services and infrastructure, the convergence of different communications technologies, and the convergence of electricity and telecommunications. This network incorporates other urban infrastructure, financial and information services, and even high-speed transportation networks into one inclusive intelligent-infrastructure that reaches, and interconnects, all ultimate consumers - billions of individuals and the trillions of microchips that will operate on their behalf. Fully integrated infrastructure can, for example, set the stage for a bottoms-up (self-organizing) approach to urban and industrial design based on ecological principles, where the waste from one process becomes the feedstock for another.

One important characteristic of the new information and communication technologies is that they make it possible to deliver large amounts of information in real time across the world. Therefore many observers have concluded that geographical distances are gradually losing their significance in modern information societies. Access to information and facilitation of communication provides new and enhanced opportunities for participation in the process of self-determination in information society, with the potential to enhance political, economic, social, educational and cultural advancement beyond the scope of traditional institutions and forms of governance. We access the current resources, trends and potentials in this area, with examples of successful utilization of communications models and technologies for direct peaceful empowerment of peoples to create new kind of society - Intelligent Society (Figure 2.).

Intelligent systems and agents through the Internet and partially through PCs form the new software generation, the intelligent systems generation. While this generation still lacks true human intelligence and consciousness, the primitive network intelligence emerges consisting of intelligent assistants capable of autonomous and social activities. In the current context, it is interesting to mention the relation of cybernetics to other relevant disciplines also preoccupied with the study of the brain and the mind. Cybernetics' main tenet was that the mind was a manifestation of physics and was susceptible to being studied by the methods of physics. Cyberneticians were accused of infatuation with their own creations. The very concept of a model started to reveal the ambiguity in the everyday use of the word: a model as

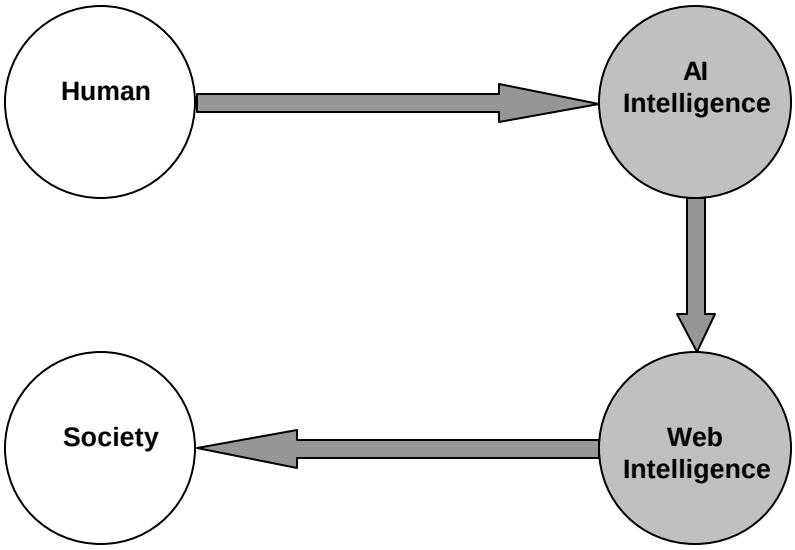

Figure 2. From Individual to Society Intelligence by WEB – AI Convergence

the imitation of something else, a model as something to be imitated. Models turned into legitimate objects of study with the idea: goals rather than means. Cybernetics contributed key concepts to other fields, whereas Artificial Life is, for the moment, most likely to contribute innovative methods such as evolutionary simulation modeling. The technical power behind cybernetics is dwarfed by today's computing resources.

The exponential nature of modern world tells us that the societies are in front of the fast and great changes. It is really hard to plan for environment of accelerating change. The belief is that if we are to survive in the culture of the 21st Century, we must attempt to perceive the future from current trends, the biggest of which is technological convergence. Technological convergence happens when what have previously been separate technologies fuse together to create powerful and unique new devices. What's happening right now is the fusion of four powerful and distinct technologies. These devices are television, interactive real-time communications devices, computers, and networks. This fusion is the synergy of interactive communication systems, giving new interactive form of synergy - synermatic. The significance of new technologies synergy is that the power of the whole is greater than the sum of the parts, especially considering the effects of technological convergence. There is the content and presentation of television, the interactivity of communications systems, the processing power and speed of computers, and the global reach of wired and wireless networks. This has created a radical new means of communication. It must be noted that the power of synermatic is that it's not just broadcast or broadband; it is interactive in nature acting as knowledgeware.

Synermatic includes radical technology units that are a great challenge to ordinary living modes, and they are disrupting the established ways of doing things. They're having a far more pervasive impact than prior technologies, and as a result of synermatic, members of information society now have direct access to the source of goods and services, information and knowledge. The Web has broken social, information and business activities of the past, and synermatic is facilitating access to services and information regardless time and place. Currently, the services are still primarily tied to the desktop, but as we become comfortable with the desktop it is about to change radically once again due to the rising power and freedom of wireless services and no-computer alike information appliances. The goal of technology

is the transparent use of the device, where the main focus is on the task, not just a tool. How do we communicate with new technologies? Up to now, this has mainly been through text output. We have communicated primarily by means of keyboard or mouse input. Being keyboard and mouse literate is critical. Being keyboard and mouse illiterate is a major obstacle to the easy use of technologies. That's because keyboarding is an unnatural act. For many, it's hard to learn to keyboard quickly and accurately. The natural means of communication is through speaking, listening and viewing, not typing and reading. Today, this is particularly a problem because almost all of the World Wide Web content is a text-based. We must get beyond this focus on text-based environments if technology is going to be used by more people. While these new ways of doing things are powerful in and of themselves, exponential change tells us that much more will arrive very soon. New technologies will allow us to have truly interactive on-line multimedia learning experiences complete with the power to follow cognitive links.

Artificial Intelligence develops into a field dominated by simple, adaptive systems; like those to intelligently route telephone communications, or optimizes certain processes. There may even be intelligent text retrieval systems that search using keywords and so forth. A second possibility is the popularized idea of omnipotence where exists the rationale as the old idea that once an appropriate threshold is reached, an Artificial Intelligence system will be able to begin controlling its own learning and evolution. This position is normally characterized by the belief in disembodied intelligence - intelligence restricted to the symbol-processing domain. If this becomes a reality, it seems clear the kind of intelligence embodied in this approach may be fundamentally different intelligence. In spite of the massive amounts of data and computer power, the process of information and knowledge gathering is still the problem, and the key resource in the process remains the analyst's time. Neural networks are a successfully applied approach to solve these needs. In computational terms, what neurons did was to change the class of computations, supported by biological wetware. Neurons are precision engineered devices, and they have even developed an amazing number of attendent cells known as glia which in some cases increase signal speed, and in others protect and recover the brain after brain damage. The secrets of how the biological neural networks do what they do are still almost completely unknown. Computer experimentation using neural net models has shown that a wide variety of statistical algorithms such as clustering, dimensionality reduction, and regression can be implemented, using a simple system of integrate and fire neurons connected to each other. In some cases, biology and mathematics complement each other, and theories are emerging through evolution of artificial intelligent systems.

Accordingly to the methodology of Embedied Artificial Intelligence approach (Prem, 1998) most of research into robotics and adaptive systems, has a number of implications for cognitive science. Cognition as a timely process driven by forces internal and external to the entity (system), happens in close interaction with the entire world for human and society. Human intelligence has evolved in evolutionary terms making side effects - society intelligence development. This development is evidently exposed by the language, which is important for individual intelligence. But, language is not only a human, but a social construct, too. The language cannot be individual, or private, and any kind of social cooperation is based primarily on language. The language scenario is thus the result of information acquired, stored and exchanged between members of a society. Human need other humans to interact with in order to acquire a fully functional language. In the same time, humans need a fully functional language to realize much of their potential intelligence. The lack of a fully functional language does not only limit an individual’s intelligence but it decreases society intelligence as well.

In the process of constructing Society Intelligence, there are number of key actors that make languages terms adoption within development of artificial social agents, feasible:

- developing ways of structuring relationships to make them more reliable (these relations are predominantly based on language structures)
- developing constraints on normal social behavior via social norms, laws and conventions

- developing institutions and groupings that act to solve the complexity of the social environment making it more structural, and for cognitive processes more applicable
- identifying proper information sources as a basis for decision making

In practice, some models of socially interacting agents (Belnap, Perloff & Xu, 2001) take one of these heuristics as the basis for agents. Hence, it is likely that intelligent and creative social agents that co-evolve within a society will develop a many separate and different heuristics.

In the process of modeling Society Intelligence, some forms of traditional Deontic logic could be well situated as the instrument that encompass the power of Web Intelligence (based on communication), and Artificial Intelligence (based on problem-solving). Besides the language as the means of communication, and the content as the means of cognitive process, Society Intelligence consists of a number of rules that are more complex to cover by AI logic existed in modeling human intelligence. Deontic logic as the original work of Mally who proposed the first formal system of deontic logic (Mally, 1926), could be with implementation of new computer science development, appropriately introduced in Society Intelligence modeling. Deontic logic is based on the study of the logical relationships among propositions that assert that certain actions or state of affairs are morally obligatory, morally permissible, morally right or morally wrong. With the extension to all forms of obligations, permissions, rights and violations existed in the entire society, deontic logic could be implemented into complex AI-based Web intelligent systems as the mechanism for solving and constructing social activities embedded into computer systems. Deontic constraints on information relations within any society-defined actions (the right, the obligation, and the permission) are presented with information actions of intelligent agents standing in entire Web Intelligent Information system. This methodology is especially important for Society Intelligence modeling that employs thousands of clients or individual members, each having their own privileges, responsibilities, duties, obligations and permissions. Each of them have their own sources of information and misinformation, abilities and inabilities, and in such circumstances, natural (human) reasoning quickly gets out of hand, and computer systems networked within Web intelligent systems becomes desirable.

Society Intelligence has norms as corrective, adaptive, stimuli and secure actions as the human intelligence has individual ability to cope with the information from inside human and his/her environment. First steps in the directions of defining individual rational behavior extended by collective awareness (Conte & Castelfranchi, 1995), open the way toward new scope of definitions of Society Intelligence as the system of various specific behavior oriented actions of entire society in replies to stimuli within and outside the model system. Several constraints from real world human intelligence modeling with AI problem-solver agents (Danielson, 1992), opens the view that in Society Intelligence modeling, world states need not be explicitly modeled since the modeling actions is sufficient. Thus, traditional intelligent agents that are coupled with rationality, individual, social and joint benefits, should be extended with the inclusion of beliefs and probabilities, vagueness and more expressive language for defining risk profiles, security levels and prognosis.

Conclusion

Evolution of Artificial Intelligent systems opens the new possibilities to maintain society knowledge acquired through experience, in order to make place only for more adequate and useful knowledge. This requires an effective immortality of the cognitive systems defining individual and collective minds: what would survive is not the material substrate (body or brain), but its cybernetic organization of a Society Intelligence. One way to reach this ideal has been called brain (knowledge) uploading as the activity of the transfer of mental organization to a very sophisticated computer system. Research in artificial intelligence, neural networks, machine learning and data mining is slowly uncovering techniques for making computers work in a more brain-like fashion, capable to learn billions of associated concepts without

relying on the rigid logical structures used by older computer systems. These techniques provide the environment within which computer systems interact with a human in way that they could anticipate every reaction or desire of human. Since user and computer system continuously work together, they merge information and sense, making separation of resources (between computers and human) meaningless. In the stage of the human death, the computational part might carry on the individual's knowledge that can survive in the non-organic part of the system, thus becoming constitutional element of the entire society intelligence. Through such techniques, the form or organization with which an individual identifies itself, could be maintained infinitely, and become even more sophisticated. It opens ways of information exchange between bodies and brains which will preserve the essence of self-consciousness, individual personal histories and creative abilities, and, at the same time, make individuals as part of a larger unity that becomes the social superorganism. This entity has the term Society Intelligence that includes control (information), communication, and organization (infrastructure).

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Biography

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