Artificial intelligence and its applications in various fields

Sindhuja .R

UG Student,
Department of Computer Science,
Sri Krishna arts and science college, Coimbatore, India

***Abstract*: Computing and programming has created a great evolution especially in the field of Artificial intelligence and it is an emerging technology in today's world. Now and then most of the things in the world may use AI I.e. In the future; intelligent machines will replace or enhance human capabilities in many areas. The term intelligence is considered as the ability to learn and to gain knowledge so that it can be used to solve the complex problems. Application areas of Artificial Intelligence is having a huge impact on various fields of life as expert system is widely used these days to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting. The areas employing the technology of Artificial Intelligence have seen an increase in the quality and efficiency. This paper gives an overview of this technology and the application areas of this technology. This paper will also explore the current use of Artificial Intelligence technologies in the various field like gaming, in the medical area to improve hospital inpatient care and make diagnosis much simpler, easier and accurate, in the home automation to make easier to access all the services simply with the voice, and the autonomous car. Thus this paper presents a brief on AI and its various emerging applications along with real time examples.**

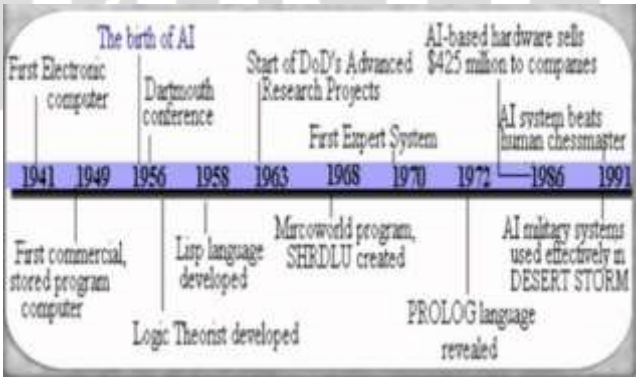
***IndexTerms*: Artificial intelligence, Health care, gaming, Autonomous vehicles, home automation.*(**

I. INTRODUCTION

Artificial intelligence is playing an increasing role in almost all the fields ranging from operational research areas to health care. The term intelligence is considered as the ability to learn and to gain knowledge so that it can be used to solve the complex problems. Thus the artificial entity of creating this intelligence is called as artificial intelligence. In other words the machine or computer with the ability to solve the problems that usually done by the human with their intelligence is artificial intelligence. These processes include learning (the acquisition of information and rules for using the information), reasoning (using the rules to reach approximate or definite conclusions) and self-Correction and etc.

II. HISTORY

John McCarthy coined the term artificial intelligence, in 1956 at the Dartmouth Conference where the discipline was born, today it is an umbrella term that encompasses everything from robotic process automation to actual robotics. However the talks and the research about this artificial intelligence started in 1940s. In 1943, warren McCulloch and Walter Pitts Published the paper 'A Logical Calculus of the ideas immanent in Nervous Activity' about the function of neurons in brain which is the base for all the neural networks.



The Turing Test Approach:

The Turing test was proposed by Alan Turing (1950) .This test was designed to test that whether a particular machine has intelligence or not. The test involves a human interrogator who interacts with a human and the computer and has to tell who is human and which one is computer. The interrogator raises some questions to both human and computer and the computer passes the test if an interrogator cannot tell whether the written response is coming from human or from the computer.

III. THE ORGINAL 7 ASPECTS OF AI

1. Simulating higher functions to use general language.

2. Programming a computer to use general language
3. Arranging hypothetical neurons in a manner so that they can form concepts.
4. A way to determine and measure problem complexity.
5. Self-improvement.
6. Abstraction defined as the quality of dealing with ideas rather than events.
7. Randomness and creativity.

IV. TYPES OF ARTIFICIAL INTELLIGENCE

There are different types of AI in terms of approach they are

- Weak AI
- Strong AI

Weak AI:

Weak AI also known as narrow AI, is an Ai system that is designed and trained for a particular task, i.e. machines which are not too intelligent to do their own work can be built in such a way that they seem smart. The best example to express the Weak AI will be the cards game in the computer in which people play against the computer and most of the times the computer is able to beat the human being. But this is because all the information and steps have been fed in that machine by a human itself, and it does not take all the actions on its own.

Strong AI:

Strong Artificial Intelligence can be defined as a phenomenon under which such machines can be built which can actually use human intelligence in their functions , so that it can be able to represent the human mind in the activities they perform. The main aim of this technology is to develop machines so much that they stop depending on human beings to perform different tasks and can take decisions on the spot.

V. VARIOUS DISCLIPINES OF AI

AI contains many sub disciplines or branches which deal in specific about the subject. They are:

- Natural Language Processing (NLP).
- Knowledge Representation and Reasoning (KRR).
- Pattern Recognition (PR).
- Machine Learning (ML).
- Artificial Neural Networks (ANN).

Natural Language Processing (NLP):

NLP is the process of understanding human language and converting to machine understandable form. For example, Speech Recognition in smart phones can understand human language and process the information as per our requirement.

Knowledge Representation and Reasoning (KRR):

KRR is used for representing information in computer understandable form in order to complete a specified task. Intelligence means knowledge that is acquired and stored in a knowledge base that is used for making decisions on its own.

Pattern Recognition (PR):

PR is the phenomenon of classifying particular data into different classes based on their specific attributes.

Machine Learning (ML):

ML deals with study, analysis and construction of algorithms to make a machine to learn for making decisions on its own. Autonomous car that can take directions on its own using past data.

Artificial Neural Networks (ANN):

ANN is developed with the inspiration of biological neuron that is how a human brain works. It mainly contains Input layer, Hidden layer and output layer. Whereas all these layers helps in thinking process. Input layer takes training data, then ANN is trained with it and now prediction can be done from the built model.

VI. APPLICATIONS OF ARTIFICIAL INTELLIGENCE

a) GAMING:

Artificial intelligence (AI) in gaming isn't a recent innovation. As early as 1949, mathematician and cryptographer Claude Shannon pondered a one-player chess game, in which humans would compete against a computer. In 1997, IBM's supercomputer Deep Blue defeated reigning world chess champion marking the first time a chess AI had defeated the top human player. But AI developers are now trying to create AIs that can actually think, learn and develop their own personalities The Google Deep Mind team paved the way for computer dominance in Go in the past two years with the development of Alpha Go, an AI that uses deep neural networks to learn from its own games as well as games played by top human players. This reinforcement learning highlights the unique strength of both human and machine learning agents. In this respect, artificial intelligence and machine

learning are creating the next generation of the whole leisure industry. With the use of AI in games we will be able to design and develop new worlds to test ideas and concepts, designs and activities within a safe environment.

b) MEDICAL FIELD:

Machine learning, the most basic form of artificial intelligence, is already infiltrating the medical field, and it turns out that machines can play an important role in improving the health including making diagnoses more accurately and quickly and finding better treatments. Some benefits of AI in the field of medical field includes

- **Fast & Accurate diagnostics**: In the case of AI, the neural network of the brain is look alike, has the ability to learn from previous cases. After some studies or research on artificial neural networks, researchers says that it is scientifically proven that these networks can diagnose fast & accurate some other diseases includes eye problems, malignant melanoma etc.
- **Reduce Human errors:** AI as a super human spell checker will assist doctors by eliminating human error & relieve them of monotonous & time-consuming tasks.
- **Cost Reduction:** With the emerging technologies including artificial intelligence, the patient can get doctor assistance without visiting hospitals/clinics which results in cost cutting. AI assistants provide online care &assist patients to add their data more frequently via online medical records etc.
- **Virtual Presence:** This technology also known as Telemedicine which allows specialists to assist their patients who live at remote locations. Using a remote presence robot, doctors can engage with their staff & patients in hospitals/clinics & assist or clear their queries.

Identify symptoms of cancer and heart disease:

IBM's Watson software is developed to identify symptoms of cancer and heart disease. In this development, IBM is acquiring Merge Healthcare—a company that has collected billions of medical scans and images from 8,000 hospitals—to use for Watson's training in accurately and efficiently identifying symptoms of cancer and heart illnesses.

The idea behind artificial intelligence in medicine is not so much to replace the doctor but to enhance the doctor's medical expertise. It may be time to realize that it's not man against machine but man *and* machine together that can finally create the biggest improvements in human health.

c) AUTOMOBILES:

Vehicles have become increasingly sophisticated under those plush seats and high-performance engines. New platforms like telemetric, which gives fleet vehicles information about vehicle and driver performance, became the next stage, followed by autonomous cars.

The Key to Driverless Cars:

The most common automotive application for AI is autonomous vehicles. Here, AI is being put to work to help learn human behavior and understand how to react to driving conditions like a person would. This includes sensing how those in other cars will behave and how to gauge weather conditions, road issues, and other factors that must be understood before driverless vehicles take over the roads and also it enables the car to automatically maintain an appropriate distance from vehicles ahead at a speed of up to 210 km/h. The car automatically recognizes speed limit so that Drivers no longer need to operate the brake or gas pedals, and they receive steering support. The Daimler E-Class is the world's first production car to be issued a test license for autonomous driving. Mercedes-Benz is also setting standards for autonomous driving with the new E-Class.

Assisted Features:

AI can also help people avoid those human errors that lead to accidents with the safety features linked to automatic braking, alert systems, and collision avoidance systems.

Connectivity:

AI is also creating a level of connectivity in the automotive industry that promises to bring major benefits to manufacturers and consumer's alike. If AI learns that a particular part or feature tends to fail after a certain duration, the manufacturer could proactively take steps to optimize its product and ensure consumers remain safe. This approach is commonly known as cognitive predictive maintenance, and companies such as Data RPM have emerged to create AI-driven platforms that make it possible."Cognitive predictive maintenance provides exactly what manufacturers are looking for: actionable insights," For consumers, connectivity can provide localized information related to everything from gas stations to restaurants to shopping.

Other Cool Applications:

AI-enabled features on vehicles tied to biometrics can also help with security, in terms of components that enable a car to drive only when it recognizes a certain voice. Eye tracking is another possibility for AI to help with monitor driving and sense whether a driver might be tired or distracted, enhancing the safety of driving for those behind the wheel and those around them. No one likes traffic or unexpected road delays, so having a car that can instantly provide new routes to avoid this irritation makes AI even more attractive to even the most skeptical. While GPS platforms already do this to some degree, they are limited in what they can offer, and they don't have the capacity to think beyond those limitations like an AI-enabled platform could do. Thus AI has moved IOT forward in many ways with these automotive applications to make the world smarter and safer, offering ways to make better decisions and encouraging wider adoption and acceptance of a more closely connected world.

d) HOME AUTOMATION:

A decade ago, the idea of controlling home's thermostat, lights and security systems remotely via Smartphone would have seemed like futuristic science fiction. But now it's totally changed with the Artificial intelligence that makes as much as simpler and easier. "The idea is to make home automation as easy as asking a friend to turn on a light," instead of unlocking the phone, open the app then to turn on the specific light. This is more natural. Instead of using a mobile or a remote control, it is possible to use existing skills and natural language. The devices like Google Home, Alexa and Amazon Echo become more commonplace and artificial intelligence becomes more sophisticated.

AI smart speakers:

The AI speakers like GOOGLE HOME, AMAZON ECHO enable users to interact with services using their voice instead of additional devices through virtual personal assistants like Google assistant for Google home and Alexa for Amazon echo and it also has an ability to differentiate different voices. These speakers uses a natural voice recognition techniques and enables the users to interact with the services like

- Playing music and receiving news update.
- Ability to add remainders and calendar appointments.
- Smart services in home control i.e. light etc.
- Provides Traffic reports, weather conditions.
- Ability to answer the questions raised by the user.

Smart locks:

With smart locks and smart garage door controls can check the status of your home's doors or lock and unlock them from anywhere letting family and guests in or out when needed.

Smart cameras:

Smart cameras are one of the most useful AI-powered devices. These cameras can not only act as deterrents, they can record in 1080p, which is important if the police need to identify someone from a recording. These devices can also automatically upload video footage to the cloud for easy storage and playback. It is also possible even to tap into the live feed from any location, with the connected Smartphone apps .Possibly the most interesting thing about these cameras, though, is how they leverage AI to determine when something out of the ordinary is going on and send you an alert. The Nest Cam, for example, can detect a human figure that appears in the frame in specific zones of your house. Thus with the help of the AI it is possible to Control all of the home devices from anywhere at any time.

e) SMART PHONES:

The most common application of AI can be seen in our mobile phones in the form of Virtual Personal Assistants. **Siri, and Google Now** are some very commonly used digital assistants that are found in IOS, Android and Windows phones. These can answer whatever you ask them like "What movie is going to be released this Friday?" or "Who is Stephen Hawking?"

Virtual personal assistant:

The assistant uses voice queries and a natural-language user interface to answer questions, make recommendations, and perform actions by delegating requests to a set of Internet services. It supports a wide range of user commands, including performing phone actions, checking basic information, scheduling events and reminders, handling device settings, searching the Internet, navigating areas, finding information on entertainment. These applications collect information in order to interpret what is being asked by the user and then the required data is fetched to suit the user's preferences. There is a huge amount of learning involved on the part of these assistants and a lot of information is tracked to ensure efficiency.

f) WEATHER FORECASTING:

Neural networks are nowadays being used for predicting weather conditions. Past data is provided to the neural network, which then analyses the data for patterns and predicts the future weather conditions.

g) DATA MINING:

Data mining is a fast-growing area. Data mining is a part of a process called KDD knowledge discovery in databases. This process consists basically of steps that are performed before carrying out data mining such as data selection, data cleaning, pre-processing of data, and data transformation. "Data Mining is the use of computer algorithms to discover hidden patterns and unsuspected relationships among elements in a large data set. AI is a broader area than machine learning. AI systems are knowledge processing systems. Knowledge representation, knowledge acquisition, and inference including search and control, are three fundamental techniques in AI.

VII. CONCLUSION:

The field of artificial intelligence gives the ability to the machines to think analytically, using concepts. Tremendous contribution to the various areas has been made by the Artificial Intelligence techniques from the last 2 decades. Artificial

Intelligence will continue to play an increasingly important role in the various fields. This paper is based on the concept of artificial intelligence, history of artificial intelligence, various disciplines of AI, and the applications in various fields. The goal of artificial intelligence is to create computers whose intelligence equals or surpasses humans. Achieving this goal is the famous "AI problem from last decade researchers are trying to close the gap between human intelligence and artificial intelligence.

VIII. Acknowledgment

I have taken my efforts to complete this survey paper. I have referred many sites and books related to AI. I would like to thank all given citations in the following section that I have acquired knowledge from their papers and books.

References

[1] John McCarthy, Marvin L. Minsky, Nathaniel Rochester and Claude E.Shannon, "A Proposal for the Dartmouth summer research project on Artificial intelligence", August 31, 1955 , Dartmouth College in Hanover, New Hampshire.
[2] https://www.difference.wiki/strong-ai-vs-weak-ai/
[3] https://www.tutorialspoint.com/artificial_intelligence/index.html
[4] Dr. K. F. Bharati, "A Survey on Artificial Intelligence and its Applications", June 2017
[5] https://www.networkworld.com/article/3160106/artificial-intelligence/how-video-game-ai-is-changing-the-world.html
[6] How AI Pioneers Will Affect the Car Industry, and Why It's A Good Thing
[7] https://venturebeat.com/2017/10/27/ai-is-making-smart-homes-safer/