Artificial Intelligence on Humanoid Robots

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ABSTRACT

"Artificial intelligence will be the future scope and in all the field Artificial Intelligence will be the developed one. It will reduce the Work Force but all the works will be completed quickly. Various tasks and various works in all the fields will be performed by single Humanoid Robot. Less work and Higher Efficiency - efficient bureaucracy – AI has the power to change public administration, but the governments are ready. This technology comes with both risks and opportunities that need to be understood deeply & evaluated. Researchers study the human body and their structure and behavior (biomechanics) to build humanoid robots. Besides the research, humanoid robots are developed to perform human tasks like personal assistance, through which they can solve any problem statement, and dangerous jobs.

Keywords : Artificial Intelligence, Humanoid Robots, Biomechanics, Machine Learning, Natural Language Processing

I. INTRODUCTION

Artificial intelligence (AI)

AI makes it possible for machines to learn from various experiences, adjust to new upcoming inputs and perform as human-like tasks. Most examples that you hear about today starting from chess-playing computers to self-driving cars heavily on deep learning and also natural language processing (NLP). By taking above two methods/technologies, computers can be trained to perform tasks by processing huge amounts of data and recognization patterns in the data.

Machine learning is one of the method of data analysis which runs analytical model building of the data. It is a branch of artificial intelligence based on that the systems can learn from data and also identifies patterns then makes decisions with the minimal human intervention. Deep learning is a type of machine learning (ML) that trains a computer to perform and do human-like tasks, such as recognizing the speech, identifying the images or making predictions with the given data sets. Instead of organizing data to run through existing equations, deep learning sets up the basic parameters about all the data and trains the computer to learn on its own by recognizing those patterns using many layers of processing in it.

Natural language processing (NLP) is one which is a branch of artificial intelligence (AI) that helps the computers understand, interpret and manipulate the human languages. NLP is came from many disciplines, which includes computer science and computational linguistics, in its pursuit to fill the gap between human communication through different languages and computer understanding of it.

Computer vision is a type of artificial intelligence which trains computers to interpret and understand the external visual world. Using digital images from the cameras and videos and deep learning (DL) models, machines can accurately identify the patterns and classify all the objects and then it will react to what they "see."

II. METHODS AND MATERIAL

AI in Humanoid:

Sophia has made to start working from February 14, 2016. The Humanoid robot (Sophia) was modeled after the ancient Egypt Queen Nefertiti for human-like appearance and its behavior when compared to previous robotic variants. Inventor of Sophia, David Hanson Sophia uses artificial intelligence, visual data processing and facial recognition technologies in it. Sophia also recognizes human gestures and facial expressions of all and is capable to answer all the questions and can make simple conversations on the topics predefined in it. Sophia the Humanoid Robot that uses voice recognition (speech-to-the text) technology from Alphabetical order and designed to get the smarter time over. Sophia speech-synthesis ability is provided by Cereproc's (Text-to-Speech engine and also allows Sophia to sing all type of songs). Sophia's intelligent software is designed by the Hanson Robotics. The Artificial Intelligence program checks analysis conversations and the extracts data

which allows it to improve more responses in the future scope.

Sophia is similar to the computer program called ELIZA, which is one of the initial attempts at simulating human conversations. This software has been programmed to give responses to specific questions or phrases which is pre-written, like a chatbot in computers. The responses from it are used to create illusion which makes the robot to understand the conversation, which includes stock answers to the questions like "Is the window open or shut. This information is shared via the Cloud Network which stores data as input and responses and analyzed to block chain technology.

According to the Quartz, the experts who have been checked the source code of Sophia state that Sophia is considered as a best chatbot with face. Moreover all the experts in Artificial Intelligent field disapproved Sophia's over stated presentation. Ben Goertzel, the main chief scientist of the company which made Sophia, acknowledged that the Sophia is "not ideal" that some of the members think that Sophia has humans equivalent intelligence, but also argues Sophia's presentation that was given, which clearly explains that something that is unique to the audiences: "If we show the beautiful smiling face on an Robot, then they get the feeling of 'AGI' (Artificial General Intelligence) which may be indeed by them.

But none of this which we call AGI is not easier in Working.

Goertzel said that the Sophia could utilize AI methods that include the face tracking, the emotion of human recognition, and also robotic movements which are generated by deep neural networks. Sophia's speech is generated via decision tree, but it is integrated with the output uniquely.

If Sophia gets first switched on, the world couldn't get enough knowledge. It has a personality, it says many jokes late night hosts, has facial recoganization which is observed by all. Thus finally a robot came straight out of the current science fiction, the closest and unique AI technology we have ever seen.

Currently, AI is not having free will and certainly is not that the conscious of two persons which tend to make if it is faced with advanced or over-hyped technologies, Mousavi states that the most advanced AI systems out there are mostly products which would follow the processes defined by the smart people. Only they can't make decisions by their own.

In Machine Learning (ML), that includes Deep Learning (DL) and neural networks, the algorithm is presented with the loads of training data – example whatever the algorithm may be it will make it to learn data, which is instructed by people -until it is completing the task by its own. For the facial recognition software, it means that more number like thousands of photos and videos are stored in system and it should identify the undefined sample from it. The best machine learning algorithms are generally just memorizing the data given to it and running the statistical models in the system. To call as "learning" is to anthropomorphize machines which operate on a very different and undefined wavelength from our human brains. Artificial intelligence is one of the big catch now-all the information given to computer if it does automatically then it is referred as AI.

"From the view of software point we can say Sophia is the big platform, like a laptops and computers is a platform for something for task performing," Sophia control system is of three different types, 1) Timeline Editor, 2) Sophisticated Chat System and 3) Open Cog. Timeline Editor is one of the straight scripting software. The Sophisticated Chat System that allows Sophia to pick up and respond to all the keyword and also the phrases. And finally the Open Cog grounds Sophia's answers the questions with the experience and reasoning. This is the only system they are hoping to grow one day into AGI. "It happened that is the young adult female robot became very popular," The entire team at Hanson Robotics said they didn't expect Sophia can do this much then they expected. The physical appearance of Sophia is another example of what someone sees as a traditional representation of attractive and, submissive that designed as female robots.

According to the point of Hanson, Sophia has simulations of every major muscle in the human face now, which allows her to generate expressions of joy, grief, curiosity, confusion, contemplation, sorrow, frustration, among other feelings too.

"In case of the some of the work we're doing, Sophia will see our expressions and sort of match a little bit to us and also tries to understand that expression in her own way, what it is we might be feeling,"

Universal Appeal

Hanson began sculpting Sophia first; he wanted her form to reverberating sound with all people from all around the world. Till that end, he was looking against old statues of Nefertiti, and ancient Chinese paintings, Audrey Hepburn and his wife also got

inspiration. But an important thing is to he also wanted to maintain the sensitivity of the robot too."That is very important that she represent the intersection of humanity and also the technology, with the initiative idea that the technology can enhance the humanity, which helps us to actualize to the higher states of human beings," said by the Hanson.

"Again the question provokes: What does the human mean it? What is the real, what isn't the real? And what is the reality of our future which has not yet existed?"

Besides modeling, she has been made appeared on the talk shows and spoken at the conferences about the role of AI in the robots. Controversially, Sophia was even granted for live in the Saudi Arabian citizenship that is becoming the first robot to have a nationality for her.

"Sophia is one robot amongst the more number of robots they have designed, which has become really internationally very famous".

Role of Neural Networks in Artificial Intelligence:
Artificial neural networks (ANN) are the important tool of machine learning. ANN systems are developed by the inspiration of neuron functionality in the normal human brain, which will make the way how the humans learn. Neural networks (NN) consist of both input & output layer, as well as a hidden layer units that changes input into output so that output layer can take and use the value. These are the tools which are used for finding the patterns which are numerous & complex for the programmers because it is impossible to retrieve the data and train the machine to recognize the patterns given in input units.

Structure:

ANN working is similar to that of the human-brain. Doing the necessary connections, it is possible to duplicate the working of brain by using silicon and wires which is just similar to the dendrites and neurons in human brain. The stimuli from external environment are accepted by dendrites in the same way mentioned, and then the input creates electric impulses that travel through the neural network. ANN has several nodes which behave as same as neurons. Each node is connected by links (wires) for the purpose of communication with one another. The Nodes which take input data to perform small operations on trained data and the resultant of such operations are passed to other nodes (neurons). The output at this node is called its node value. The image for neuron structure is shown below.
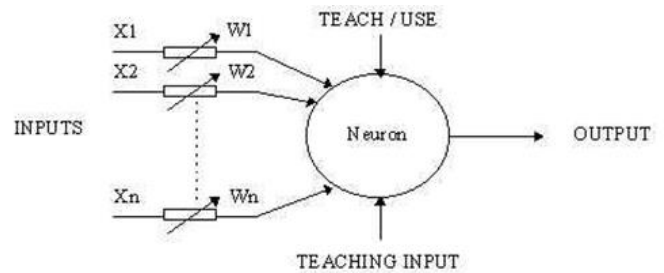
Neural networks have a special ability to retrieve all the meaningful data from imprecise data, which is used in detecting the trends and also to extract the patterns which are difficult to understand by either computer or by the humans. A fully trained NN can be made as an "expert" in the information that has been given to analyze and that can be used for provide projections.

How do Neural Networks learn from trained Data:

Initially, neural networks (NN) are fed with huge number of data. Training of the NN is generally done by providing input and educating the network as what should be the output. Example, facial recognition is the latest and trending technology implemented by all the Mobile phone companies. All the input is gathered by the identification of similar matching data, like image of the person's face, emotion, various facial expressions, and all these inputs have to be trained. The proper answers will allow accommodating its internal data to check how better the NN can learn.

Rules should be defined in such a way that, each node decides what to be sent to next layer considering its own inputs from the previous layer. It can be done by considering many things like, genetic algorithms, fuzzy logic, and gradient-based training Bayesian method. ANNs are given some set of rules related to object relationships. Correct decisions must be taken in building the rules.

III. RESULTS AND DISCUSSION

Training:

Supervised Training:

The supervised training has both the inputs and the outputs that are provided. The neural network then processes each of the inputs and compares its resulting outputs against the desired outputs. The Errors are then propagated back through the system, causing the system to adjust the weights which can be able to control the network. These processes occurred over and over as the weights gets continuously tweaked. The set of data which enables the training is called the "training set." During the training of a network the same set of data is processed over many times as the connection weights are ever refined.

Unsupervised or Adaptive Training:

As now presently, unsupervised learning is not well understood. The adaption to the environment is one of the promise which would enable science fiction types of robots to continually learn on their own as they encounter new situations and new environments. Life is fully filled with situations where exact training sets do not exist. Some of these situations involve strict action where new techniques and new weapons might be encountered. Because of this unexpected aspect to life and the human desire to be prepared, there continues to be research into, and hope for, this field. Yet, at the present time, the vast bulk of neural network work is in systems with supervised learning. Supervised learning is achieving results.
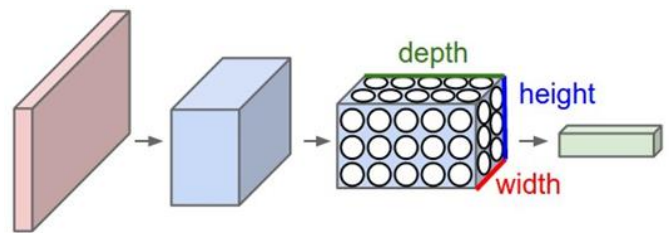
Applications:

- ✓ Health Care
- ✓ Agriculture
- ✓ Finance
- ✓ Gaming etc

IV.CONCLUSION

In a highly competitive world, we have a lot to gain from neural networks. ANN capability to learn through better example makes them powerful and flexible. Moreover, we need not devise any algorithm to perform a particular task. We don't require internal mechanisms of that task. These are well suited for real time systems as they respond fast with best computational times because of their parallel architecture. Neural Network is also contributing to other areas of research like psychology and neurology. In neurology, it is used to investigate the internal mechanisms of the brain and model parts of living organisms. The most exciting aspect of neural networks is that there is a possibility that one-day 'conscious' networks might arise. Some scientists are arguing that consciousness is a "mechanical property" and conscious neural networks are realistic and are possible. Neural networks have a huge potential and we can get the best from them by collaborating with fuzzy logic, computing, AI and ML.

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