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Natural Language Processing
A part of Artificial intelligence

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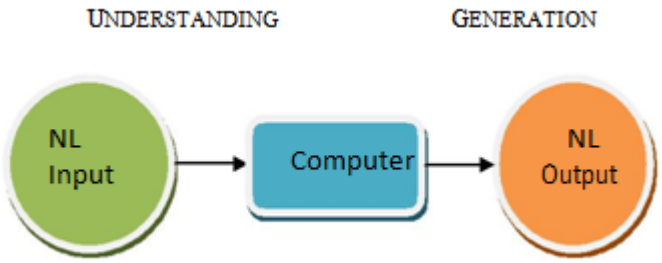
Abstract— — Language is way of communicating your words Language helps in understanding the world; we get a better insight of the world. Language helps speakers to be as vague or as precise as they like. NLP stands for natural language processing. . Natural languages are those languages that are spoken by the people. A natural language processing girdle everything a computer needs to understand natural language and also generates natural language. Natural language processing (NLP) is a field of computer science, artificial intelligence, and linguistics mainly focuses on the interactions between computers and human languages or natural languages. NLP is focussed on the area of human computer interaction. The need for natural language processing was also felt because there is a wide storage of information recorded or stored in natural language that could be accessible via computers. Information is constantly generated in the form of books, news, business and government reports, and scientific papers, many of which are available online or even in some reports. A system requiring a great deal of information must be able to process natural language to retrieve much of the information available on computers. Natural language processing is an interesting and difficult field in which we have to develop and evaluate or analyse representation and reasoning theories. All of the problems of AI arise in this domain; solving "the natural language problem" is as difficult as solving "the AI problem" because any field can be expressed or can be depicted in natural language.

Keywords— Naturallanguageprocessing (NLP), Syntactic, Symantec, Pragmatic, Discourse Integration, orphological, Lexical, Linguistics, Generation, Machine Learning.

I. INTRODUCTION

We now belong to the age of machines and computers; they truly have made our work as humans quite bearable. This has been possible with the development of Artificial Intelligence, which can be defined as the science and engineering that goes behind the manufacture of intellectual machinery. It is because of various computer programmers that have been created by making use artificial intelligence that our work load has diminished. To have a very philosophical definition as to what artificial intelligence is, it is best to state that AI tries to replicate the thought process of the human mind in terms of a machine that computes We now belong to the age of machines and computers; they truly have made our work as humans quite bearable. This has been possible with the development of Artificial Intelligence, which can be defined as the science and engineering that goes behind the manufacture of intellectual machinery. It is because of various computer programmers that have been created by making use artificial intelligence that our work load has diminished. To have a very philosophical definition as to what artificial intelligence is, it is best to state that AI tries to replicate the thought process of the human mind in terms of a machine that computes. Experts of artificial intelligence have however put up differences between the simulations, replication and emulation capabilities of machines endowed with AI. According to them simulation occurs when the machine has the identical

type of input and output to that of humans. In case of replication, it has been found that the same internal causes affect both the human brain and the AI in the same way. And emulation is possible only when replication takes place and when it has been found out that both the human brain and AI is made from the same stuff.



I. EASE OF USE

II. HISTORY OF NLP

The history of NLP generally starts in the year 1950s. In 1950, Alan Turing published an article titled "Machine and Intelligence" which advertised what is now called the Turing test as a subfield of intelligence. Some beneficial and successful Natural language systems were developed in the 1960s were SHRDLU, a natural language system working in restricted "blocks worlds" with restricted vocabularies was written between 1964 to 1966.

Steps in NLP

1. Speech recognition
2. Syntactic analysis
3. Semantic analysis
4. Pragmatic analysis

1. Recognise speech signal

- Speech recognition

2. Sequence of words spoken

- Syntactic analysis (using knowledge of the grammar)

3. Structure of the sentence

- Semantic analysis (using info. about meaning of words)

4. Partial representation of meaning of sentence

- Pragmatic analysis (using info. about context)

5. Final representation of meaning of sentence

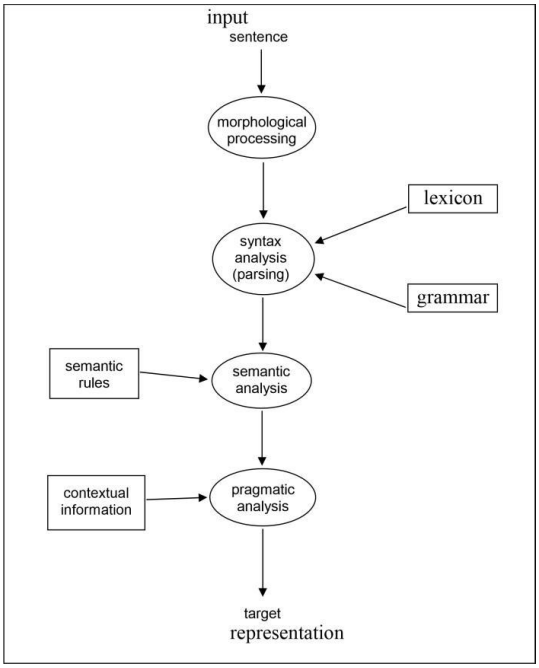


Fig.:- [logical steps in NLP]

1. **Speech Recognition** -It produces frequency spectrogram inside computer.

The Smallest unit of speech- phonemes. Other units of speech are dB(decibel). The basic sounds in the signal (40-50 phonemes) . Here it constructing words from phonemes.

2. **Syntactic Analysis (Parsing)** − It involves analysis of words in the sentence for grammar and arranging words in a manner that shows the relationship among the
Words. The sentence such as "The school goes to boy" is rejected by English syntactic analyser.

3. **Semantic Analysis** − It draws the exact meaning or the dictionary meaning from the text. The text is checked for meaningfulness. It is done by mapping syntactic structures and objects in the task domain. The semantic analyser disregards sentence such as "hot ice-cream".

4. **Pragmatic Analysis** − during this, what was said is re-interpreted on what it actually meant. It involves deriving those aspects of language which require real world knowledge.

III. MAJOR TASKS IN NLP

THIS LISTS SOME OF THE DIFFERENT RESEARCHES DONE IN NLP.

a) Automatic summarization

It produces s an understandable summary of a set of text. It is used to provide summaries or detailed information of text of a known type,.

b) Coreference resolution

It refers to a sentence or larger set of text that determines which words refer to the same objects; example of this is concerned with matching up pronouns with the nouns or names that they link to.

c) Discourse analysis

The task is identifying the discourse structure of connected text, i.e. the nature of the discourse relationships between sentences e.g. elaboration, explanation, and contrast. Another possible task is recognizing and classifying the speech acts in a large set of text e.g. yes and no questions, content question, statements, assertion etc.

d) Machine translation

Automatically translates text from one human language to another.

Morphological segmentation

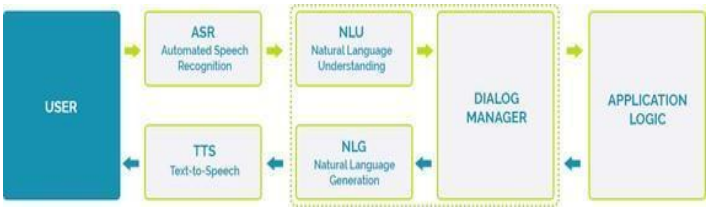
Separate words into individual morphemes and identify the class of the morphemes. The difficulty of this task depends greatly on the complexity of the morphology i.e. the structure of words of the language being considered.

e) Named entity recognition (NER)

It describes a stream of text, determine which items in the text relates to proper names, such as people or places, and what the type of each such name or place we are referring to is.

f) Naturallanguage understanding

It converts large set of text into more formal representations such as first-order logic structures that are easier for computer programs to manipulate notations of natural languages concepts.



IV. OTHER TASKS INCLUDES

1. Optical character recognition (OCR): Given an image representing printed text, helps in determining the corresponding or related text.
2. Tagging: It describes a sentence, determines the part of speech for each word.
3. Parsing: It refers to the parse tree (grammatical analysis or evaluation) of a given sentence
4. Question answering: It answers a given human language question and determines its answer.

V. FUTURE OF NLP

Human level or human readable natural language processing is an AI-complete problem. It is equivalent to solving the central artificial intelligence problem and making computers as intelligent as people so that they can solve problems like humans and think like humans as well as perform activities that humans can't perform and making it more efficient than humans .NLP's future is closely linked to the growth of Artificial intelligence. As natural language understanding or readability improves, computers or machines or devices will be able to learn from the information online and apply what they learned in the real world. Combined with natural language generation, computers will become more and more capable of receiving and giving useful and resourceful information or data.

CONCLUSSION

In conclusion, Natural Language Processing and its Educational Application provide a perfect solution to the various problems and barriers in the educational system, which result in affecting the academic progress and learning of the students. Language is one of the major concerns for the students. NLP with an effective approach for assisting the progress and improvement in the learning ability of students based on development and implementation of various effective tools, assist writing, learning, and assessment of texts, such as use of search engines, electronic resources and analysis of grammatical construction, syntax, sentence composition, etc. All these are the effective techniques, which can be utilized to develop the structural framework for analysis of texts.

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