



Artificial Intelligence and its related Application in the Processing of Natural Language

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ABSTRACT: This paper aims on explaining the importance of Artificial Intelligence and focus on its application in Natural Language Processing. Artificial Intelligence is a vast concept and has several applications like in gaming, medical applications and many others but specifically in our paper we focus on its application in Natural Language processing which is basically a method to communicate with standard systems using a natural language like English and is generally used when we want any intelligent system like robots to perform as per our instruction. The major goal of Natural Language Processing is to design a software that will understand, analyze and generate languages that humans use naturally such that they are capable of addressing computers just like any other human and in order to do so the required proposed system and methodology are taken in to consideration and discussed in the paper in detail.

KEYWORDS: Artificial Intelligence, Application of Artificial Intelligence, Natural Language Processing, Natural Language Understanding, Natural Language Generation.

I. INTRODUCTION

Artificial Intelligence plays a vital and increasing role in research of management science and operational research areas. Basically, intelligence is considered as the ability to collect knowledge and information and aims to solve complex problems with proper reasoning. In the near future intelligent machines will replace human efforts and capabilities in many areas. Artificial intelligence is the study and developments of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects. It is the study of the computation that makes it possible to perceive reason and act accordingly. Artificial intelligence is different from psychology and computer science because it emphasis on computation and on perception, reasoning and its corresponding actions respectively. Its aims and helps to make machines more powerful, smarter and useful. It works with the help of artificial neurons and scientific theorems. Major areas of Artificial Intelligence are Expert Systems, Natural Language Processing, Speech Understanding, Robotics and Sensory Systems, Computer Vision and Scene Recognition, Intelligent Computer Aided Instruction, Neural Computing. The various techniques applied in artificial intelligence are Neural Networks, Fuzzy Logic, Evolutionary Computing, and also Hybrid Artificial Intelligence. Artificial intelligence is more consistent, permanent and less expensive. Specifically in this paper we are discussing application of Artificial Intelligence in Natural Language Processing and its associated methodology and system. Natural Language Processing (NLP) basically refers to Artificial Intelligence method of communicating with an

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intelligent system using a natural language such as English. The processing of natural language comes in to act when we any intelligent system like robot or related machine to perform as per our instruction. The field of Natural Language Processing involves and focuses on making computer perform several tasks using natural language that humans generally use building compatibility between standard smart machines and humans. The related inputs in the Natural Language Processing can be speech or written text.

II. LITERATURE SURVEY

A linguistic ontology of space for natural language processing John A. Bateman, Joana Hois, Robert Ross, Thora Tenbrink 2010[1]. Natural Language Processing (Almost) from Scratch published in the journal of machine learning research in 2011 Ronan Collobert, Jason Weston [2]. Natural Language Processing For Indian Languages: A Literature Survey Paperback – August 23, 2012 by P. J. Antony (Author), K. P. Soman [3]. Seth Grimes on BI, text/content analytics, sentiment analysis, and more March 4, 2013.

III. PROPOSED SYSTEM AND METHODOLOGY

3.1 ARCHITECTURE OF NATURAL LANGUAGE PROCESSING SYSTEM

Well, as per the fact the largest part of human linguistic communication occurs as speech and in comparison written text is still plays a less central role than speech in most activities. But however, processing of speech is difficult as compared to processing of written text. The reason being in order to build a program that understands spoken language we need all the facilities of written language, its related language and also additional language in order to handle all the noise and ambiguities on the audio signal. Therefore for this reason it is beneficial to divide the entire program in to two important tasks. The first task will be basically processing of written text, use of lexical, syntactic, and semantic knowledge of the language as well as the required real world information. The second task basically involves processing spoken language, using all the information needed above plus additional knowledge about phonology as well as enough added information to handle the further ambiguities that arise in speech.

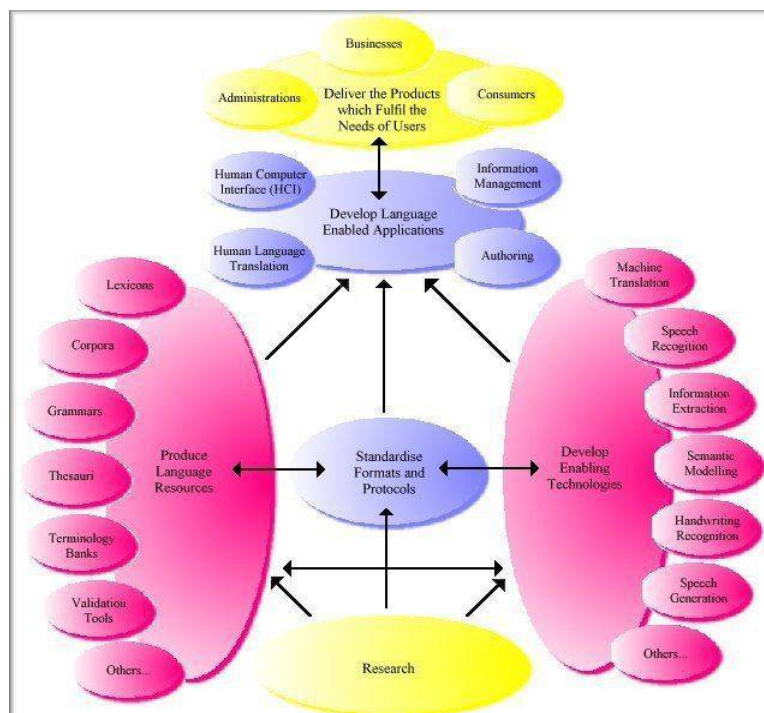


Fig.1: Architecture of Natural Language Processing System



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The Architecture of Natural processing System involves the chain of activities involved in language engineering. The process of research and development leads to the development of techniques, production of resources, and also the development of required standards. The first level majorly comprises of the number of generic classes of application such as language translations, information management, authoring and human interface and at the second level these applications are applied at the real world applications and problems across the social and economic spectrum.

3.2 METHODOLOGY

The steps that are taken in to consideration in Natural Processing Language are given below. The required steps are Lexical Analysis, Syntactic Analysis, Semantic Analysis, Disclosure Integration and Pragmatic Analysis.

Step 1- Lexical Analysis

It majorly involves and deals with identifying and analyzing the structure of words. Lexicon of a language means the collection of words and phrases in a language. The division of the whole chunk of txt into paragraphs, sentences, and words are done by using the Lexical analysis.

Step 2- Syntactic Analysis

Syntactic Analysis which is also called as parsing involves analysis of words in the sentence for grammar and arranging words in a specific required manner which shows the relationship among the words.

Step 3- Semantic Analysis

It is mainly used to draw and extract exact meaning from the text.

Step 4- Disclosure Integration

The meaning of any sentence depends upon the meaning of the sentence just before it. In addition, it also brings about the meaning of immediately succeeding sentence.

Step 5- Pragmatic Analysis

Pragmatic Analysis majorly involves deriving specific aspects of language which require real world knowledge.

3.3 TERMINOLOGY OF NATURAL LANGUAGE PROCESSING

Some of the terminologies of Natural Language Processing are Phonology, Morphology, Morpheme, Syntax, Semantics, Pragmatics, Discourse, world language and the explanation of required terminologies are given below.

- Phonology – Phonology is the study and concept of organizing sound systematically.
- Morphology – Morphology is a study of construction of words from primitive meaningful units.
- Morpheme – Morpheme is a primitive unit of meaning in a language.
- Syntax – Syntax refers to specific set of rules used in order to meet a needed protocol. It also involves determining the structural role of words in the sentence and in phrases.
- Semantics – Semantic is concerned with the meaning of words and how to combine words into meaningful phrases and sentences.
- Pragmatics – Pragmatics deals with using and understanding sentences in different situations and how the interpretation of the sentence is affected.
- Discourse – Discourse deals with how the immediately preceding sentence can play a role in affecting the interpretation of the next sentence.
- World Knowledge – It includes the general and required knowledge about the world.

3.4 SIGNIFICANCE OF NATURAL LANGUAGE PROCESSING

3.4.1 ADVANTAGES OF NATURAL LANGUAGE PROCESSING

Some of the advantages of Natural Language Processing that should be taken in to consideration are improved service from our public administration and public service agencies, wide accessibility of information, enhanced ability to compete in global markets, saving time by using intelligent computer systems, improvements in the quality of



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information recorded in information systems, better filtering of the required information, more effective international co-operation, greater security through voice verification techniques.

3.4.2 DISADVANTAGES OF NATURAL LANGUAGE PROCESSING

Natural Language Processing has a very rich form and structure. Furthermore it is also very ambiguous.

IV. CONCLUSION

The field of artificial intelligence gives the ability to the machines to think analytically, using concepts. Tremendous contribution to the various areas has been made by the Artificial Intelligence techniques from the past many years. Artificial Intelligence will continue to play an increasingly important role in the various fields. Artificial Intelligence has several applications like it can be used in Natural Language Processing, gaming, medical application and several others. It can also be used to build smarter products which will add to the benefit of people around. For example the construction of locomotion system for ALS patients requires Artificial Intelligence and it helps ALS patients to attain mobility just by using their thinking capability. Furthermore Artificial Intelligence can replace motion sensor based games as well in future. Specifically in this paper we have focused on application of Artificial Intelligence in Natural Language Processing. In this paper required efforts have been made to propose and design a way through just by using natural language it could be possible for humans to communicate with computer and other smart systems. Language technologies can be applied to a wide range of problems in business and administration to produce better, more effective solutions. They can also be used in education in order to help the disabled and also to bring new services to both organizations and consumers. Thus we conclude that Natural language Processing which is based on the concept of Artificial Intelligence has a very positive and influential impact on the society for its betterment.

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