

## “Challenges in Natural Language Processing Exposed to Artificial Intelligence in Mumbai City”

**Neeta Sonkar**

Assistant Professor, Laxmichand Golwala College of Commerce & Economics  
Mumbai, Maharashtra, India

### Abstract

Artificial Intelligence is the way in which computers can be made to copy the way human think. Artificial Intelligence is the branch of computer science that emulates the development of intelligence machines, thinking and working like humans, whereas Natural Language Processing is the technology used in aid computers to understand the human’s natural language. In this paper an attempt was made to know how Natural Language Processing deals with present technology. To teach machine to understand how human communicate is not easy task. In general sense a typical interaction between human and machines mostly using Natural Language Processing. Research shows a more optimistic future, where humans and robots work together and humans using artificial intelligence as a tool to enhance their life experience.

**KEYWORDS:** Artificial Intelligence, Types, Natural Processing Language, Techniques, Challenges.

### 1. INTRODUCTION

Artificial intelligence (AI)<sup>i</sup> is the science of creating intelligent machines and intelligent computer programs that can think and act like human beings. The idea of artificial intelligent is based on the human philosophy that whether a machine can be as intelligent as the human. The aims to create artificial intelligent is to emulates a system that is an expert in every form i.e., behavior, learning, demonstration, explanation and can give valuable advice to its users also to extend and implement human thinking and intelligent in machines.

#### 1.2 TYPES OF ARTIFICIAL INTELLIGENCE

**1. Natural Language Processing:** Natural Language Processing is the science of drawing insights from natural human language in order to communicate with machines and grow businesses. e.g., Twitter, Amazon.

**2. Machines Learning:** Machines Learning is the science of getting machines to interpret, process, and analyze data in order to solve real-world problems.

**3. Deep Learning:** Deep learning is an advanced field of machine learning that can be used to solve

more advanced problems. Deep Learning is the logic behind the face verification algorithm on Facebook, Self-driving cars, virtual assistants like Siri, Alexa etc.

**4. Robotics:** AI Robots are artificial agents acting in a real-world environment to produce results by taking accountable actions. E.g., Sophia the humanoid.

**5. Fuzzy Logic:** Fuzzy logic is a computing approach based on the principles of “degrees of truth” instead of the user modern computer logic. e.g., Medical fields etc.

**6. Expert System:** An expert system in an Artificial Intelligence based computer system that learns and reciprocates the decision-making ability of a human expert. e.g., Information Management, Medical facility etc.

## 2. NATURAL LANGUAGE PROCESSING

Natural Language Processing (NLP)<sup>ii</sup> is a branch of artificial intelligence that deals with the way computer and human language interacts with each other. The main functions of this process include speech recognition, natural language understanding, and natural language generation. Natural Language Processing involves the reading and understanding of spoken or written language of a computer. Through natural processing language, computers learn to accurately manage and apply overall linguistics meaning to text excerpts like phrases or sentences. Python is the leading coding language for NLP because of its simple syntax, structure, and rich text processing tool.

### 2.2 TECHNIQUES USED IN NATURAL LANGUAGE PROCESSING

**1. Syntax:** Syntactic is used to assess how the natural language aligns with the grammatical rules. Some Syntax techniques are, Lemmatization, Morphological segmentation, Word segmentation, Part of speech tagging, Parsing, Sentence breaking, Stemming.

**2. Semantics:** Semantics involves applying computer algorithms to understand the meaning and interpretation of words and how sentences are structured. Some Semantics techniques are, Named entity recognition (NER)<sup>iii</sup>, Word sense disambiguation, Natural language generation.

### 2.3. CHALLENGES OF NATURAL LANGUAGE PROCESSING

**1. Breaking the Sentences:** A breaking application should be intelligent enough to separate paragraphs into their appropriate sentence units. This data may exist in the form of tables, graphics, notations, page breaks, etc., which need to be appropriately processed for the machine to derive meaning in the same way a human would approach interpreting text.

**2. Tagging the Parts of Speech and Generating Dependency Graphs:** For a machine to learn, it must understand formally the fit of each word, i.e., how the word positions itself into the sentence, paragraph, document or corpus.

**3. Building the Appropriate Vocabulary:** Using parts of speech tags and dependency graphs, a powerful vocabulary generated and subsequently interpreted by the machines in a way comparable to human understanding.

**4. Linking different components of vocabulary:** The linkage between any two vocabulary terms generated from the document or corpus. Word2vec, a vector-space based model assigns vectors to each word in a corpus; those vectors capture each word's relationship to closely occurring words or set of words.

**5. Setting the Context:** One of the most important challenging tasks in natural language processing system is to train a machine to derive context from a discussion within a document.

**6. Extracting Semantic Meaning:** Extracting Semantic is a combination of both linguistic and semantic methodologies that would allow the machine to correctly understand the meaning within a selected text.

**7. Extracting Named Entities:** Named Entity Recognition (NER), is the next big challenge is to successfully execute NER. It is essential when training a machine to distinguish between simple vocabulary and named entities. Sometimes these entities expressed by dollar amounts, places, locations, numbers, time etc.

**8. Transforming Unstructured Data into Structured Format:** Many companies are aiming to solve the problem of putting the unstructured data into a format that reusable for analysis; the same task has been done only manually by humans.

### **3. REVIEW OF LITRETURE**

1. Madeleine bates and Ralph M. Weischedel. (2006): “Challenges in Natural Language Processing” This study has specifically highlights natural language processing has come far in the past twenty years, the technology has not achieved a major impact on society because of some fundamentals limitations that cannot be overcome or because there has not been enough time to refine and apply. The study was conducted in New York at Cambridge University Press.

2. Suresh Babu Golla. (2019): “Challenges of implementing Natural Language Processing” This study clearly said the challenges are due to data complexity and the dynamic nature of the datasets. Study also emulates the people must have learn about the various platform of artificial intelligence to secure a better future. The study was published in the Analytics India Magazines

3. Ravindra Bachate. (May 2019): “Acquaintances with Natural Languages Processing for Building Smart Society” this study covers specifically Artificial Intelligence mechanism need to be implemented on machines and for this specific purpose Natural Language Processing mechanism have to be considered because there have been developed mechanism that give machines the possibility to understand the context of the inputs presented by human beings.

### **4.OBJECTIVE OF THE STUDY**

The study was conducted for the following objectives:

1. To find out the reliability of the artificial intelligence.
2. To study the level of perception and awareness of people in Natural Language Processing.
3. To make understand them about the benefits of kinds of uses of NLP

### **5. SCOPE OF THE STUDY**

This study will help to identify the reliability of the Artificial Intelligence. This will also help to identify the reason and perception of the people toward the various challenges in natural language processing. It will give an idea and concrete result about how to create awareness and encourage people to choose the various platform of Artificial Intelligence.

### **6. RESEARCH METHODOLOGY**

The study was done completely by collecting primary data through a questionnaire. A questionnaire was prepared and information was collected with the help of it. The sample size was 50. The respondents were all from Mumbai city since the study was exclusively done in Mumbai city. A personal interview of all the respondents was also taken to understand their perception in a better way.

### **HYPOTHESIS:**

**NULL HYPOTHESIS:** There is no impact of natural language processing on the perception of the people.

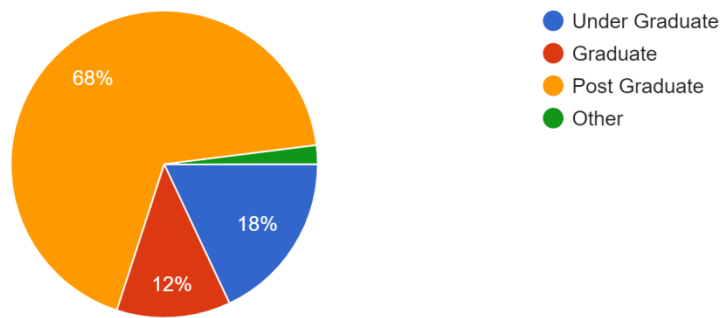
**ALTERNATIVE HYPOTHESIS:** There is an impact of natural language processing on the perception of the people.

### **7. DATA ANALYSIS AND INTERPRETATION**

Data collected through the questionnaire and personal interview were analysed and interpreted. All the data has been represented in a diagrammatic form.

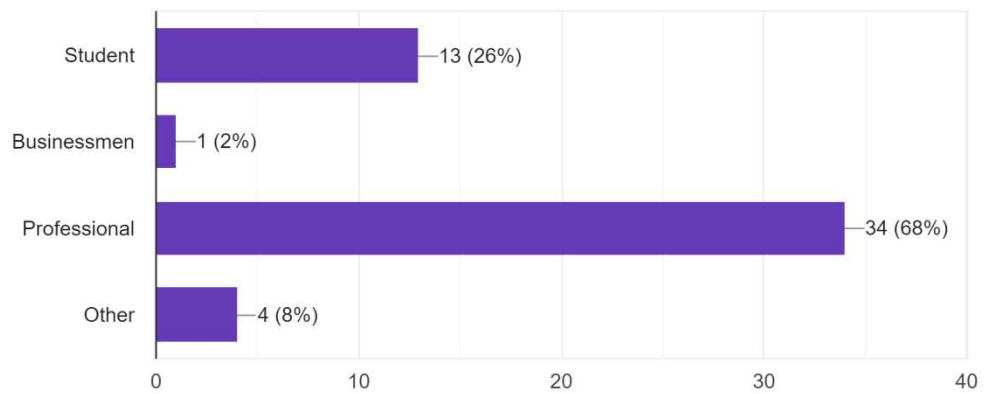
### Q.1 Qualification

50 responses



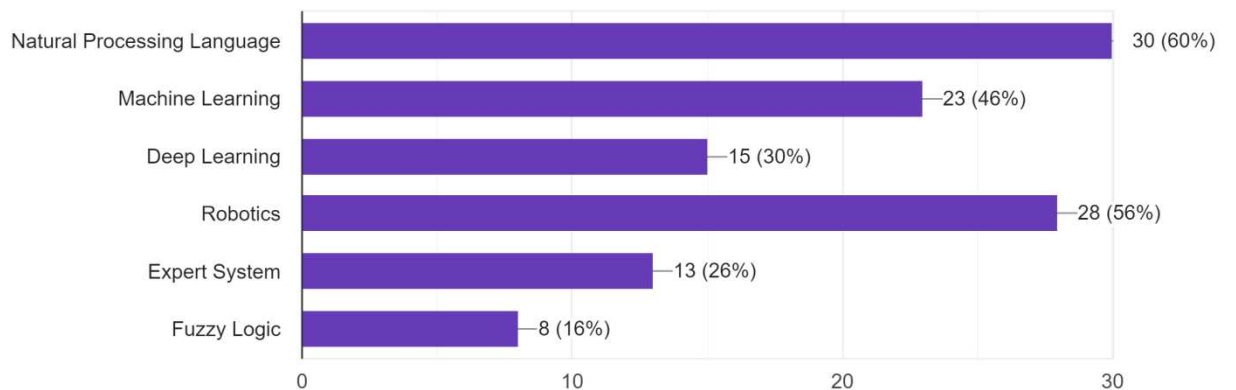
### Q.2 Occupation

50 responses



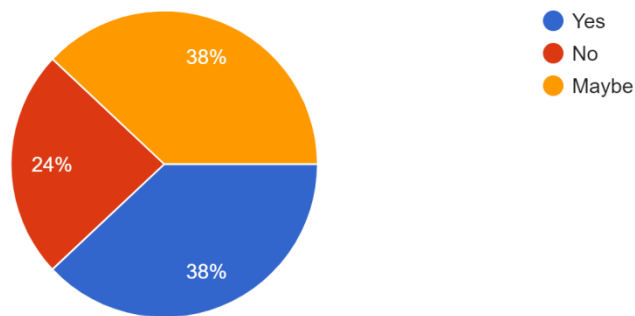
### Q.3 Are you aware of the following types of Artificial Intelligence?

50 responses



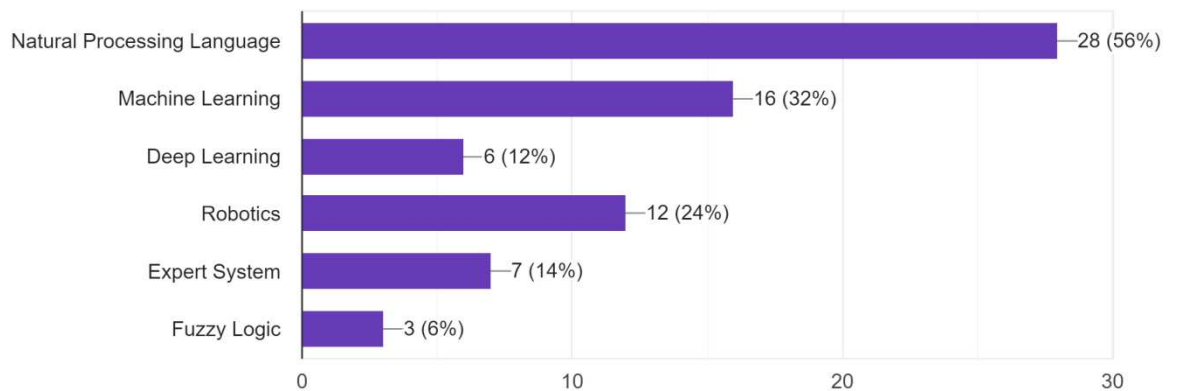
Q.4 Do you prefer in any of the above types?

50 responses



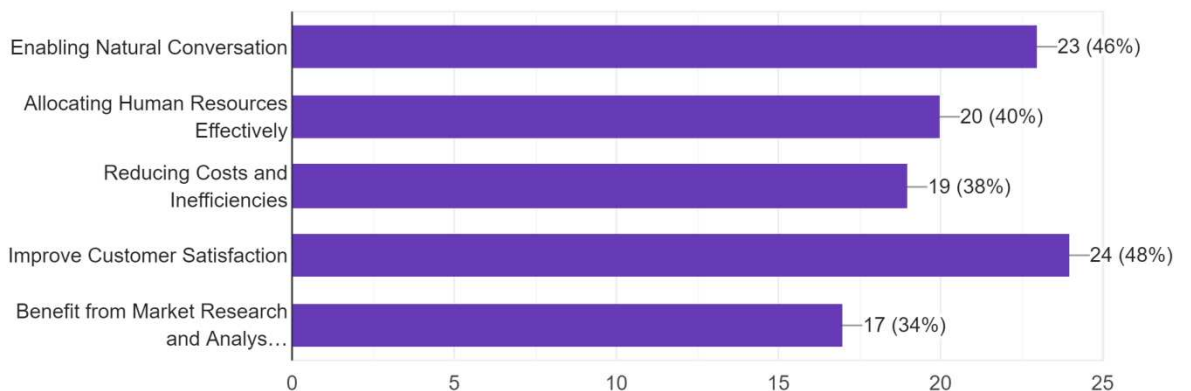
Q.5 Which of the following do you prefer most?

50 responses

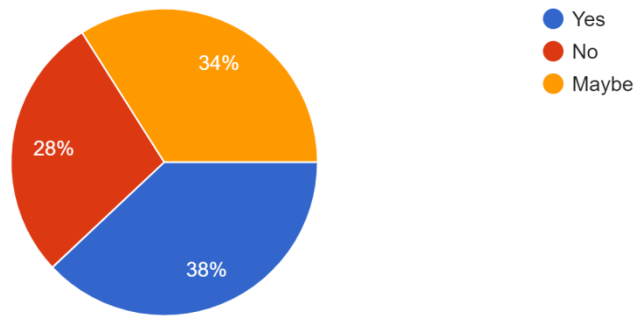


Q.6 According to you which of the following reasons you considered while preferring the Natural Language Processing?

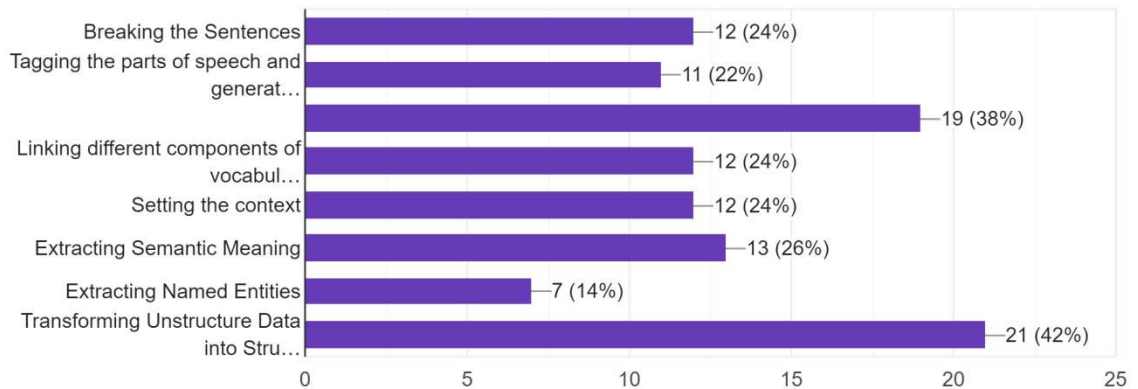
50 responses



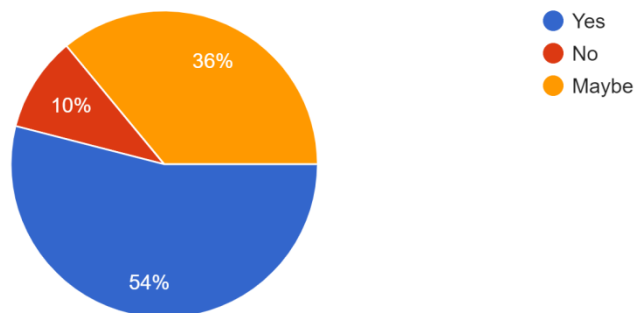
Q.7 Do you face any Challenges while preferring the above reasons?  
50 responses



Q.8 According to you which of the following challenges are you facing most?  
50 responses

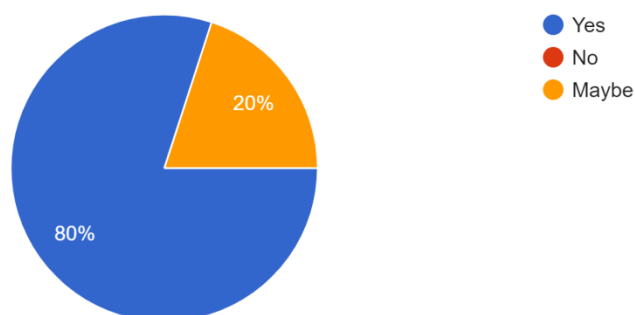


Q.9 According to you from the above challenges does it has greater impact on the necessities of the people?  
50 responses



Q.10 Is Natural Language Processing can build a greater future for human being?

50 responses



## 8. FINDINGS

On the basis of above interpretation of data, it was found that majority of people are aware of Natural Language Processing but are hesitant to prefer it because of less technology knowledge. A large no. of people said that they prefer it mostly to enabling natural conversation & improving customer satisfaction but still they are facing challenges while using it. Asper the data received it is clear that around 42% of the respondent are facing challenges i.e., transforming unstructured data into structured format & 38% are Tagging the Parts of Speech and Generating Dependency Graphs. Most of the people agreed that it has greater impact on the necessities of the users. A large no. of respondents was professional people who mostly prefer natural language processing for allocating human resource effectively and benefit from market research and analysis. Almost, 80% respondents agreed that natural language processing can build better future for human being. On the basis of responses, it is proved that less technology knowledge has major impact on the usage of natural language processing. **Therefore, null hypothesis is rejected which is “There is no impact of natural language processing exposed to Artificial Intelligence on users” and alternative hypothesis is accepted i.e. “There is a huge impact of natural language processing exposed to Artificial Intelligence on users”.**

## 9. SUGGETIONS

- People should be made aware of the various branches of Artificial Intelligence and the way it works so that they should be more comfortable and feel safe while using Natural Language Processing.
- Also, they must be provided with accurate information and proper guidance so that they are able to make their own decision related to various branches of Artificial Intelligence.
- Many people using various platforms of Artificial Intelligence blindly by considering new learning. They ignore or are not made known about the risks associated with it. Hence, such people must be alert before using their AI and its branches.
- Everyday technology becomes more complex and powerful. Therefore, people are required to learn those things from reputed sources to avoid the challenges.



- Also, people must learn keenly about Artificial Intelligence and its kinds of platform for their better future requirement.

## 10. CONCLUSION

We do know that people may hesitant to use Natural Language Processing, but it is all about knowledge and future necessities. However, few respondents were such who have already used Natural Language Processing but other people who have not aware yet must learn about it. Artificial Intelligence always boost positively the knowledge of the users. It must be activated in every walk of life. People hesitant to learn & use various platform of AI due to less awareness hence, the scope of artificial intelligence limits to only one or two techniques. Therefore, our users who ignore the benefit of natural language processing must be motivated now to enjoy it. It is clear that there is a less idea among people which needs to be reduced by spreading the knowledge and true information to them.

Artificial Intelligence Institutions, online courses, information technology experts must come forward and organize various session for people for who have less awareness and idea about how it works. Also, various courses are now available which teaches the Artificial Intelligence and various branches also how it will useful for career.

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<sup>i</sup>Artificial Intelligence

<sup>ii</sup>Natural Language Processing

<sup>iii</sup>Named Entity Recognition