

ADVANCED ANALYSIS AND DESIGN

Project : Advanced Analysis and Design

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Artificial Intelligence

Introduction

I have chosen this topic to spotlight on one of the most technological trend these days known as AI (*Artificial Intelligent*). Therefore; I will discuss some of the most important aspects related to AI in which it will help in a better understanding of Artificial Intelligent and both its advantages and disadvantages to be able to protect ourselves from the upcoming technological trend. This paper will also discuss some of the algorithms used in AI systems.

History of Artificial Intelligence:

Artificial Intelligence was first proposed by John McCarthy in 1956 in his first academic conference on the subject. The idea of machines operating like human beings began to be the center of scientist's mind and whether if it is possible to make machines have the same ability to think and learn by itself was introduced by the mathematician Alan Turing. Alan Turing was able to put his hypotheses and questions into actions by testing whether "*machines can think*"? After series of testing (later was called as Turing Test) it turns out that it is possible to enable machines to think and learn just like humans. Turing Test uses the pragmatic approach to be able to identify if machines can respond as humans. ("Smith", (n.d.)).

Description Artificial Intelligence

Artificial Intelligence is: the field of study that describe the capability of machine learning just like humans and the ability to respond to certain behaviors also known as (A.I.). The need of

Artificial Intelligence is increasing every day. Since AI was first introduced to the market, it has been the reason of the quick change in technology and business fields. Computer scientist are predicting that by 2020, *“85% of customer interactions will be managed without a human”*. (“Gartner”, (n.d.)). This means that humans simple request will depend on computers and artificial intelligence just like when we use Siri or Galaxy to ask about the weather temperature. It is very important to be prepared for AI revelation just like UAE have by installing a state minister for AI in Dubai.

Pros and Cons of Artificial Intelligence

AI offers reliability, cost- effectiveness, solve complicated problems, and make decisions; in addition, AI restrict data from getting lost. AI is applied nowadays in most fields whether business or engineering. One of the great tools in AI is called “reinforcement learning” which is based on testing success and failure in real life to increase the reliability of applications. Unfortunately, AI is limited with its capability and functionality. (“Sadek”,(n.d.))

Although Artificial Intelligence made our lives much easier and saved us more time than ever, scientists are predicting that by the huge dependency on AI humanity could extinct. Scientists argue that by having a AI machines, people will be jobless and that will conclude in losing the sense of living. Since machines are learning and doing thigs more efficiently and effectively in a timely manner, this could be the reason of our extinction.

AI Algorithms and Models

AI is mainly based on algorithms and models as a technique which is designed based on scientific findings such as math, statistics, and biology (Li & Jiang, (n.d.)). AI works based on several models such as: Ant Colony Algorithm, Immune Algorithm, Fuzzy Algorithm, Decision Tree, Genetic Algorithm, Particle Swarm Algorithm, Neural Network, Deep Learning and in this report, I will discuss some of the most known models which are: Support Vector Machine, and the Artificial Neural Network.

- Support Vector Machine (SVM) where it is used to build a classification model by finding an optimal hyperplane based on a set of training examples as shown in (figure A-1). It is also have been used for pattern classification and trend prediction lots of applications for instance: power transformer fault diagnosis, disease diagnosis and treatment optimization. (Li & Jiang, (n.d.)).

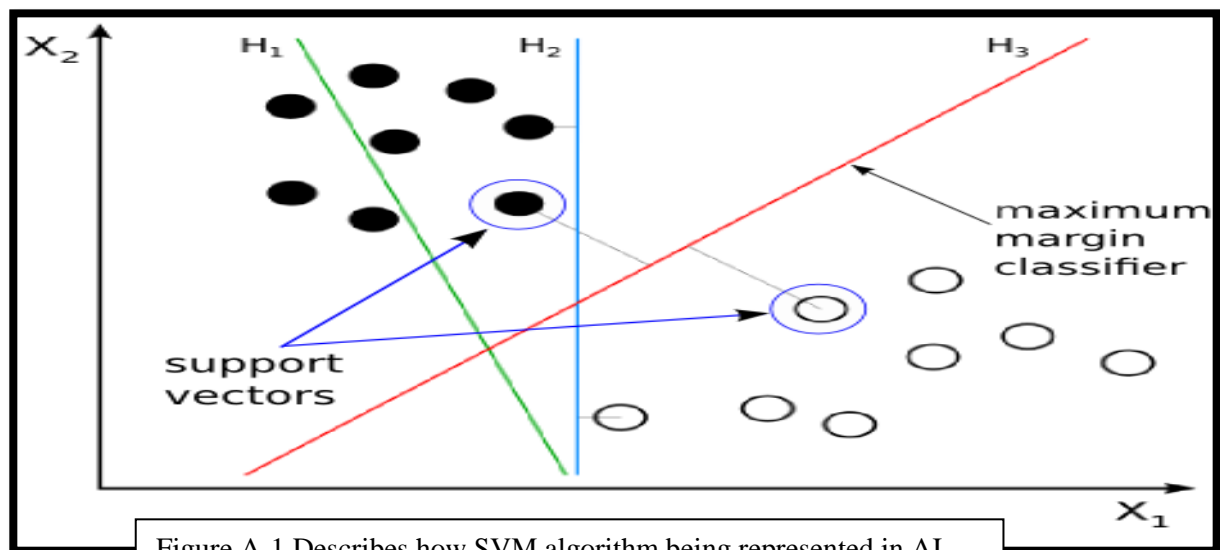


Figure A-1 Describes how SVM algorithm being represented in AI

- Artificial Neural Network (ANN) is a representative model of understanding thoughts and behaviors in terms of physical connection between neurons. ANN has been used to solve variety of problems through enabling the machine to build mathematical models to be able to imitate natural activities from brains perspective as shown in (figure A- 2). By using this algorithm, the machine will be able to identify the solution of any problem just like human's brain.

Figure A-2 Describes how ANN algorithm being represented in AI

Some Applications on Artificial Intelligence:

AI can be designed using lots of algorithms. These algorithms help the system to determine the expected response which will basically tell the computer what to expect and work accordingly. Here are some of the greatest AI applications that we are probably using in our daily life without knowing:

- Voice recognition
- Virtual agents:
- Machine learning platform

- Ai optimized hardware
- Decision management
- Deep learning platform
- Biomatters
- Robotic process automation
- Text analytics and NLP
- Adaptive Manufacturing:
 - Machines that are “able to learn a multitude of tasks from demonstrations, just like their human counterparts can.” (“Yoa”,2017))

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.

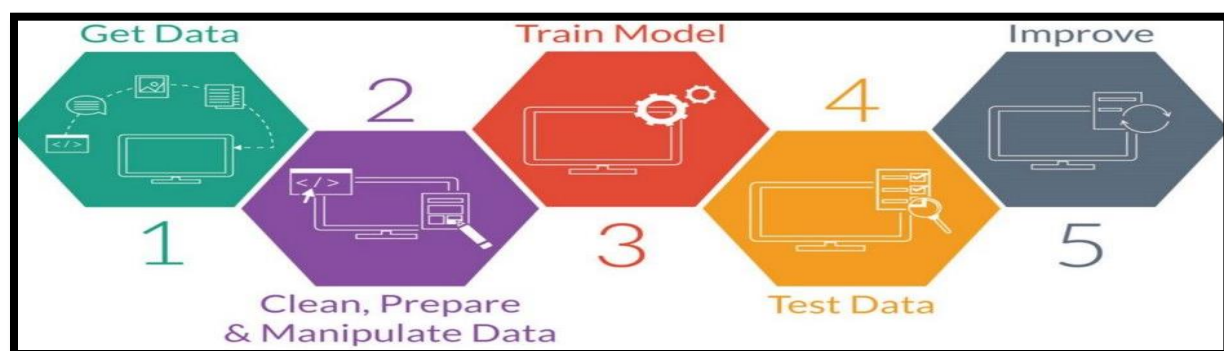


Figure A- 3 Describes Phases of Developing Artificial

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).

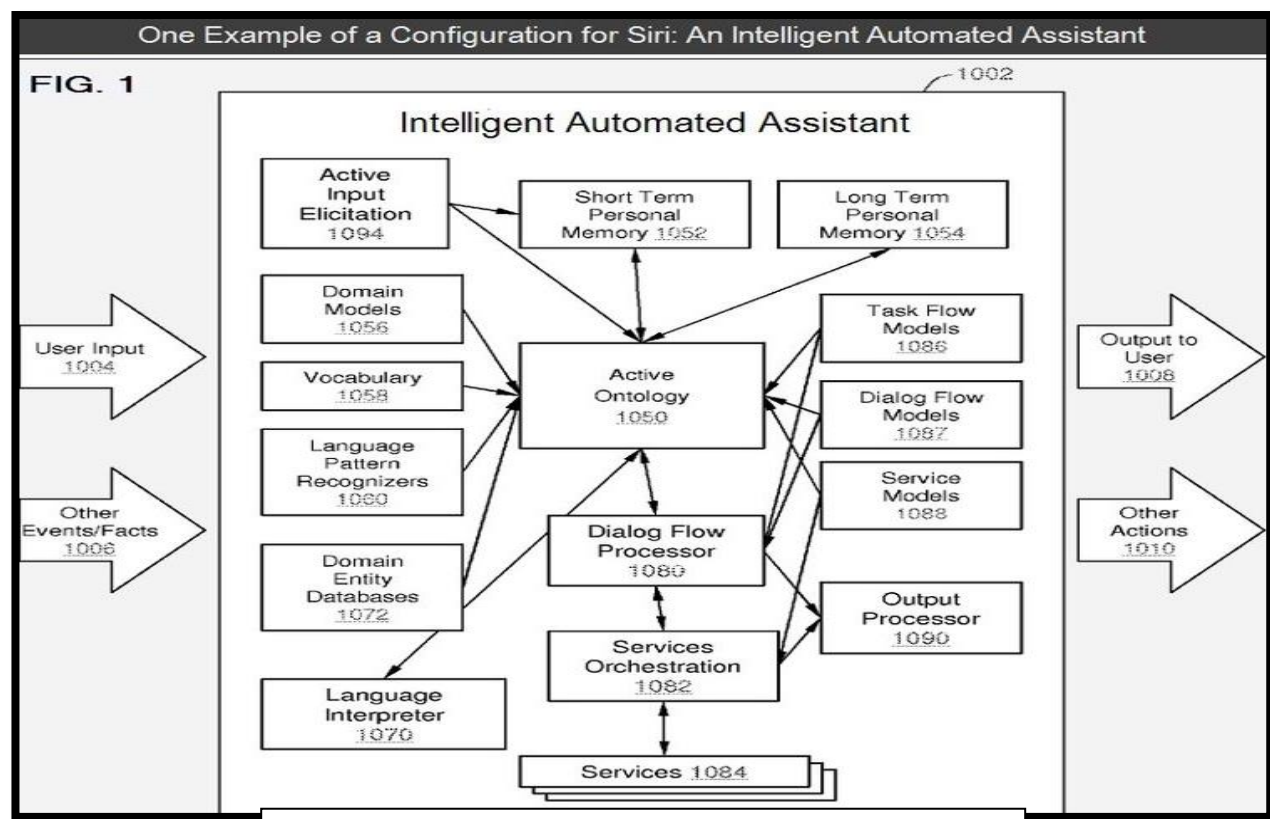


Figure A- 3 Describes one Example of configuration for Siri

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)

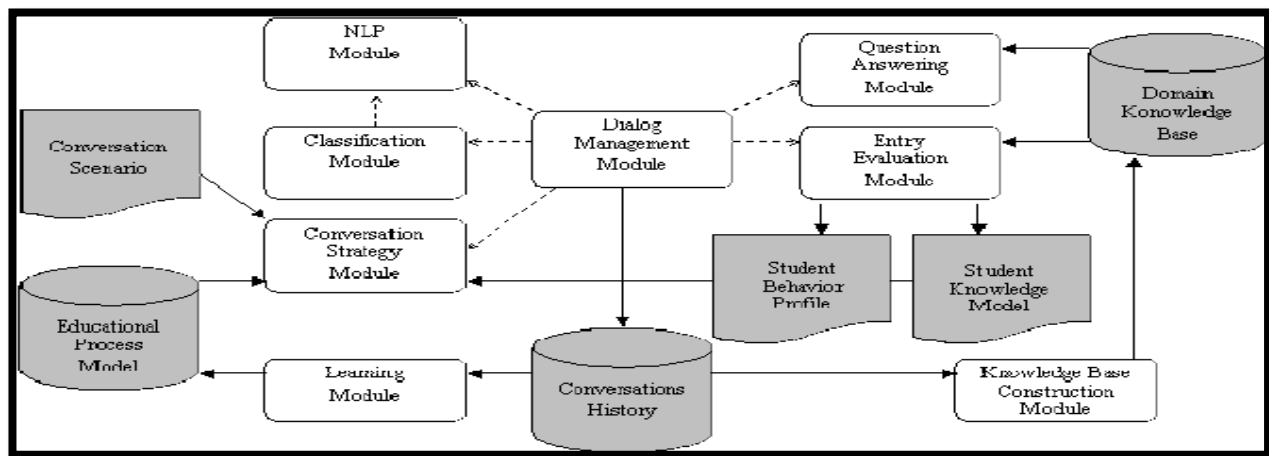


Figure A-5 Describes Proposed conversational agent architecture

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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