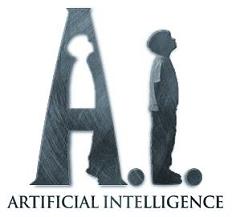
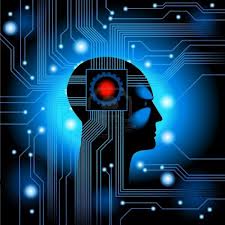
**ARTIFICIAL INTELLIGENCE**



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**Submitted by:Binoy Panchiwala**

**Roll no:2K14/SE/054**

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**ABSTRACT**

This paper is the introduction to Artificial intelligence (AI). Artificial intelligence is exhibited by artificial entity, a system is generally assumed to be a computer. AI systems are now in routine use in economics, medicine, engineering and the military, as well as being built into many common home computer software applications, traditional strategy games like computer chess and other video games.

I tried to explain the brief ideas of AI and its application to various fields. It cleared the concept of computational and conventional categories. It includes various advanced systems such as Neural Network, Fuzzy Systems and Evolutionary computation. AI is used in typical problems such as Pattern recognition, Natural language processing and more. This system is working throughout the world as an artificial brain.

Intelligence involves mechanisms, and AI research has discovered how to make computers carry out some of them and not others. If doing a task requires only mechanisms that are well understood today, computer programs can give very impressive performances on these tasks. Such programs should be considered ``somewhat intelligent''. It is related to the similar task of using computers to understand human intelligence.

We can learn something about how to make machines solve problems by observing other people or just by observing our own methods. On the other hand, most work in AI involves studying the problems the world presents to intelligence rather than studying people or animals. AI researchers are free to use methods that are not observed in people or that involve much more computing than people can do. We discussed conditions for considering a machine to be intelligent. We argued that if the machine could successfully pretend to be human to a knowledgeable observer then you certainly should consider it intelligent.

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**INTRODUCTION**

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**INTRODUCTION**

**ARTIFICIAL:-**

The simple definition of artificial is that objects that are made or produced by human beings rather than occurring naturally.

**INTELLIGENCE:-**

The simple definition of intelligence is a process of entail a set of skills of problem solving, enabling to resolve genuine problems or difficulties that encounters and to create an effective product and must also entail the potential for finding or creating problems and thereby laying the groundwork for the acquisition of new knowledge.

**ARTIFICIAL INTELLIGENCE:-**

Artificial intelligence is a branch of science which deals with helping machines find solution to complex problems in a more human like fashion. This generally involves borrowing characteristics from human intelligence, and applying them as algorithms in a computer friendly way. A more or less or flexible or efficient approach can be taken depending on the requirements established, which influences how artificial intelligent behavior appears.

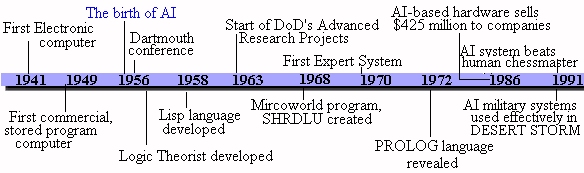
Artificial intelligence is generally associated with computer science, but it has many important links with other fields such as maths, psychology, cognition , biology and philosophy , among many others . Our ability to combine knowledge from all these fields will ultimately benefits our progress in the quest of creating an intelligent artificial being.

A.I is mainly concerned with the popular mind with the robotics development, but also the main field of practical application has been as an embedded component in the areas of software development which require computational understandings and modeling such as such as finance and economics, data mining and physical science.

A.I in the fields of robotics is the make a computational models of human thought processes. It is not enough to make a program that seems to behave the way human do. You want to make a program that does it the way humans do it.

In computer science they also the problems bcoz we have to make a computer that are satisfy for understanding the high-level languages and that was taken to be A.I.

**HISTORY OF A.I**

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The intellectual roots of AI, and the concept of intelligent machines, may be found in Greek mythology. Intelligent artifacts appear in literature since then, with real mechanical devices actually demonstrating behaviour with some degree of intelligence. After modern computers became available following World War-II, it has become possible to create programs that perform difficult intellectual tasks.

1950s: The Beginnings of Artificial Intelligence (AI) Research

With the development of the electronic computer in 1941 and the stored program computer in 1949 the condition for research in artificial intelligence is given, still the observation of a link between human intelligence and machines was not widely observed until the late in 1950

The first working AI programs were written in 1951 to run on the Ferranti Mark I machine of the University of Manchester (UK): a draughts-playing program written by Christopher Strachey and a chess-playing program written by Dietrich Prinz.

The person who finally coined the term artificial intelligence and is regarded as the father of the of AL is **John McCarthy.** In 1956 he organized a conference “the Darthmouth summer research project on artificial intelligence" to draw the talent and expertise of others interested in machine intelligence of a month of brainstorming. In the following years AI research centers began forming at the Carnegie Mellon University as well as the http://world-information.org/wio/infostructure/100437611663/100438659360/img_layout/icon_link_icardMassachusetts Institute of Technology (MIT) and new challenges were faced:

1) The creation of systems that could efficiently solve problems by limiting the search.

2) The construction of systems that could learn by themselves.

**1960:-**

By the middle of the 1960s, research in the U.S. was heavily funded by the [Department of Defense](http://en.wikipedia.org/wiki/DARPA) and laboratories had been established around the world. AI's founders were profoundly optimistic about the future of the new field: [Herbert Simon](http://en.wikipedia.org/wiki/Herbert_Simon) predicted that "machines will be capable, within twenty years, of doing any work a man can do" and [Marvin Minsky](http://en.wikipedia.org/wiki/Marvin_Minsky) agreed, writing that "within a generation .

By the 1960’s, America and its federal government starting pushing more for the development of AI. The Department of Defense started backing several programs in order to stay ahead of Soviet technology. The U.S. also started to commercially market the sale of robotics to various manufacturers. The rise of expert systems also became popular due to the creation of Edward Feigenbaum and Robert K. Lindsay’s DENDRAL. DENDRAL had the ability to map the complex structures of organic chemicals, but like many AI inventions, it began to tangle its results once the program had too many factors built into it... the problem of creating 'artificial intelligence' will substantially be solved". The same predicament fell upon the program SHRDLU which would use robotics through a computer so the user could ask questions and give commands in English.

**1980:-**

In the early 1980s, AI research was revived by the commercial success of [expert systems](http://en.wikipedia.org/wiki/Expert_systems), a form of AI program that simulated the knowledge and analytical skills of one or more human experts. By 1985 the market for AI had reached over a billion dollars. At the same time, Japan's [fifth generation computer](http://en.wikipedia.org/wiki/Fifth_generation_computer) project inspired the U.S and British governments to restore funding for academic research in the field. In the 1990s and early 21st century, AI achieved its greatest successes, albeit somewhat behind the scenes. Artificial intelligence is used for [logistics](http://en.wikipedia.org/wiki/Logistics), [data mining](http://en.wikipedia.org/wiki/Data_mining), [medical diagnosis](http://en.wikipedia.org/wiki/Medical_diagnosis) and many other areas throughout the technology industry

**1990 :-**

From 1990s until the turn of the century, AI has reached some incredible landmarks with the creation of intelligent agents. Intelligent agents basically use their surrounding environment to solve problems in the most efficient and effective manner. In 1997, the first computer (named Deep Blue) beat a world chess champion. In 1995, the VaMP car drove an entire 158 km racing track without any help from human intelligence. In 1999, humanoid robots began to gain popularity as well as the ability to walk around freely. Since then, AI has been playing a big role in certain commercial markets and throughout the World Wide Web. The more advanced AI projects, like fully adapting commonsense knowledge, have taken a back-burner to more lucrative industries.

**GOALS OF A.I**

The general problem of simulating (or creating) intelligence has been broken down into a number of specific sub-problems. These consist of particular traits or capabilities that researchers would like an intelligent system to display. The traits described below have received the most attention.

1. **Deduction, reasoning, problem solving:-**

For difficult problems, most of these algorithms can require enormous computational resources most experience a "combinatorial explosion": the amount of memory or computer time required becomes astronomical when the problem goes beyond a certain size. The search for more efficient problem-solving algorithms is a high priority for AI research.

Human beings solve most of their problems using fast, intuitive judgements rather than the conscious, step-by-step deduction that early AI research was able to model. AI has made some progress at imitating this kind of "sub-symbolic" problem solving: embodied agent approaches emphasize the importance of sensorimotor skills to higher reasoning; neural net research attempts to simulate the structures inside the brain that give rise to this skill; statistical approaches to AI mimic the probabilistic nature of the human ability to guess.

1. **Knowledge representation:-**

Knowledge representation and knowledge engineering are central to AI research. Many of the problems machines are expected to solve will require extensive knowledge about the world. Among the things that AI needs to represent are: objects, properties, categories and relations between objects; situations, events, states and time; causes and effects; knowledge about knowledge (what we know about what other people know) and many other, less well researched domains. A representation of "what exists" is an ontology: the set of objects, relations, concepts and so on that the machine knows about. The most general are called upper ontologies, which attempt provide a foundation for all other knowledge.

1. **Planning:-**

Intelligent agents must be able to set goals and achieve them. They need a way to visualize the future and be able to make choices that maximize the utility (or "value") of the available choices.

In classical planning problems, the agent can assume that it is the only thing acting on the world and it can be certain what the consequences of its actions may be. However, if the agent is not the only actor, it must periodically ascertain whether the world matches its predictions and it must change its plan as this becomes necessary, requiring the agent to reason under uncertainty.

1. **Natural language processing:-**

Natural language processing gives machines the ability to read and understand the languages that humans speak. A sufficiently powerful natural language processing system would enable natural language user interfaces and the acquisition of knowledge directly from human-written sources, such as Internet texts. Some straightforward applications of natural language processing include information retrieval (or text mining) and machine translation.

A common method of processing and extracting meaning from natural language is through semantic indexing. Increases in processing speeds and the drop in the cost of data storage makes indexing large volumes of abstractions of the users input much more efficient.

1. **Motion and manipulation:-**

The field of robotics is closely related to AI. Intelligence is required for robots to be able to handle such tasks as object manipulation and navigation, with sub-problems of localization (knowing where you are, or finding out where other things are), mapping (learning what is around you, building a map of the environment), and motion planning (figuring out how to get there) or path planning (going from one point in space to another point, which may involve compliant motion - where the robot moves while maintaining physical contact with an object).

1. **Perception:-**

Machine perceptionis the ability to use input from sensors (such as cameras, microphones, sonar and others more exotic) to deduce aspects of the world. Computer vision is the ability to analyze visual input. A few selected subproblems are speech recognition facial recognition and object recognition.

1. **Social intelligence:-**

Affective computing is the study and development of systems and devices that can recognize, interpret, process, and simulate human affects. It is an interdisciplinary field spanning computer sciences, psychology, and cognitive science While the origins of the field may be traced as far back as to early philosophical inquiries into emotion. A motivation for the research is the ability to simulate empathy. The machine should interpret the emotional state of humans and adapt its behaviour to them, giving an appropriate response for those emotions.

Emotion and social skills play two roles for an intelligent agent. First, it must be able to predict the actions of others, by understanding their motives and emotional states. (This involves elements of game theory, decision theory, as well as the ability to model human emotions and the perceptual skills to detect emotions.) Also, in an effort to facilitate human-computer interaction, an intelligent machine might want to be able to *display* emotions—even if it does not actually experience them itself—in order to appear sensitive to the emotional dynamics of human interaction.

1. **General intelligence:-**

Most researchers think that their work will eventually be incorporated into a machine with general intelligence (known as strong AI), combining all the skills above and exceeding human abilities at most or all of them. A few believe that anthropomorphic features like artificial consciousness or an artificial brain may be required for such a project.

Many of the problems above may require general intelligence to be considered solved. For example, even a straightforward, specific task like machine translation requires that the machine read and write in both languages (NLP), follow the author's argument (reason), know what is being talked about (knowledge), and faithfully reproduce the author's intention (social intelligence). A problem like machine translation is considered "AI-complete". In order to solve this particular problem, you must solve all the problems.

**CATEGORIES OF A.I**

AI divides roughly into two schools of thought:

* + 1. **Conventional AI.**
    2. **Computational Intelligence (CI).**

1. **Conventional AI :-**

Conventional AI mostly involves methods now classified as machine learning, characterized by formalism and statistical analysis. This is also known as symbolic AI, logical AI, neat AI and Good Old Fashioned Artificial Intelligence (GOFAI).

**Methods include**:

* Expert systems: apply reasoning capabilities to reach a conclusion. An expert system can process large amounts of known information and provide conclusions based on them.
* Case based reasoning
* Bayesian networks
* Behavior based AI: a modular method of building AI systems by hand.

1. **Computational Intelligence (CI) :-**

Computational Intelligence involves iterative development or learning (e.g. parameter tuning e.g. in connectionist systems). Learning is based on empirical data and is associated with non-symbolic AI, scruffy AI and soft computing.

**Methods include:**

* Neural networks: systems with very strong pattern recognition capabilities.
* Fuzzy systems: techniques for reasoning under uncertainty, has been widely used in modern industrial and consumer product control systems.
* Evolutionary computation: applies biologically inspired concepts such as populations, mutation and survival of the fittest to generate increasingly better solutions to the problem. These methods most notably divide into evolutionary algorithms (e.g. genetic algorithms) and swarm intelligence (e.g. ant algorithms).

**Typical problems to which AI methods are applied :-**

* Pattern recognition
* Optical character recognition
* Handwriting recognition
* Speech recognition
* Face recognition
* Natural language processing, Translation and Chatter bots
* Non-linear control and Robotics
* Computer vision, Virtual reality and Image processing
* Game theory and Strategic planning

**Other fields in which AI methods are implemented :-**

* **Automation:-**
  + - **Automation** is the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services. The correct incentive for applying automation is to increase productivity, and/or quality beyond that possible with current human labor levels so as to realize economies of scale, and/or realize predictable quality levels. automation greatly decreases the need for human sensory and mental requirements while increasing load capacity, speed, and repeatability.
* **Cybernetics:-**
  + - Cybernetics in some ways is like the science of organisation, with special emphasis on the dynamic nature of the system being organised. The human brain is just such a complex organisation which qualifies for cybernetic study. It has all the characteristics of feedback, storage, etc. and is also typical of many large businesses or Government departments.
    - Cybernetics is that of artificial intelligence, where the aim is to show how artificially manufactured systems can demonstrate intelligent behaviour.
* **Hybrid intelligent system :-**
  + - Hybridization of different intelligent systems is an innovative approach to construct computationally intelligent systems consisting of artificial neural network, fuzzy inference systems, rough set, approximate reasoning and derivative free optimization methods such as evolutionary computation, swarm intelligence, bacterial foraging and so on. The integration of different learning and adaptation techniques, to overcome individual limitations and achieve synergetic effects through hybridization or fusion of these techniques, has in recent years contributed to a emergence of large number of new superior class of intelligence known as **Hybrid Intelligence**.
* **Intelligent agent:-**
  + - In artificial intelligence, an **intelligent agent** (**IA**) is an autonomous entity which observes through sensors and acts upon an environment using actuators (i.e. it is an agent) and directs its activity towards achieving goals.
* **Intelligent control:-**
  + - Intelligent Control or self-organising/learning control is a new emerging discipline that is designed to deal with problems. Rather than being model based, it is experiential based. Intelligent Control is the amalgam of the disciplines of Artificial Intelligence, Systems Theory and Operations Research. It uses most recent experiences or evidence to improve its performance through a variety of learning schemas, that for practical implementation must demonstrate rapid learning convergence, be temporally stable, be robust to parameter changes and internal and external disturbances.
* **Automated reasoning:-**
  + - The study of automated reasoning helps produce software that allows computers to reason completely, or nearly completely, automatically. Although automated reasoning is considered a sub-field of artificial intelligence, it also has connections with theoretical computer science, and even philosophy.
* **Data mining:-**
  + - **Data mining** (the analysis step of the "Knowledge Discovery in Databases" process, or KDD), an interdisciplinary subfield of computer science, is the computational process of discovering patterns in large data sets involving methods at the intersection of artificial intelligence, machine learning, statistics, and database systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use
* **Behavior-based robotics:-**
  + - Behavior-based robotics is a branch of robotics that bridges artificial intelligence (AI), engineering and cognitive science. Its dual goals are:
      1. To develop methods for con- trolling artificial systems, ranging from physical robots to simulated ones and other autonomous software agents
      2. To use robotics to model and understand biological sys- tems more fully, typically, animals ranging from insects to humans. Cognitive robotics.
* **Developmental robotics:-**
* **Developmental Robotics** (DevRob), sometimes called **epigenetic robotics**, is a methodology that uses metaphors from neural development and developmental psychology to develop the mind for autonomous robots.
* The program that simulates the functions of genome to develop a robot's mental capabilities is called a developmental program.
* **Evolutionary robotics:-**
  + - **Evolutionary robotics** (ER) is a methodology that uses evolutionary computation to develop controllers for autonomous robots
* **Chatbot:-**
  + - Chatterbot, a chatter robot is a type of conversational agent, a computer program designed to simulate an intelligent conversation with one or more human users via auditory or textual methods.
    - Internet Relay Chat bot, a set of scripts or an independent program that connects to Internet Relay Chat as a client, and so appears to other IRC users as another user.
* **Knowledge Representation:-**
  + - **Knowledge representation** (KR) is an area of artificial intelligence research aimed at representing knowledge in symbols to facilitate inferencing from those knowledge elements, creating new elements of knowledge.
    - The KR can be made to be independent of the underlying knowledge model or knowledge base system (KBS) such as a semantic network



**American Association for Artificial Intelligence (AAAI) :-**

Founded in 1979, the American Association for Artificial Intelligence (AAAI) is a nonprofit scientific society devoted to advancing the scientific understanding of the mechanisms underlying thought and intelligent behaviour and their embodiment in machines. AAAI also aims to increase public understanding of artificial intelligence, improve the teaching and training of AI practitioners, and provide guidance for research planners and funders concerning the importance and potential of current AI developments and future directions.

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**APPLICATIONS OF A.I**

Artificial intelligence has been used in a wide range of fields including medical diagnosis, stock trading, robot control, law, scientific discovery and toys.

* **Hospitals and medicine:-**

A medical clinic can use artificial intelligence systems to organize bed schedules, make a staff rotation, and provide medical information.

Artificial neural networks are used as clinical decision support systems for medical diagnosis, such as in Concept Processing technology in EMR software.

Other tasks in medicine that can potentially be performed by artificial intelligence include:

* Computer-aided interpretation of medical images. Such systems help scan digital images, *e.g.* from computed tomography, for typical appearances and to highlight conspicuous sections, such as possible diseases. A typical application is the detection of a tumor.
* Heart sound analysis.
* **Heavy industry:-**

Robots have become common in many industries. They are often given jobs that are considered dangerous to humans. Robots have proven effective in jobs that are very repetitive which may lead to mistakes or accidents due to a lapse in concentration and other jobs which humans may find degrading.

* **Game Playing** **:-**
* This prospered greatly with the Digital Revolution, and helped introduce people, especially children, to a life of dealing with various types of Artificial Intelligence
* You can also buy machines that can play master level chess for a few hundred dollars. There is some AI in them, but they play well against people mainly through brute force computation--looking at hundreds of thousands of positions.
* The internet is the best example were one can buy machine and play various games.
* **Speech Recognition** **:-**

In the 1990s, computer speech recognition reached a practical level for limited purposes. Thus United Airlines has replaced its keyboard tree for flight information by a system using speech recognition of flight numbers and city names. It is quite convenient. On the other hand, while it is possible to instruct some computers using speech, most users have gone back to the keyboard and the mouse as still more convenient.

* **Understanding Natural Language** **:-**

Just getting a sequence of words into a computer is not enough. Parsing sentences is not enough either. The computer has to be provided with an understanding of the domain the text is about, and this is presently possible only for very limited domains.

* **Computer Vision :-**

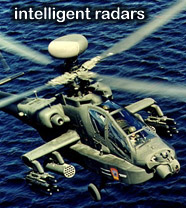
The world is composed of three-dimensional objects, but the inputs to the human eye and computer’s TV cameras are two dimensional. Some useful programs can work solely in two dimensions, but full computer vision requires partial three-dimensional information that is not just a set of two-dimensional views. At present there are only limited ways of representing three-dimensional information directly, and they are not as good as what humans evidently use.

* **Expert Systems** **:-**

A ``knowledge engineer'' interviews experts in a certain domain and tries to embody their knowledge in a computer program for carrying out some task. How well this works depends on whether the intellectual mechanisms required for the task are within the present state of AI. One of the first expert systems was MYCIN in 1974, which diagnosed bacterial infections of the blood and suggested treatments. It did better than medical students or practicing doctors, provided its limitations were observed.

* **Heuristic Classification :-**

One of the most feasible kinds of expert system given the present knowledge of AI is to put some information in one of a fixed set of categories using several sources of information. An example is advising whether to accept a proposed credit card purchase. Information is available about the owner of the credit card, his record of payment and also about the item he is buying and about the establishment from which he is buying it (e.g., about whether there have been previous credit card frauds at this establishment).



**FUTURE SCOPE OF A.I**

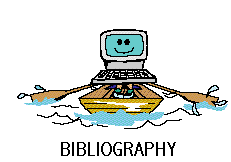
* In the next 10 years technologies in narrow fields such as speech recognition will continue to improve and will reach human levels.
* In 10 years AI will be able to communicate with humans in unstructured English using text or voice, navigate (not perfectly) in an unprepared environment and will have some rudimentary common sense (and domain-specific intelligence).
* We will recreate some parts of the human (animal) brain in silicon. The feasibility of this is demonstrated by tentative hippocampus experiments in rats There are two major projects aiming for human brain simulation, CCortex and IBM Blue Brain.
* There will be an increasing number of practical applications based on digitally recreated aspects human intelligence, such as cognition, perception, rehearsal learning, or learning by repetitive practice.
* The development of meaningful artificial intelligence will require that machines acquire some variant of human consciousness.
* Systems that do not possess self-awareness and sentience will at best always be very brittle.
* Without these uniquely human characteristics, truely useful and powerful assistants will remain a goal to achieve. To be sure, advances in hardware, storage, parallel processing architectures will enable ever greater leaps in functionality
* Systems that are able to demonstrate conclusively that they possess self awareness, language skills, surface, shallow and deep knowledge about the world around them and their role within it will be needed going forward.
* However the field of artificial consciousness remains in its infancy.
* The early years of the 21st century should see dramatic strides forward in this area however

**CONCLUSION OF A.I**

We conclude that if the machine could successfully pretend to be human to a knowledgeable observer then you certainly should consider it intelligent. AI systems are now in routine use in various field such as economics, medicine, engineering and the military, as well as being built into many common home computer software applications, traditional strategy games etc.

AI is an exciting and rewarding discipline. AI is branch of computer science that is concerned with the automation of intelligent behavior. The revised definition of AI is - AI is the study of mechanisms underlying intelligent behavior through the construction and evaluation of artifacts that attempt to enact those mechanisms. So it is concluded that it work as an artificial human brain which have an unbelievable artificial thinking power.

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