

Machine Learning Vs Artificial Intelligence

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ABSTRACT

Artificial Intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Artificial intelligence in the last two decades has greatly improved performance of the manufacturing and service systems. Study in the area of artificial intelligence has given rise to the rapidly growing technology known as expert system. 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.

Keywords : Computer Science, Expert System, Artificial Intelligence

I. INTRODUCTION

Artificial Intelligence is to make a computer, a computer-controlled robot or a software think intelligently similar to a human. It applied to the system, the way human think, how humans learn, decide and solve problems. Finally, a smart and intelligent system is built. Artificial Intelligence is a trendy technology in the modern world. It is a combination of a variety of disciplines such as Computer Science, Biology, Mathematics and Engineering.



Figure 02 : Artificial Intelligence

There are many applications of Artificial Intelligence (AI). Modern Gaming applications use AI. AI research also includes Natural Language Processing. It is to give the ability to a computer or machine to understanding the natural language spoken by humans and perform tasks accordingly. Another

application is Industrial Robots. There are more sophisticated robots with efficient processors and a huge amount of memory. They can adjust to new environment and collect data using light, temperature, sound etc. They are used in fields such as medicine and manufacturing. Artificial Intelligence also applied in optical character recognition, autonomous vehicles, military simulations and many more.

Researchers in computer science and statistics have developed advanced techniques to obtain insights from large disparate data sets. Data may be of different types, from different sources, and of different quality (structured and unstructured data). These techniques can leverage the ability of computers to perform tasks, such as recognising images and processing natural languages, by learning from experience. The application of computational tools to address tasks traditionally requiring human sophistication is broadly termed 'artificial intelligence' (AI). As a field, AI has existed for many years. However, recent increases in computing power coupled with increases in the availability and quantity of data have resulted in a resurgence of interest in potential applications of artificial intelligence.⁵ These applications are already being used to diagnose diseases, translate languages, and drive cars; and they are increasingly being used in the financial sector as well.

II. AI DESIGN MODELS

AI application are a lot around us and in this paper, I will discuss some of the most common application of AI that we always use nowadays which is Virtual Assistants such as Siri, Cortana...etc. Over the past few years smart assistants are becoming a very common technology in most of the smart devices and most importantly, that these assistants are getting smarter than ever. In addition to the awesome help they provide us with, is that every one of

these apps has unique features. Artificial Intelligence works according to the following phases: getting the data, clean/manipulate/prepare the data, train model, test data, and improve the data as mentioned in (figure A-3). Before accessing the data, a business must verify the quality of the data to ensure that it meets the requirement.

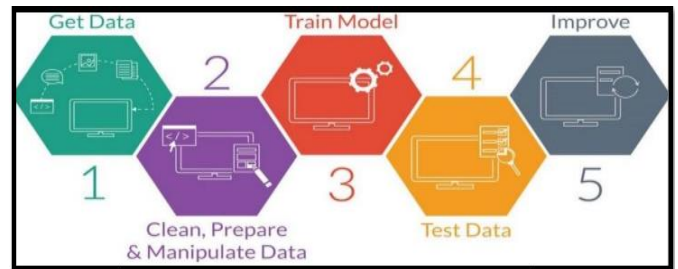


Figure A - 3 Describes Phases of Developing Artificial

Siri Virtual Assistant:

Siri is the well-known virtual assistant which uses voice recognitions and typed command in order to perform a certain task within a device. Siri is considered one of AI most used applications. The application simply takes the input from the user such as (e.g. Call dad) and try to find the most related keywords used in this command. Siri tries to eliminate inconsistent result through using the language pattern recognizer and from there to active ontology by searching through the contacts, then it tries to relate the contact named "Dad" and perform the task which is in this case is "Calling" and finally the output of this action will be "calling dad" and to consider all the possible situations refer to (figure A-4).

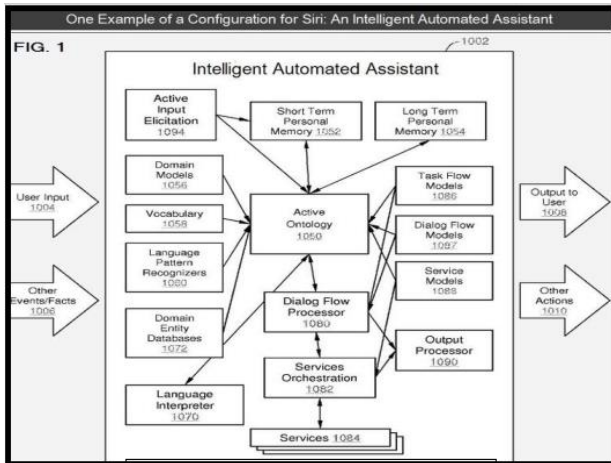


Figure A- 3 Describes one Example of configuration for Siri

In another scenario the architecture of the virtual assistant is shown in (figure A – 5) as we can see the flow of the system starts by taking the input from the user, after that the system decide the conversation strategy module to be used which is a respond from the dialog management module, meanwhile a classification module response to an NLP module. Finally, using the conversation history database is used to analyze the knowledge base construction module which will response back to the domain knowledge based as explained in detail in (figure A- 5)

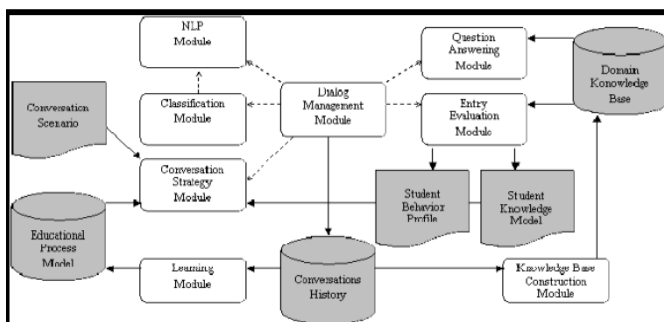


Figure A-5 Describes Proposed conversational agent architecture

III. KEY DIFFERENCE - MACHINE LEARNING VS ARTIFICIAL INTELLIGENCE

Artificial Intelligence is a broad concept. Self-driven cars, smart homes are some examples of

Artificial Intelligence. Some countries have intelligent robots in fields such as medicine, manufacturing, military, agriculture, and household. Machine Learning is a type of Artificial Intelligence. The key difference between Machine Learning and Artificial Intelligence is that Machine Learning is a type of Artificial Intelligence that gives the ability for a computer to learn without being explicitly programmed and Artificial Intelligence is the theory and development of computer systems able to perform tasks intelligently similar to a human. Machine Learning uses an algorithm to parse data, learn from it and make decisions accordingly. It is a development of self-learning algorithms, and Artificial Intelligence is the science of developing a system or software that is smart as a human.

What is Machine Learning?

An algorithm is a sequence of steps that tell the computer to solve a problem. Machine Learning is a type of Artificial Intelligence. It provides computers the ability to learn without being explicitly programmed. They are various algorithms available for solving Machine Learning problems. Depending on the type of the problem, one can choose a suitable Machine Learning algorithm. It focusses on developing computer programs that can give a result when exposed to new data.

There are different types of Machine Learning. They are Supervised Learning, Unsupervised Learning and Reinforcement Learning. Supervised Learning uses a known dataset to make predictions. A set of input data(X) and set of corresponding response values or outputs (Y) are given to the supervised learning algorithm. That dataset is known as a training dataset. Using

that dataset, the algorithm builds a model ($Y=f(X)$), so it can give an output value to complete new dataset.

Classification and Regression are Supervised Machine Learning algorithms. Classification is used to classify a record. One simple example is “whether the temperature is cold”. The answer can be either “yes” or “no”. There is a specific number of choices to classify. If there are two choices, it is a two-class classification. If there are more than two choices, it is a multi-class classification. Regression is used to calculate the numeric output. For example, predicting the temperature of tomorrow. Another example would be predicting the value of the house.

In Unsupervised Learning, only the input data is given, and there are no corresponding outputs. Instead, the algorithm finds a pattern or a structure to learn more about the data. Clustering is categorized as Unsupervised Learning. It separates data into groups or clusters to ease out the interpretation of data.

IV. COMPONENTS OF AI

The major components of AI are:

The User Interface :-

The user interface is the means of statement between a user and the expert systems problem-solving processes. A good expert system is not very useful if not it has an useful interface. It has to be able to confirm the directions in a form that the user enters. It should interpret the answers, formed by the system.

The Information Base :-

It stores all the facts and rules about a exacting problem domain. It makes these accessible to the inference engine in a form that it can use. The particulars may be in a form of background in order built into the system. The rules include both the manufacture rules that concern to the area of expert system and the heuristic and rules-of-thumb that are provided by the area expert in order to make the system find solutions.

The Shell or interface Engine :-

The interface engine is the program that locates the suitable information in the information base, and infers new information by applying consistent processing and analytical strategies.

V. BRANCHES OF ARTIFICIAL INTELLIGENCE

Genetic Programming

Genetic programming revolves around that functions that get programs to carry out exact tasks and solve exact problems. This is done by ‘cover together’ random lisp programs and choosing between millions of generation. By meaning, genetic programming is a innovative algorithm-based method that can draw its ancestry to the organic growth that occupied the search for computer programs that performed user-defined tasks. The world can thank JOHN KOZA and his group of experts in ‘Artificial Intelligence’ for the method of genetic programming.

Ontology

Ontology is a branch of artificial intelligence that is anxious with the study of various kinds of objects. It is a set of concepts that are formally represented within an area. Ontology is then fearful on the association between the concepts in their exact domains. Ontology can also be used to cause about entity within a exacting area and explain the exacting area in detail.

Epistemology

Epistemology concerns itself with the study of the information that can show helpful in the study of the solving of the harms that disease the world. Epistemology, has managed to cut for itself a place in artificial engineering. As a branch of artificial intelligence however, epistemology focuses on answering four center questions: What is information? How is information acquired? What do people know? How do we know what we know? The term 'Epistemology' was first introduced into the English language by the Scottish philosopher James Frederick Ferrier.

Heuristics

It is a branch of artificial intelligence that concerns itself with the experience-based techniques for the solving of problems, learning and discovery. Heuristic methods and techniques are all concerning rapidly and powerfully discovering an optimal answer for a specific problem. Heuristics, usually speak, is all about judgment many or exact solutions to a exact problem.

VI. CONCLUSION

AI nowadays is being implemented in almost every field of study through several models such as SVM and ANN. We should be able to proceed with knowing and understanding the consequences of every technological trend. In my opinion, we are in

the AI revelation era and therefore; we should adopt into this change and welcome it too by embracing AI and moving toward a better society.

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