SIGNIFICANCE OF ARTIFICIAL INTELLIGENCE IN GOOGLE DUPLEX USING DEEP LEARNING TECHNIQUE

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Abstract - Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Artificial intelligence is often used to describe intellectual functions that machines correlate with the human mind. Deep learning is a subset of machine learning, and machine learning is a subset of AI, which is an umbrella term for any computer program that does something smart. In other words, all machine learning is AI, but not all AI is machine learning. Deep Learning is used to learn how to sense the multimedia data through multiple layers. If the volume of data is enlarged, machine learning techniques are inadequate approaches in performance and deep learning provides accurate performance. Google Duplex is a latest development from Google with Deep learning concept. It allows a man to make a Cafe, Spa reservation via phone, but instead of the user communicates directly to the cafe worker, Google Duplex communicate through the Google Assistant, talk to the user with an voice-based call (TTS engine),which is resembling the human tone of voice.

Key Words: Artificial intelligence ,Machine Learning, Deep learning, RNN, Google Assistant, Google Duplex

1. INTRODUCTION

Artificial intelligence occasionally called Machine Intelligence, investigation associated with artificial intelligence is highly technological and expert. Several of the actions computers with artificial intelligence are considered for include: Speech Recognition, Learning and Planning. The goals of AI are creating the expert systems and stimulate machines like human intelligence.

AI makes feasible for machines to be trained from experience, adjust the trained inputs and execute human-like tasks. We can be classified AI by its intelligence. There are 3 types of AI. There are ANI (Narrow), AGI (General) and ASI (Super).

- Artificial Narrow Intelligence(ANI) is accomplishing distinct process elegantly, example when we are playing chess, produce forecast and ideas.
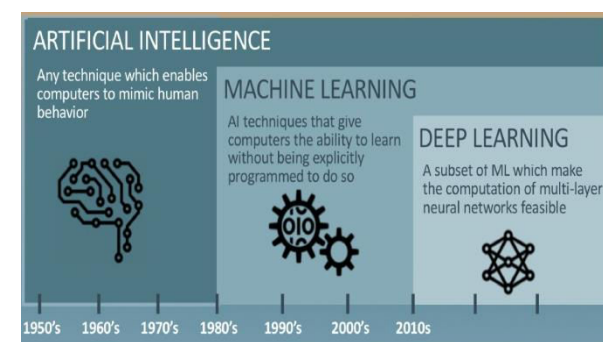- Artificial General Intelligence(AGI), also notorious as human-level AI or Strong AI. Its smartness and competence could be applicable to do different jobs together with be trained and develop itself.
- Artificial Super Intelligence(ASI) is smarter than the united intelligence of the smartest humans in each field. IMPOSSIBLE for humans to imagine, can do.
- Following are the main goals of Artificial Intelligence:

1. Replicate human intelligence
2. Solve Knowledge-intensive tasks
3. An intelligent connection of perception and action
4. Building a machine which can perform tasks that requires human intelligence such as:
   - Proving a theorem
   - Playing chess
   - Plan some surgical operation
   - Driving a car in traffic
5. Creating some system which can exhibit intelligent behavior, learn new things by itself, demonstrate, explain, and can advise to its user.

2. EVOLUTION OF AI

A modern AI was layout by Newell an Simon in 1955. The term Artificial Intelligence given by and Father of AI is Mr.John McCathy. Mr.George Devol innovated the first digitally operated and a programmable robot called the Unimate.Fig 1 shows the evolution of AI

Fig -1::Evolution of AI

3. MACHINE LEARNING VS DEEP LEARNING

We can train the data based on learning methods. They are two types of learning:

(a) Supervised Learning- It train the dataset with the expected output in the network. In this method, we give the inputs, it process and adjust the values with back propagation and compare the results against the output.

(b) Unsupervised Learning- It train the input with the desired input but not with expected output. The system decides the output based the features of input data.
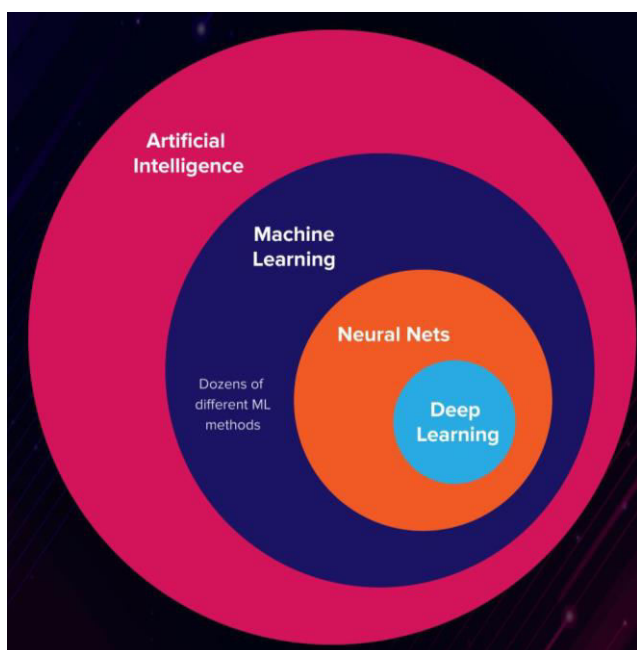

Fig -2::AI vs ML vs DL

Machine learning is the finest tool to evaluate, recognize and classify a pattern in the information. It can be trained to computerize tasks that would be meticulous or impractical for a human being. The computer can be trained without human interference.

Deep learning is software that imitates the association of neurons in a brain. It is a subset of machine learning. The device uses diverse layers to learn beginning of the data. The strength of the model is represented by the number of input, hidden and output layers in the model. The main motive is the feature extraction is done mechanically in the different layers of the network.

4. GOOGLE DUPLEX

Google Duplex is an innovative technology to bring out natural conversations in real world tasks over the phone to confirm appointments or reservation. Natural Language Understanding (NLU) & Natural Language Generation to transmit the mutual conversation in Duplex. This makes so comfortable to the user while they received call from Duplex. The discovery of physical Robot satisfied the human expectations which can do all the work of their behalf. The physical Robot features extended from factories to household works like cleaning, flooring, laundry, cooking, take care of old aged people etc. The trained too all house hold things behalf of human. The services wish to extend business people also.

Now with the Google Duplex feature, a virtual assistant will be there on the other hand who will not be giving recorded instructions but will chat with you like a typical human being and make the task easy. When we use Duplex to make the advance reservation in hotel, Google Assistant makes a call to the hotel behalf of user. She will discuss verbally with the café staff and make necessary arrangements for your table. After completion of reservation, Assistant intimates you on your mobile, automatically it generate the calendar event with the confirmation email. A disclosure attached with the voice call like "Hi, I am the Google assistant

.I am going to make the advance booking!"This predetermined call will be recorded for the reference. So, the third-party understanding he is talking with robot not a human. It uses the same natural tones and phrases like "mmm" and "uhh" like human conversation.

5. TECHNIQUES BEHIND GOOGLE DUPLEX

A. *Tensor Flow*

Google's TensorFlow — that ease the process of acquiring data, training models, serving predictions, and refining future results. The most famous deep learning library in the world is Google's TensorFlow. TensorFlow package of machine learning and deep learning models and algorithms and makes them helpful by way of a common figure of speech. Python is the front-end API for building applications in this framework.

All the Google product uses machine learning for the improvisation of search engine, translation, image capturing. Google Duplex's conversations sound natural gratefulness to move ahead for accepting, interacting, timing, and verbalizing. The center of

Duplex is a RNN (Intermittent neural system), which was manufactured utilizing TensorFlow Expanded (TFX).TensorFlow is a platform to run machine learning models.

To reach the high quality, we trained Duplex RNN on a couple of unknown phone discussion data. The system uses the Google's automatic speech recognition technology (ASR) as well as the features of the audio, history of dialogue, the limitation of conversation etc. Continuously the system is trained for the fine understanding of the end user. At last Google used Hyper parameter optimization from TFX to the next improvisation. The oral language part uses text to speech (TTS) engine and a synthesis TTS engine;
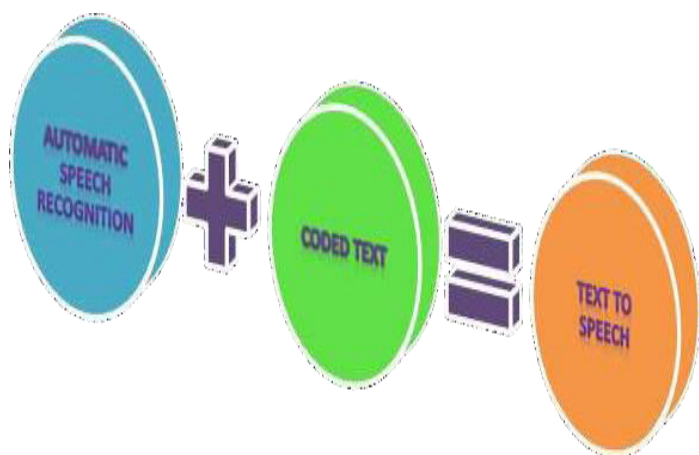

Fig -3:Process of text to Speech Engine

B. RNN

Recurrent Neural Network is based on neural networks where link relation nodes create a directed graph behind a chronological sequence. It allows to show temporal active behavior. RNN is generally used to analyze the text, image capturing, emotion analysis and machine translation. How it work means the output of the previous step are attached with the input of current step not like traditional neural network, inputs and output are identical of each other. Sometime the previous word is helping to predict the next word of the sentence but it may be a problem.

RNN used the Hidden layer overcome these problems. Hidden state are is plays prominent role in RNN which has the capable to remember few information about the next.RNN have a memory which recollect the information what has been identified. Hidden layer is processing point of all the inputs and outputs to produce the output.

C. NLP

Natural language processing (NLP) is the capability of a PC program to recognize human words as it is oral. NLP is a part of artificial intelligence. The growth of NLP applications is demanding that computers communicate with human through the programming language that should be specific, clear-cut and extremely structured, or explain with the perfect enunciated voice commands. Modern approach to NLP is implemented on Deep learning, part of AI that scrutinizes and uses pattern as data to get better a program's understanding. It needs enormous amount of data (Big data) to study and train, correlate with identifications and assembles the data set. NLP uses some tools as Intel NLP Architect, NLTK and Gensim.

NLP used to decode the text and analyzes it. An immense amount of data saved in document files, like medical records. Sentiment analysis is one more important case study for NLP. Data scientist can evaluate the comments in social media to look their business brand is performing by the use of sentiment analysis. Example the service team discover the areas where people want business to achieve superior.

D. IMPLEMENTATION

Google Duplex, the supernatural system that allows an AI to make a call and schedule reservations at Cafe. Now it services to more areas of 43 states of the United States. Google Pixel phone (Version XL, 2, 3, and 3XL) has the Google Duplex application. The NLP join hands together Audio processing to attracted all the people those who are attended the demo session. The service is working

on all Pixel Smartphone's and many non-Pixel devices. It affords excellent digital services that can assist us to promote out trade online. We can design our personalized website and pursuance digital marketing approaches distinctively to our business. Still, this application is popular in US not in the India. We will use in upcoming years.

PROS (1) It makes things as easy (2) we get help and can access without language barriers (3) Boon for business magnet.

CONS (1) No Control over the call (2) The what-if Duplex advancement (3) Easier to abuse small businesses

Suggestion: It may be a chance the business people confused to see the name Google when they get

incoming call in their phone. so they refused to pick up the calls. Because, it is not so popular even in the foreign country itself. So advertisement of Google Duplex is much important to the society which it belongs too.

6. APPLICATIONS OF AI IN USE TODAY

AI has many practical applications,it shows that at least 30% of companies globally will use AI in at least one fragment of their sales processes.

- Chatbots
- Artificial Intelligence in eCommerce
- AI to Improve Workplace Communication
- Human Resource Management
- Healthcare
- Intelligent Cybersecurity
- Artificial Intelligence in Logistics and Supply Chain
- Sports betting Industry
- Streamlined Manufacturing with AI

7. CONCLUSIONS

Deep learning makes us scary and inspiring how it correlates with real time applications. The number of possible uses of Duplex is endless. The idea behind of Google duplex where usual discussion, acoustic recognition, machine learning, TTS and synthesis engines will be in the next few years. In future it may extend it services in the following fields, Ticket reservation, Product delivery, Call centre, Contact centre, Enterprise etc. If it will happen means all type of business people enjoy the fruitfulness of Google Duplex.

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