Future and Feature of Intelligent Systems and Their Societies

Ituma, Chinagolum
Computer Science Department
Ebonyi State University Abakaliki
chinagolumituma@yahoo.com

Abstract

This research work presents us with the definition of "Intelligent system". This definition helps us to better understand how we act and furthermore permits us to build an artificial intelligent system. The analysis in this report covered what we can possibly know about our environment, how we represent, in the brain, the situation in which we find ourselves and how we choose an appropriate action. Besides this, we lay the foundations for developing a scientific ethics, sociology as a hard science and a scientific philosophy. Finally the research work covered the consequences of having artificial intelligent systems with us in the near future.

Keywords: intelligence, systems, artificial intelligence, intelligent systems, automatic machines, robots.

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1. Introduction

This research work on intelligent systems and their society tries to look at two basic societies, first, the society of intelligent animals, specifically the man and secondly the society of intelligent machines commonly seen as the Robots and automated machine systems. The research covered a predictive study into what the future of the society that is made of both man and intelligent machine system will look like. In this research work we studied the intelligent system of man and how it can be used to build machine intelligence. The study also covered the features of the new society in terms of ethics, labour, economy, war etc.

1.1 Definition of Intelligence

Intelligence is a coordination of the intellect reaching out for performance in reaching its objectives or goals. This implies having experiences where the system learnt which actions best let it reach its objectives. Non gained experience makes a person not to be intelligent in all areas of knowledge. This means they are only intelligent in those areas where they had experiences.

1.2 Definition of a System

A system is part of the universe, with a limited extension in space and time. What is outside the frontier of the system, we call its environment. Stronger or more correlations exist between one part of the system and another, than between this part of the system and parts in the environment.

1.3 An Intelligent System

An intelligent system learns how to act so it can reach its objectives or goals. There are

1.4 Artificial Intelligence

- Duda, R.O., Hart, P.E., Stork, D.G. [3]defined AI as a concept that describes the creation of a device or devices that will

emulate the ability of the human brain to absorb, and more importantly, interpret data, in context.

- Gurney, K. [4] defined artificial intelligence as both a system and a concept, this refers to the idea of a computer system that can think and "learn" like a human. A computer with artificial intelligence could update and increase its knowledge based on previous problems and results.
- Haykin, S. [5] defined AI as science and technology to develop computers that can think and function in ways normally associated with human intelligence, including reasoning, inference, learning and problem solving
- Fahlman, S, Lebiere, C [6] said AI is the branch of computer science that deal with writing computer programs that can solve problems creatively.
- Netdictionary.com and Wikipedia an electronic encyclopedia wrote that Artificial intelligence is intelligence exhibited by any manufactured system.

Details of an Intelligent System

The Intelligent System has a temporary objective that it has derived from its main objective. It senses its environment and stores these sense impressions as elementary concepts. Concepts are material way of storing information. Working on concepts creates new ones and stores relationships to other total, part, abstract and concrete concepts.

In intelligent systems there is a check of the incoming information. With the information, expressed as concepts, the system builds up the present situation. Now the system prunes. Pruning involves looking into its memory and finding applicable response rules. It chooses one of the best rules it has found and performs the corresponding action. The intelligent system continually records the present situation and the action that followed as a response rule. The very first response rules are due to chance actions and to teaching. When the system is externally inactive, that is it sleeps, it reviews the response rules stored in its memory and performs some generalizations. After some while, its memory is full and it forgets the least used concepts and response rules.

2.0 Background of the Study.

2.1 Trends and the Origins of Artificial Intelligence

The earliest substantial work in the field was done by the British logician and computer pioneer Alan Mathison Turing, in 1935, at Cambridge University. Turing conceived the modern computer. He described an abstract computing machine consisting of a limitless memory and a scanner that moves back and forth through the memory, symbol by symbol, reading what it finds and writing further symbols. The actions of the scanner are dictated by a program of instructions that is also stored in the memory in the form of symbols. This is Turing's "stored-program concept".

Abdi, H., Valentin, D., Edelman, B.E. [1] recorded that During the Second World War Turing was a leading cryptanalyst at the Government Code and Cypher School, Bletchley Park. Turing had a colleague, Donald Michie, who later founded the Department of Machine Intelligence and Perception at the University of Edinburgh. Donald remembered Turing talking often about the possibility of computing machines that could, (1) learning from experience and (2) solving problems by means of searching through the space of possible solutions, guided by rule-of-thumb principles presently called heuristic search. Bhagat, P.M. (2005) in his book stated that at Bletchley Park Turing illustrated his ideas on machine intelligence by reference to chess. In principle, a chess-playing computer could play by searching exhaustively through all the available moves, but in practice this is impossible, since it would involve examining an astronomically large number

of moves. Heuristics are necessary to guide and to narrow the search. Michie recalls Turing experimenting with two heuristics that later became common in AI, *minimax* and *best-first*. The minimax heuristic (described by the mathematician John von Neumann in 1928) involves assuming that one's opponent will move in such a way as to maximize their gains; one then makes one's own move in such a way as to minimize the losses caused by the opponent's expected move. The best-first heuristic involves ranking the moves available to one by means of a rule-of-thumb scoring system and examining the consequences of the highest-scoring move first. In London in 1947 Turing gave what was, so far as is known, the earliest public lecture to mention computer intelligence, saying "What we want is a machine that can learn from experience", adding that the "possibility of letting the machine alter its own instructions provides the mechanism for this". In 1948 he wrote (but did not publish) a report entitled "Intelligent Machinery". This was the first manifesto of AI and in it Turing brilliantly introduced many of the concepts that were later to become central, in some cases after reinvention by others. One of these was the concept of "training" a network of artificial neurons to perform specific tasks.

According to Bishop, C.M. [2] in 1950 Turing introduced the test for computer intelligence that is now known simply as the Turing test. This involves three participants, the computer, a human interrogator, and a human "foil". The interrogator attempts to determine, by asking questions of the other two participants, which is the computer. All communication is via keyboard and screen. The interrogator may ask questions as penetrating and wide-ranging as he or she likes, and the computer is permitted to do everything possible to force a wrong identification. (So the computer might answer "No" in response to "Are you a computer?" and might follow a request to multiply one large number by another with a long pause and an incorrect answer.) The foil must help the interrogator to make a correct identification.

In 1991, the New York businessman Hugh Loebner started the annual Loebner Prize competition, offering a $100,000 prize for the first computer program to pass the Turing test (with $2,000 awarded each year for the best effort). However, no AI program has so far come close to passing an undiluted Turing test.

2.3 Artificial Intelligence Programs That Are Complete Intelligent System

Walter Fritz [7] asked this question and provided an answer, “Why does anybody want to build complete Artificial Intelligent Systems? Well, they could free us from work and provide a much higher standard of living”. For a number of years, computer scientists have written programs that are complete intelligent systems. Not all are identical to the "intelligent system" that we described above. Nevertheless all have an input corresponding to senses, a choice of actions based on response rules, sometimes called "productions", and the ability to act, be it as graphics on a computer screen, as a text output or as limb movements. Most have a memory for storing experiences and the ability to learn. Sometimes the brain does not do the action immediately but uses its imagination. It selects a response rule and determines what situation results from the action. Then it selects again an action for this new situation and determines the probable result. Thus it can choose not one response rule but a complete plan of action. The programmer writes the different functions of the intelligent system as program functions; also called sub programs.

3.0 Materials and Methods: Methodology and Analysis

3.1 *The Way a Robot Brain Works*

The robot is an intelligent machine. At the start of the robots "life" the memory is empty of concepts and response rules. But every time the robot has an experience it stores a new response rule containing the present situation, the action it had done and if it was useful for reaching its own objectives or not. These response rules are only good for very specific situations. When the brain is inactive, when it "sleeps", it reviews these response rules and makes generalizations. Now it has response rules that are applicable to a wider range of situations. In a society of intelligent animals, man and intelligent Machines, there should be harmony for the best to be achieved. This means there must be a rule that will guide the man and the machine. This we can call ethics.

3.2 Ethics as a Science

We shall start with an **artificial** intelligent system, for instance, an advanced robot, needs to know what to do in a given situation. And that is what ethics is about, knowing what to do and what not to do. So the robot has to act ethically. And what is true for a robot is just as true for a human being. Thus a scientific ethics and an experimental ethics, based on well defined terms, is created and applied to robots and human beings.

For the robots or intelligent machines to be ethical, there are already some laws that have been stated by Isaac Asimov which the intelligent machine should be designed to obey. These laws are stated below.

3.3 The Law of Robots

3.3.1 ***Law Zeroth*****:** A robot may not injure humanity, or, through inaction, allow humanity to come to harm.

3.3.2 ***Law One*****:** A robot may not injure a human being, or, through inaction, allow a human being to come to harm, unless this would violate a higher order law, that is the zeroth law.

3.3.3 ***Law Two*****:** A robot must obey orders given it by human beings, except where such orders would conflict with a higher order law that is the first two laws.

3.3.4 ***Law Three:*** A robot must protect its own existence as long as such protection does not conflict with a higher order law that is the first three laws. How do we achieve ethics for man and for intelligent machine?

To achieve ethics for man we must uphold home training for our children. These children when not trained will grow up with evil tendencies. They will also grow up to build intelligent machines with the intention to annihilate humanity than save man and make his environment more habitable.

4.0 Discussions

4.1 Some Features Of The Future Society of the Intelligent Systems

- A change from a labour to a leisure oriented society. The intelligent machines will do most of the work for man no matter how tedious or complex the job is. Men only have to seat and watch the machines work for him. This will be possible for those who can make the intelligent machines work for them.
- A society were one can be paid for accepting not to work. The introduction of intelligent machines to do the work of man will most certainly displace a lot from their work. Since the intelligent machines will most certainly be more productive than man those who can afford them will most certainly dismiss their human workers for the machine option. The government may come up with a policy that anybody displaced from his work by an intelligent machine the machine should pay the person. Since the machines will

still be more gainful their owners can still persuade the human worker to be paid for accepting no longer to work. Another scenario may be were the intelligent machines will be paying taxes which will be used to pay the people who would have been working to earn a salary.

- A society were their will be a change from given man a specialized training to buying a specialized intelligent machine.
- Societies were you can stay at a place and manage chains of business as if you are present in each business scene.

- Societies were machines will go to war instead of man. Terrorism is a type of war being very prominent in our present day. A terrorist is not just a soldier who fights believing to go home safe and come back to fight another day. He fights to kill and be killed at the same scene. He has no 'value' for human life. The only thing fit to fight a terrorist is an intelligent machine who if lost is just a machine that is lost.

Conclusion and Recommendation.

One certain thing is that intelligent machines have come to stay with us. They do our Works better than we would have done it. They will eventually take over from us in more than ninety percent of man' activities. Every invention to solve a given problem will most certainly introduce another form of a problem. This intelligent machine will most certainly introduce problems that will require professionalism to solve. We there for recommend home training strictly. When the society is filled with criminals, they will eventually design intelligent machines with criminal tendencies. If home training cannot be achieved, we recommend a society of man and the intelligent machines working together with a good well home trained man supervising the machines

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References

[1] Abdi, H., Valentin, D., Edelman, B.E. (1999). *Neural Networks.* Thousand Oaks: Sage. Alan turing 1948, "Intelligent Machinery", Unpublished. Bhagat, P.M. (2005) *Pattern Recognition in Industry*, Elsevier. ISBN 0-08-044538-1.

[2] Bishop, C.M. (1995) *Neural Networks for Pattern Recognition*, Oxford: Oxford University Press. ISBN 0-19-853849-9 (hardback) or ISBN 0-19-853864-2 (paperback)

[3] Duda, R.O., Hart, P.E., Stork, D.G. (2001) *Pattern classification (2nd edition)*, Wiley, ISBN 0-471-05669-3.

[4] Gurney, K. (1997) *An Introduction to Neural Networks* London: Routledge. ISBN 1-85728-673-1 (hardback) or ISBN 1-8572r8-503-4 (paperback).

[5] Haykin, S. (1999) *Neural Networks: A Comprehensive Foundation*, Prentice Hall, ISBN 0-13-273350-1.

[6] Fahlman, S, Lebiere, C (1991). *The Cascade-Correlation Learning Architecture*, created for National Science Foundation, Contract Number EET-8716324, and Defense Advanced Research Projects Agency (DOD), ARPA Order No. 4976 under Contract F33615-87-C-1499.

[7] Walter Fritz(2006) "intelligent systems" , New Horizons Press. www.netdictionary.com/a.html visited on 24/06/2008

[8] www.wikipedia.org/wiki/Artificial_intelligence visited on 24/06/2008