Realisation of Human Super-Intelligence (Developmental Learning)

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Abstract: - It is demonstrated that technical advancement results in the development of more and more intellectual human-computer systems which can make the most efficient use of human intellectual resources. This is why the objective of education must be the development of human intellectual resources which will become more and more in demand. The results of 60-year-long scientific efforts aimed at the development of computer systems alternative to humans and able to solve intellectual tasks without a human and instead of a human turned out to be unsuccessful, with a rare exception (here belongs, for instance, the creation of combat robots). Nevertheless, some scientists, inspired by great successes in the development of computers, believe that the problem of artificial intelligence (AI) will soon be solved. Moreover, they state that in 2030, at the latest, following the successful solution of the AI problem, an Internet-integrated computer civilization able to solve super-intellectual problems will emerge on Earth. However, the manuscript demonstrates that these assumptions are not to become true in the foreseeable future, because humans are unattainably more advanced information machines than computers. This is why the concept of artificial intelligence is an erroneous and, moreover, detrimental way of development of computer technology. Instead, the manuscript suggests the concept of development of mass human super-intelligence, which can be successfully implemented already in the nearest years.

Key-Words: - Human Super-Intelligence, Artificial Intelligence, Technological Singularity, Internet, Information Security, Personal Computer, Personal Memory, Developmental Learning

1 Introduction

The objectives of education can be different – getting knowledge, mastering skills, physical development, etc. Therefore, in order to determine one'seducation objective, it is necessary to define the aim of one's life. To put it shortly, we have to know the result an individual wants to achieve in their particular life – to become rich, to become famous, to become clever, to get a prestigious job, to live an interesting life, etc. Certainly, it would be nice to achieve all of the above. However, this is hardly possible. There is always something more important, something less important, something unimportant at all. This is why it is necessary to decide. Many people suffer not because they made the wrong choice, but because they cannot make this choice.

In order to define the aim of one's life, it is necessary to know a lot about real life and to be able to find one's bearings. This is why it would be useful for children trying to answer these questions to use the knowledge and life experience of adults. However, adults also lack comprehensive knowledge.

This is why, taking into account that intellectual labour is more and more demanded nowadays, – even to be rich, intellectual efforts are necessary, otherwise you will soon become poor – the main objective of education is, obviously, the intellectual development of people.

In this respect, it is useful to know that there is the concept of artificial intelligence (AI), which, in the opinion of many, can make it easier for people to find solutions of complex intellectual problems, and which, seemingly, will make the intellectual development of people useless. This is why let us discuss the AI problem in some more detail.

2. The Problem of Artificial Intelligence

Many professionals in computer engineering and software development, mathematics and electronics, neurophysiology and psychology, philosophy and linguistics have been dealing with the problem for

over 60 years. There are hundreds of research institutes and university departments aimed at solving the problem of artificial intelligence. The results of research on artificial intelligence are published in hundreds of scientific journals. However, despite great achievements in developing amazingly advanced computer technologies, the results of solving the problem of artificial intelligence itself are far less spectacular.

Obviously, the research of the artificial intelligence problem has to be reviewed.

2.1. Problem Definition and its Evolution

At the very beginning, the problem of artificial intelligence (AI) was defined as a part of computer science dealing with the development of methods for computer simulation of certain functions of human intellectual activity, such as understanding written and oral speech, distinguishing images, etc. These problems, in fact, remain unsolved. Later on, within the framework of the AI problem, different intellectual tasks were set, and these tasks were at least partially solvable. Huge attention was also paid to studying the intellectual activity of humans. There was intensive development of more and more advanced robots which by definition were supposed to solve intellectual tasks without people and instead of people (e.g., in the battlefield). And, finally, as a distant perspective of solving the AI problem, some scientists predicted the emergence of computer civilization on Earth.

Thus, it turned out that the actual objective (conscious or unconscious) of solving the AI problem is forcing most humans out of any intellectual activity, and consequently, inevitable intellectual degradation of people at long last. Did anyone care to ask people whether they want it or not?

However, over the time which passed since the AI problem was defined [1], attempts to solve it have basically come to a deadlock [2] – [5]. For instance, a computer is still unable to tell a cat from a dog. This is why the initial enthusiasm of scientists has been replaced with noticeable pessimism.

Dr. Donald Michie, head of Alan Turing Institute, wrote in this respect [6] that it was impossible to even approach solving the problem of artificial intelligence at that level of development of computer engineering.

Many years later, basically the same idea was expressed by V.M. Kuklin, Professor at Kharkov University [7], who wrote that scientists dealing with the AI problem are unable to repeat the achievements of nature even to the slightest extent.

Nevertheless, impressive development of computer technology cheated some scientists into an illusion that all AI problems will soon be successfully solved. The concept of technological singularity evolved, according to which, development of the AI problem will lead to the emergence of Internet-integrated computer civilization by the year 2030 [8] – [12]. The authorsdo not specify what this computer civilization will make of the human civilization. They do state, however, that this process is irreversible, since those countries which will try to hamper research of the AI problem and the development of the Internetwill inevitably condemn themselves to economic and military-technical retardation, with all the consequences that come with it.

2.2. Analysis of the Results

However, the foregoing statements of the authors of the technological singularity concept are incorrect. They come from overestimated expectations of artificial intelligence (which has not even been developed so far) and incomplete understanding of the degree of advancement of human intelligence.

This is why, it would be reasonable to compare artificial intelligence to human intelligence. It is easy to see that human intelligence and artificial intelligence have a lot in common; here belong:

- information processing means;
- information storage means;
- information input means.

The processor of a personal computer in terms of its advancement seems to greatly exceed the human brain. Indeed, a PC can very quickly and precisely perform extremely complicated mathematical calculations. A human is unable to make such quick mental reckonings. It seems this circumstance led to the assumption on the alleged intellectual superiority of computers over humans, because many people believe that doing math is a very complex and extremely intellectual activity.

In fact, thus assumption is incorrect, because a computer can solve only clearly defined problems (try to define clearly, for instance, how to tell a dog from a cat). Any inaccuracy or mistake, which can be corrected by a human easily, on the go, is an insurmountable problem for a computer. Moreover, human brain often hints to correct solutions in difficult day-to-day situations, when many important circumstances are not fully known or

even completely unknown. Finally, a human brain has an additional, extremely valuable asset – the intuition, which no one is able to explain. For instance, George Soros, a well-known business magnate, wrote about his unsuccessful efforts to develop an algorithm of his successful stock exchange speculations [13].

Moreover, one of the main types of human thinking is often the powerful multi-factor subconscious thinking, whereas computers can more or less successfully imitate much more primitive human rational thinking, which is low-factor. However, it is the ability to analyse and solve unclearly defined multi-factor problems (relating, e.g., to illnesses, politics, science, economics, etc.), which distinguishes super-intelligence from intelligence [14]. This is the criterion of distinction of super-intelligence from all other types of intelligence. In terms of this criterion, a computer does not possess super-intelligence. A human has, so to say, unconscious super-intelligence which is able to solve absolutely all problems nature has to give humans as a biological species. However, it is not used efficiently enough in creative activity, at least, not to its full extent.

The intelligence of a computer, just like that of a human, is to a great extent determined by the sophistication of its memory. Human memory is also much more advanced than that of a computer. Its data volume exceeds that of a computer memory. Arrangement of data storage in it is just the height of perfection. Thus, human brain receives through the eyes about one tenth per cent of information contained in the initial image (e.g., on a TV screen) [6]. No one knows how such efficient processing of information takes place (otherwise more advanced TV-sets would have been developed).

Information enters the human brain via different senses simultaneously. However, over 99% of all information received by a human comes through the eyes [15]. The eyes, as mentioned above, are a much more perfect information input medium than a computer keyboard or a modem connected to the Internet.

This is why, we have to admit that at present and in any foreseeable future a human being is an unattainably more sophisticated information machine than a computer.

For the same reason computer civilization which is supposed to enslave people will never emerge on Earth.

Extra-terrestrial beings visiting the Earth are sure to have absolute super-intelligence, however, they do not intend to enslave the Earth;otherwise they would have done it a long time ago.

3. The Problem of Human Super-Intelligence

The problem of artificial intelligence has an alternative – the problem of developing human super-intelligence [14], [16], [17].

3.1. Problem Definition

Consequently, human intelligence in its current form is quite perfect and relevant to the living conditions. It is a set of several intellectual sub-systems [14] and includes low-factor rational thinking, multi-factor subconscious thinking, and some others.

The major and most powerful intellectual instrument of a human is the multi-factor subconscious thinking (i.e. most people do not even suspect they have this type of thinking). The matter is that almost all problems solved by people are multi-factor (since their result depends on a large number of circumstances, or, in other words, factors). By the way, due to lack of understanding and ignoring this particular point achievements in the development of artificial intelligence are so insignificant. The subconscious thinking solves these problems 24 hours a day, but in the vigilant state it also helps the conscious rational thinking to solve current practical tasks.

Since rational thinking, which is based on processing of mostly visual (and, therefore, not more than three-dimensional) information, is low-factor, it is simpler and faster. Since the subconscious thinking is multi-factor, it is much slower and more complicated. People have to escape from all their day-to-day affairs and have a sleep (not only humans, by the way, but all more or less complex living beings) in order to process all information accumulated over the day with their powerful subconscious thinking. This is why we say that ‘night brings counsel’. This is why in the morning fever is usually lower than at night. This is why scientists often make discoveries in sleep. Humans would not be able to survive without their multi-factor subconscious thinking.

Due to development of computer technology over the past two decades and availability of computers to a mass user, it has become possible to greatly enforce human intelligence and to develop the so-called human super-intelligence in the form of human-computer systems of the ‘master-slave’ type, which will be able to successfully solve multi-factor tasks. In these systems, a human will be the master, and a computer will be the intellectual slave, i.e., the ‘master-slave’ complex would not be able to

operate without a human. These computer means will allow improving the performance of not only multi-factor subconscious, but also the low-factor conscious types of human thinking, because in fact they are different manifestations of a single operating mechanism of human intelligence. This is why, super-intelligent multi-factor systems will be useful to everyone engaged in workmanship.Those who would be able to master the systems of human super-intelligence would be able to achieve the best results in their activity.

Thus, we have received the answer to the question about human activity which will be objectively most demanded in the nearest time, and about the corresponding objective of contemporary education.

3.2. Ways of Solving the Problem

It is easy to notice that there is a certain contradiction.

On the one hand, in order for personal computers to be able to solve intellectual and super-intellectual tasks, they must be equipped with personal memory containing a large enough volume of valid continuously and automatically updated information. Consequently, to provide for the appropriate informational support of these personal computers, their personal memory must be 24 hours a day connected to an information network connecting all information sources, as well.

On the other hand, personal computers, when used to solve intellectual and super-intellectual tasks, should never be connected to the Internet, because intellectual users need:

- complete information security, because their intellectual activities must be as much confidential as possible;
- complete and quickly automatically updated personal data base in their personal computers;
- complete package of applications capable of solving the corresponding tasks (e.g., MathCad), which cannot be accessed by anyone else under the pretext of installing updates or any other pretext (and, consequently, no one would be able to abuse this access).

The Internet does not meet any of these requirements, due to its well-known drawbacks.

3.3. Internet Information Network

The existing information technologies based on the use of global information network, the Internet, have drastically changed the information environment of people [18], [19]. We can even say that, in terms of information, the society has already turned into the Internet-civilization. Intellectual activity of people nowadays is impossible to imagine without the use of the World Wide Web and e-mail.

The basic principles of the Internet were formulated in the 1960s-1980s [20], [21]. In 1995 the Federal Network Council (FNC) adopted a resolution defining the term “Internet”. Already at that time many shortcomings of the Internet were revealed [22], many of which have not been eliminated until now.

Since then, the Internet has been constantly evolving [23], and the number of its users has been growing rapidly. By mid-2008, the Internet already had 1.5bn users (which is one fourth of the global population).

Nevertheless, we cannot but admit that even the Internet-to-be will, due to further use of packet-switched communications, retain its major drawbacks – lack of guaranteed information security, and low data retrieval speed and limited functionality.

The latter deserves special clarification. In an increasingly global economy, information and communication technologies are critical for nations to participate in trade and reap the benefits of access to world markets [24]. However, the efficiency of information and communication technologies based on the Internet, in terms of solving the tasks challenging the global economy, is insufficient [25].

Therefore, the business community is in need of new technological principles for developing information networks, which would allow completely eliminating the drawbacks of the Internet. The drawbacks of the Internet are known to any user, the major being:

- lack of many needed (first of all, business-oriented) services;
- poor information security of both individual and corporate users;
- time-consuming data retrieval;
- infringement of copyright, and so on.

Some of these drawbacks can still be found in the updated variants of the Internet - in the satellite Internet, “Internet2”, NGN (Next Generation Networks) etc.

Let us discuss the drawbacks of the Internet in more detail.

Despite the fact that the modernized variants of the Internet offer new services, there are no business-oriented services among them. This is why the need of the business community for rapid, complete and reliable information still remains unsatisfied. The use of the currently available Internet services for business purposes does not provide for guaranteed information security and often triggers megabuck losses [26].

Lack of guaranteed information security for users is quite a significant drawback of the Internet [27] – [30], as with the use of bidirectional or two one-way lines necessary for packed-switched communications, the threats of hacking, viruses, worms, fishing, network espionage, spamming, trolling, and so on, would never be eliminated. And no anti-virus, cryptographic, or other software would ever be able to solve this problem.

Another significant drawback of the Internet is its extremely low data retrieval speed (by several orders of magnitude lower than the data transfer rate), which is, first of all, caused by the fact that the Internet has a huge amount of information of little value, or trash information. Moreover, all sites in the Internet are designed in a different way, some of them even being works of art. However, these sites are inconvenient for fast information retrieval and its comparative analysis. Finally, sometimes the Internet simply lacks the necessary information. Therefore, higher data transmission speed in broadband Internet systems is not able to solve this problem, although, of itself, it is a very useful improvement of the Internet.

Infringement of copyright in the Internet is also a drawback [31], since it breaches one of the basic principles of market economy – intellectual property protection.

Moreover, virtual absence of any legal regulation of the Internet resulted in it being used for asocial and even criminal purposes [32], [33]. Cyber crime and cyber terrorism pose a significant threat not only to the economic activity of people and countries, but violate civil rights, threaten public and national security, undermine the basic principles of the democratic society.

3.4. PC•net Information Network

First of all, here belongs lack of guaranteed information security and long information retrieval time. The Internet very often simply lacks the necessary information, and, on the contrary, is abundant with junk information. Infringement of copyright is a frequent occurrence in the Internet. Other criminal activities are sometimes also based on the Internet. The Internet does not provide many services necessary for serious work. Finally, in accordance with the technological singularity concept, Internet-integrated artificial intelligence, in the opinion of its authors, can threaten the existence of human civilization.

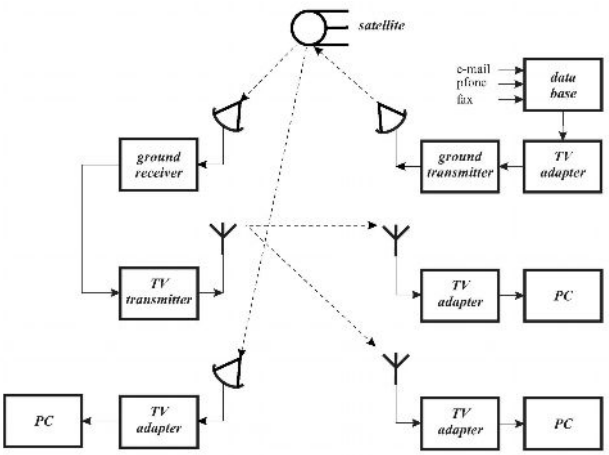

Fig. 1 Functional scheme of simplest implementation of information network PC-net

This is why, in order to implement human super-intelligence, we must have a different information network based on a different technical solution and having different performance characteristics. An information network which fully meets the above requirements is the new global information network PC-net [34], [35] described below. It differs from the Internet, first of all, due to the fact that is does not use packet-switched communication, for which the Internet requires either two communication lines (direct and feedback) or one bidirectional communication line (e.g., telephone). All the troubles of the Internet – viruses, hackers, spam, etc. – come from the existence of feedback lines. This is why, PC-net information network does not have feedback lines; it uses only single one-way broadband communication lines, which make it impossible for hackers to retrieve any information from users' PCs (just like from their TV-sets). For the same reason, it would be useless to infiltrate Trojans and use any other spyware. Besides, hardware and software means of information security of the data banks will be able to protect users from viruses, spam and other malware. As for noise suppression during transmission of computer information to users, it will be provided for by the use of noise-proof encoding which has proven to be highly efficient in deep space communication.

Examples of functional schemes of the simplest implementations of PC-net is given in Figures 1, 2

and 3. As can be seen, protected (because they are not connected to the Internet) users' PCs are connected to a regional television network (aerial, cable, satellite, or fibre-optic) via TV adapters, which are functionally similar to Internet modems. TV transmitters are also equipped with TV adapters In Fig. 1, protected users' PCs are connected to PC-net information network via on-air and satellite television communication lines; in Fig. 2 - via on-air and cable television communication lines; in Fig. 3 - via on-air, satellite and cable satellite television communication lines. Other variants of connecting protected users' PC to PC-net information network are also technically possible, e.g., via fiber-optic communication lines. With the help of rebroadcasting transmitters (ground transmitter, satellite, and ground receiver) a regional television network can be connected to the global network of computer-television broadcasting.

The information which is broadcast via PC-net will be continuously and progressively accumulated in data bases, supplied with very detailed descriptors and broadcast to all users. Users subscribe to the paid network of computer-television broadcasting similar to the way television viewers subscribe to pay-to-see TV; the only difference is that when making a subscription they will have to indicate not the TV channels they want to watch, but the descriptors of the items which interest them.

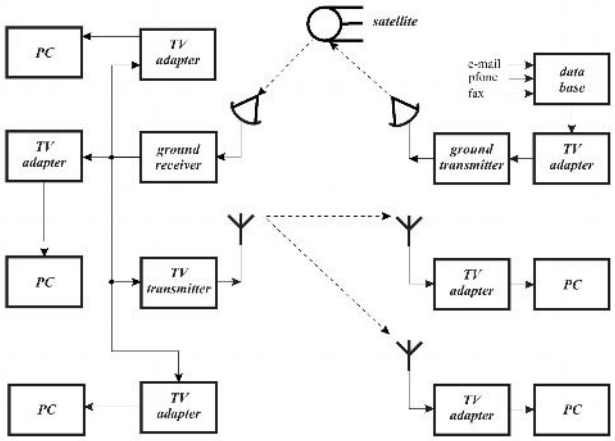

Fig. 2 Functional scheme of other simplest implementation of information network PC-net

The necessary information can be broadcast to users' PCs 24 hours a day (including business hours, in the background mode). Users can review the information when it's most convenient for them, and decide what they want to do – either to delete the information or to store it the personal memory of their PC. This is why any user who is a PC-net subscriber can quickly create and efficiently update an infinitely large and detailed personal data base on the topic of interest, which will enable them to make justified and efficient decisions.

We have to beware that the suggested PC-net information network is not an alternative to the Internet, because PC-net offers new services which cannot be implemented in the Internet.

It is possible to deploy the global PC-net for information support of PCs personal memory quite quickly and at a comparatively low cost, because almost everything it needs is ready and available in the market. Moreover, at the beginning it can be deployed in the form of regional information networks which will later on be joined into a single global network.

There is know-how for the proposed development.

4. Use of the New Information Network PC-net

As well as the Internet, information network PC-net offers its users various facilities, referred to as services.

4.1. For Analytical Activity

Analytical service is one of the most important, and it is this service which enables implementing human super-intelligence available to the mass user.

The objective of human activity with the help of the analytical service is analysis of information available to the user in order to reveal certain trends (e.g., in administrative or economic management) and regularities (e.g., in science) in situations and processes under consideration. This is the task currently performed by analytical services of banks, corporations, intelligence offices, military headquarters, as well as by scientists.

Correct assessment of situations and relevance of the corresponding management decisions depends on the results of analytical activity. Analytical service is just as important in scientific research. Since human rational thinking, as mentioned above, is low-factor, at present almost all known laws of nature, with a rare exception (here belongs, for instance, the third Kepler law with Newton amendment) are described with functions of not more than three variables. However, nature doesn't seem to be so primitive as to have only these simple regularities. In fact, it is the people who are psycho-physiologically unable of learning more complex regularities. You can make sure of it yourself, trying to imagine, e.g., a four-dimensional cube (in other words, a tesseract, or octachoron).

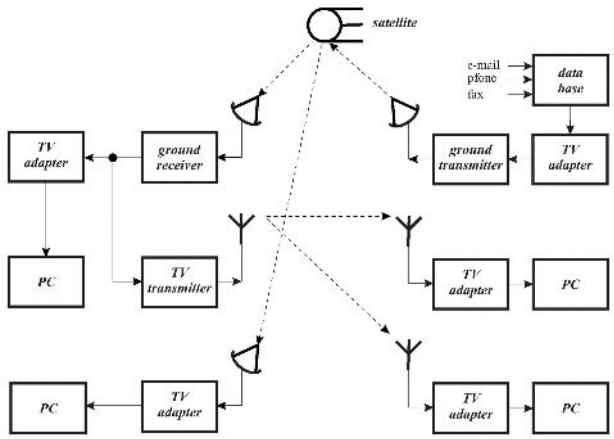

Fig. 3 Functional scheme of one more simplest implementation of information network PC-net

However, with the help of the analytical service under consideration, people will be able to learn (and, consequently, to use) these multi-factor laws of nature. To this end, the user will have to process the information uploaded via the PC-net into the personal memory of the protected computer, and then do (certainly, with the help of special software, e.g., for intelligence enforcement) the following:

- reveal the most important factors relevant to processes and situations under consideration;
- determine functional or other cause-and-effect relations among the revealed significant factors;
- use the revealed regularities to develop the best strategy of behaviour (illness treatment, safe operation of complex scientific and engineering systems, business management, etc.).

Finally, users willing to develop their super-intellectual abilities with the help of their personal computers are advised to undergo a special psychological training. The earlier this is done, the better. This is why the best solution of the problem would be combination of this training with education (see below on educational service).

Certainly, these super-intellectual tasks can be performed with the help of supercomputers, as well. However, firstly, supercomputers are relatively scarce, very expensive, and are already being used for project works. Secondly, scientific discoveries are usually made accidentally, and, therefore, to raise the probability of a discovery being made at least by one user, according to the law of large numbers, scientific pursuit must become mass, involving enthusiasts whose work is not regulated by anyone.

4.2. For education

Information network PC-net can offer many other useful services, including an educational service which is directly related to the development of human super-intelligence, firstly, because people learn to think outside the box in the process of education, and, secondly, because creative people during their pursuits often have to complete additional training or even be completely retrained [36].

The educational service works as follows. Its users (not only students) who want to gain knowledge use the computer-television broadcasting network PC-net to receive, either independently or through their educational institutions, and download into their PCs:

- textbooks and workbooks supplied with a large number of hyperlinks to other chapters of textbooks (including other textbooks) and answers to frequently asked questions;
- problem books with detailed solutions of typical and advanced problems;
- materials of student contests and entrance exams of previous years (preferably with analysis of typical mistakes);
- learning and development, learn-as-you-play programs, etc.

As is known, the quality of education depends on how well individual peculiarities of learners are taken into account. The matter is that people have a different body of mastered knowledge (due to individual differences in abilities, different life experience, peculiarities of thinking, and so on). New knowledge is mastered in the process of education only in the case when it is based on previously mastered knowledge. The art of teaching lies in the ability to take into account these circumstances as much as possible. Certainly, group teaching never allows for implementation of the principle of learning based on mastered knowledge to its full extent (because different people have a different body of basic mastered knowledge). It is poorly implemented in self-study (because there is no one to ask). It is best implemented in individual training.

However, the best way to implement the principle of learning based on previously mastered knowledge is to resort to the educational service of PC-net, because a personal computer the memory of which contains all the information mentioned above can always help to find supplementary materials explaining certain obscure issues (which is also done by a personal tutor). This is why in terms of efficiency education with the use of this service will be comparable to elite individual tutorial. This

education will be developing and aimed at further use of systems of human super-intelligence.

The problem of high-quality distant learning is topical not only for students. At present companies specializing in information technologies annually spend billions US dollars on continuous training and retraining of their staff [37].

As is seen, in order to improve the quality of education, this service offers new technical means suitable for new education strategy. The new strategy may be referred to as developmental learning, because, contrary to the existing education methods, it aims not so much on obtaining knowledge, but rather on building the skills for the most efficient creative use of this knowledge in practical activity. Developmental learning thus presupposes building the skills for evaluating the quality and relevancy of information obtained, as well as the abilities for independent search of the required information.

Developmental learning will require new textbooks and workbooks. The existing textbooks are mostly unsuitable for this type of learning, because they present the material mostly in a dogmatic way as an unconditionally true knowledge. However, developmental learning requires textbooks which, first of all, teach to think, this is why they must not only contain knowledge, but explain the complicated and often uneasy way it was obtained (e.g., the physical meaning of complex numbers discovered over 500 years ago). It must be explained that knowledge presented in textbooks is often semi-knowledge (e.g., students must be informed that approximately half of optical phenomena are explained by one theory, another half – by another theory, and there is no unified optics theory; similarly, there is no single field theory). Sometimes hypotheses currently denied or rejected by science must be analysed (e.g., the ether theory). It must be explained that there are very few unconditional truths in science (illustrating it with the example of the OPERA and MINOS physical experiments, the results of which disprove the special theory of relativity in its current form).

People who intend to become super-intellectuals must not be deceived, either in primary school, or at universities. They must understand that obtaining knowledge is a hard day-to-day work. This is why they must be taught not to obtain ready-to-use knowledge, but to find knowledge themselves. In this respect, the process of education will resemble the process of scientific work, at the beginning it will take place under the supervision and with the help of teachers, later on – scientific advisors, and, eventually, independently.

People who complete this course of education will be best prepared for the super-intellectual activity described above.

4.3. In Business

Understanding multi-factor processes in economics is as much important as in science. Indeed, despite stunning successes of global science in the 20th century, economic development of the society has been going at a much slower pace than science and technology allow [6]. Moreover, during crises which occur from time to time and which no one has managed either to explain or to prevent, economic development turns backwards. This result, as explained in [38] – [40], is caused by lack of understanding of actual economic processes, i.e., lack of their relevant mathematical description, and, consequently, the behaviour which is inappropriate in the current economic situation.

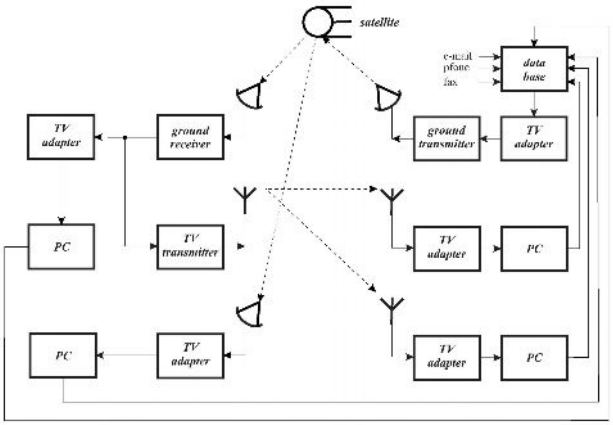

Fig. 4 Functional scheme of simplest implementation of information network PC-net with feedback

However, use of the analytical service described above will allow successfully revealing the development trends of the corresponding economic sectors, and make currently efficient management decisions.

Information network PC-net also suggests a new technological solution improving the process of trading, which will allow creating the largest and most convenient 24/7 global e-store. The trading service operates as follows.

Everyone who wants to offer their goods and services to customers must fill in an electronic information card giving detailed information of the offer – name, price, etc. – and submit it to the closest data base. In the data base the data is processed, supplied with the corresponding descriptors, and sent via local and/or global computer-television broadcasting network to subscribers. Users get the information in accordance

with the descriptors they have specified, and make their choices (on their own or with the help of software) and purchases.

Similarly, it is possible to implement the exchange service which, contrary to the trading service offering goods and services at fixed prices, provides auction trade. Anything can be the subject of this trade – goods, services, stocks and securities, currency, and so on.

The exchange service offered by PC-net, thus, will allow developing the largest and most convenient round-the-clock global universal exchange.

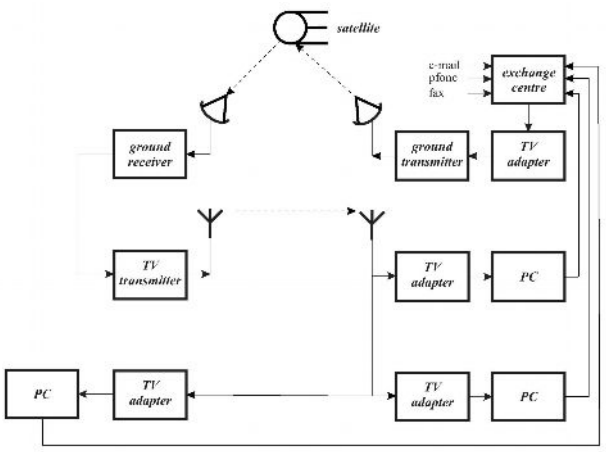

Fig. 5 Functional scheme of simplest implementation of information network PC-net with feedback and LAN

The only technical peculiarity of PC-net used to implement the exchange service is the additional feedback (see Fig. 4) from the users to the exchange data base, which is necessary to submit the bids. However, to avoid breach of protection of their PCs from network threats of the Internet, users are advised to use an additional PC for the purpose of feedback. These two computers (the protected and the unprotected) must never be connected with a two-way communication line.

4.4. For Administrative Management

Understanding multi-factor processes in administrative management is as important as in science and economics. Indeed, decisions made by top-managers often define the success or failure of multi-billion projects and the fortunes of millions of people.

Let us give just one example. The Great Depression in the USA started in October 1929. At the beginning of 1929 Herbert Hoover, President of the United States, said in his inaugural address: "I have no fears for the future of our country. It is bright with hope". Indeed, in January 1929 stock

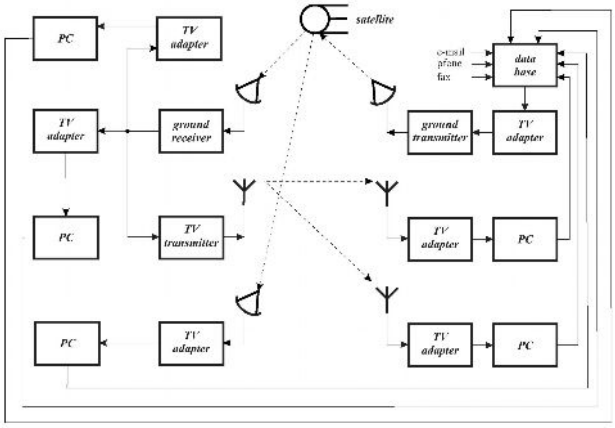

Fig. 6 Functional scheme of other simplest implementation of information network PC-net with feedback and LAN

indices were three times higher than five years ago. However, already by the end of October 1929 the Dow-Jones index dropped almost twofold. In 1932 the US metallurgy worked to barely 12% of its capacity. Besides, scientists have so far been unable to explain the Great Depression [41].

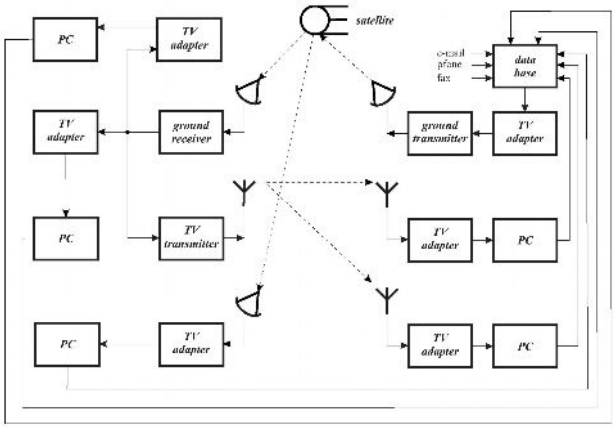

Fig. 7 Functional scheme of one more simplest implementation of information network PC-net with feedback and LAN

Multi-factor processes are analysed by the analytical service described above. Besides, to solve current tasks, the PC-net information network offers administrative service which, as follows from its name, can be used to manage any large institution – a ministry, a corporation, a bank [42]. These institutions deal with a lot of sensitive information. This is why guaranteed information security provided by PC-net is very useful for them, especially due to the fact that it can be enforced by the use of cryptographic encoding.

Since in large institutions many protected computers receive information, it makes sense to connect them to the information network PC-net via a local information network (see Fig. 5, 6). In order

to transmit information, it is also useful to use a local information network (for simplicity not shown in the Figures), to which unprotected PCs are connected. Protected computers connected to PC-net and unprotected computers connected to the Internet must not be connected to each other, although they may be used by the same users and even be located on the same desk [42].

Finally, it is obvious that all the above services of the suggested information network PC-net can be used simultaneously, just like in the Internet there are services of email, the World Wide Web, and so on.

5. Conclusion

At present and in the foreseeable future, a human is an unattainably more sophisticated information machine than a computer.

The problem of artificial intelligence is an incorrect, and, moreover, detrimental direction for the development of computer technology, because its objective is in essence to force most people out of intellectual activity.

An alternative to the problem of artificial intelligence – the problem of human super-intelligence – on the contrary, aims at using computers in order to develop the intellectual potential of people.

Since intellectual and super-intellectual creative human activity is more and more demanded, the system of comprehensive education must be rebuilt and aimed, first of all, at the intellectual development of people.

References:

1. A. M. Turing, Computing Machinery and Intelligence, *Mind*, Vol. 59, 1950, pp. 433- 460.
2. H. L. Dreyfus, *What Computers Can't Do: The Limits of Artificial Intelligence*, MIT Press, 1972.
3. A. Newell and H. A. Simon, *Human problem solving*, Prentice Hall, 1972.
4. J. Haugeland, *Artificial Intelligence: The Very Idea*, MIT Press, 1989.
5. G. F. Luger, *Artificial intelligence. Structures and Strategies for Complex Problem Solving,* 5th Edition, Addison Wesley, 2004.
6. D. Michie and R. Johnston, *The Creative Computer: Machine Intelligence and Human Knowledge,* Penguin Books, 1985.
7. V. M. Kuklin, Contaminated by intelligence, or ways of creating artificial intelligence. *Universities*, No 4, Publisher: Okna Media Group, Kharkiv, 2004, pp. 84-90.
8. V. Vinge, The coming technological singularity: How to survive in the post-human era, *In VISION-21 Symposium,* NASA Lewis Research Center and the Ohio Aerospace Institute, 1993.
9. H. Moravec, When will computer hardware match the human brain? *Journal of Evolution and Technology*, Vol. 1, 1998, pp. 1- 12.
10. R. Kurzweil, *The Singularity Is Near: When Humans Transcend Biology*, Viking, 2005.
11. N. Bostrom, How Long Before Super intelligence? *Linguistic and Philosophian Investigations*, Vol. 5, No 1, 2006, pp. 11-30.
12. E. S. Yudkowsky, Artificial Intelligence as a Positive and Negative Factor in Global Risk, *Singularity Institute for Artificial Intelligence*, 2006, pp. 1-41.
13. G. Soros, *Soros on Soros: Staying Ahead of the Curve*, John Willey & Sons, Inc. 1995.
14. A. A. Antonov, Human-computer super intelligence, *American Journal of Scientific and Industrial Research*, Vol. 1, No 2, 2010, pp. 96-104.
15. R. M. Dombrugov, *On visual communication.* Publisher: Tekhnika, Kiev, 1990.
16. A. A. Antonov, Human Super Intelligence, *International Journal of Emerging Sciences*, Vol. 1, No 2, 2011,. pp. 164-173.
17. A. A. Antonov, From artificial intelligence to human super-intelligence, *International Journal of Computer Information Systems*, Vol. 2, No 6, 2011, pp. 1-6.
18. A.M. Castells, *The Internet Galaxy: Reflections on the Internet, Business, and Society,* Oxford University Press Inc., 2003.
19. E. Brousseau and N. Curien, eds., *Internet and Digital Economics: Principles, Methods and Applications*, Cambridge University Press, 2007.
20. C. Moschovitis, H. Poole, T. Schuyler, T. M. Senft, *History of the Internet: A Chronology, 1843 to the Present*, ABC-CLIO, (1999)
21. J. Naughton, *A Brief History of the Future: From Radio Days to Internet Years in a Lifetime*, Overlook Press, 2000.
22. L. Cruz, K. Lee, J. Lipnik, T. Weeks, *The Communications Decency Act And the Internet: Case History, Arguments, Analysis and a Potential Solution*, 1996.
23. J. L. Zittrain, *The Future Internet and How Stop It*, Yale University Press, 2008.
24. B. Rajagopalan, D. Hillison, R. Calantone, V. Sambamurthy, Diffusion of information and

communication technologies: a takeoff analysis, *International Journal of Business Information Systems,* Vol. 5, No.4, 2010, pp. 329 - 347
25. R. Ashrafi and Y. Baghdadi, E-business: issues, challenges and architecture, *International Journal of Business Information Systems*, Vol. 3, No. 4, 2008, pp. 391 - 409.
26. G. Elliott, *Global Business Information Technology: An Integrated Systems Approach*, Addison Wesley, 2004.
27. I. Fourie, Cyber Terrorism: Political and Economic Implications, *Online Information Review*, Vol. 31, No 2, 2007, pp.242 – 243.
28. L. Janczewski and A. M. Colarik, *Cyber warfare and cyber terrorism*, Idea Group Inc., 2008.
29. S. W. Brenner, *Cybercrime: Criminal Threats from Cyberspace*, Praeger, 2010.
30. J. Clough, *Principles of Cybercrime*, Cambridge University Press, 2010.
31. G. E. Higgins, *Cybercrime: An Introduction to an Emerging Phenomenon*, McGraw-Hill, 2010.
32. F. D. Kramer, S. H. Starr, L. K. Wentz, eds., *Cyberpower and National Security,* Potomac Books Inc., 2009.
33. M. D. Young, National Cyber Doctrine: The Missing Link in the Application of American Cyber Power, *Journal of National Security. Law & Policy*, Vol. 4, No. 1, 2010, pp. 173 - 196.
34. A. A. Antonov, Safe Global/Regional Informational Network, *European Journal of Scientific Research*, Vol. 28, No 1, 2009, pp. 165-174.
35. A. A. Antonov, New Business-Oriented Global/Regional Information Network, *International Journal of Business Information Systems*, in press.
36. N. I. Khodakovskiy, Research of systems based on knowledge in artificial intelligence subsystems, *Computer means, networks and subsystems*, No 9. 2010, pp. 37-46.
37. A. A. Glinskikh, Global IT-education market, *Computer-Inform,* No 20 (113), 2001.
38. A. A. Antonov, Differential equation for the 'goods-money-goods' process, *European Journal of Scientific Research*, Vol. 40, No 1, 2010, pp. 27-42.
39. A. A. Antonov, Economic oscillating systems, *American Journal of Scientific and Industrial Research*, Vol. 1, No 2, 2010, pp. 359-363.
40. A. A. Antonov, Realization of Crisis-Free Economy, *International Journal of Emerging Sciences, Special Issue: Selected Best Papers*, Vol. 1, No 3, 2011, pp. 387-399.
41. R. McConnell, S. L. Brue and S. M. Flynn, *Economics: Principles, Problems and Policies*, McGraw-Hill Higher Education, 2011.
42. M. J. Cronin, *Banking and finance on the Internet,* John Wiley and Sons, 1997.