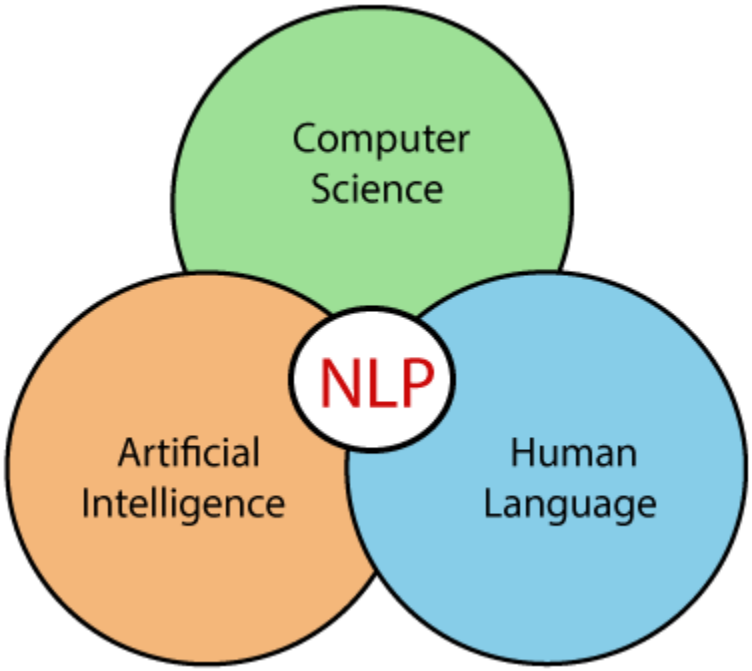
INTRODUCTION

Natural Language Processing (NLP) is a field of Artificial Intelligence (AI) that deals with the interaction between computers and human languages. NLP is used to analyze, understand, and generate natural language text and speech. The goal of NLP is to enable computers to understand and interpret human language in a way that is similar to how humans process language.



Components of NLP

There are the following two components of NLP

1. Natural Language Understanding (NLU)

Natural Language Understanding (NLU) helps the machine to understand and analyse human language by extracting the metadata from content such as concepts, entities, keywords, emotion, relations, and semantic roles.

NLU mainly used in Business applications to understand the customer's problem in both spoken and written language.

NLU involves the following tasks -

- It is used to map the given input into useful representation.
- It is used to analyze different aspects of the language.

2. Natural Language Generation (NLG)

Natural Language Generation (NLG) acts as a translator that converts the computerized data into natural language representation. It mainly involves Text planning, Sentence planning, and Text Realization.

Difference between NLU and NLG

NLU	NLG
NLU is the process of reading and interpreting language.	NLG is the process of writing or generating language.
It produces non-linguistic outputs from natural language inputs.	It produces constructing natural language outputs from non-linguistic inputs.

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Applications of NLP

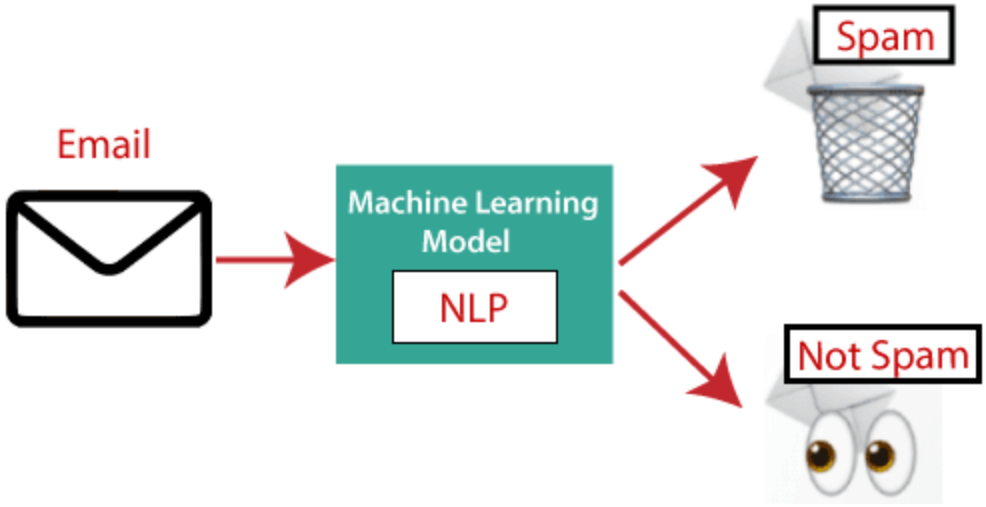
There are the following applications of NLP -

1. Question Answering

Question Answering focuses on building systems that automatically answer the questions asked by humans in a natural language.

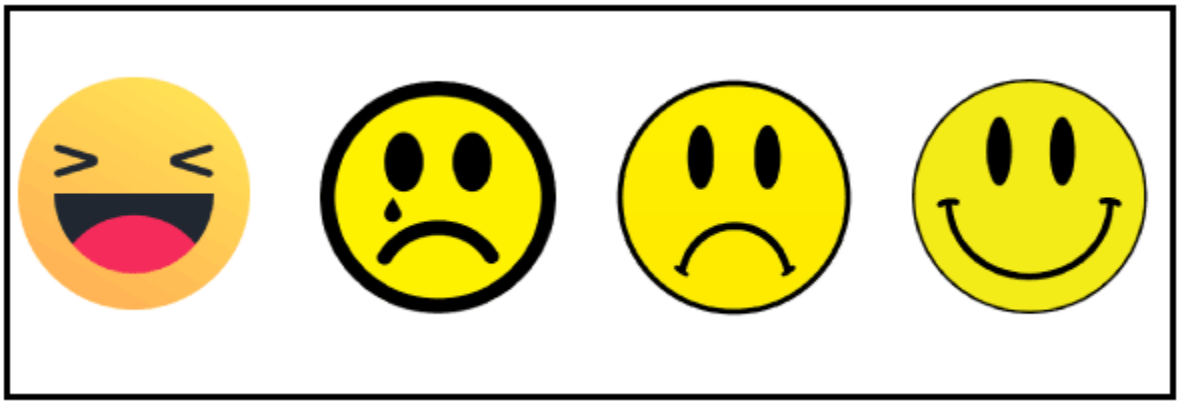
2. Spam Detection

Spam detection is used to detect unwanted e-mails getting to a user's inbox.



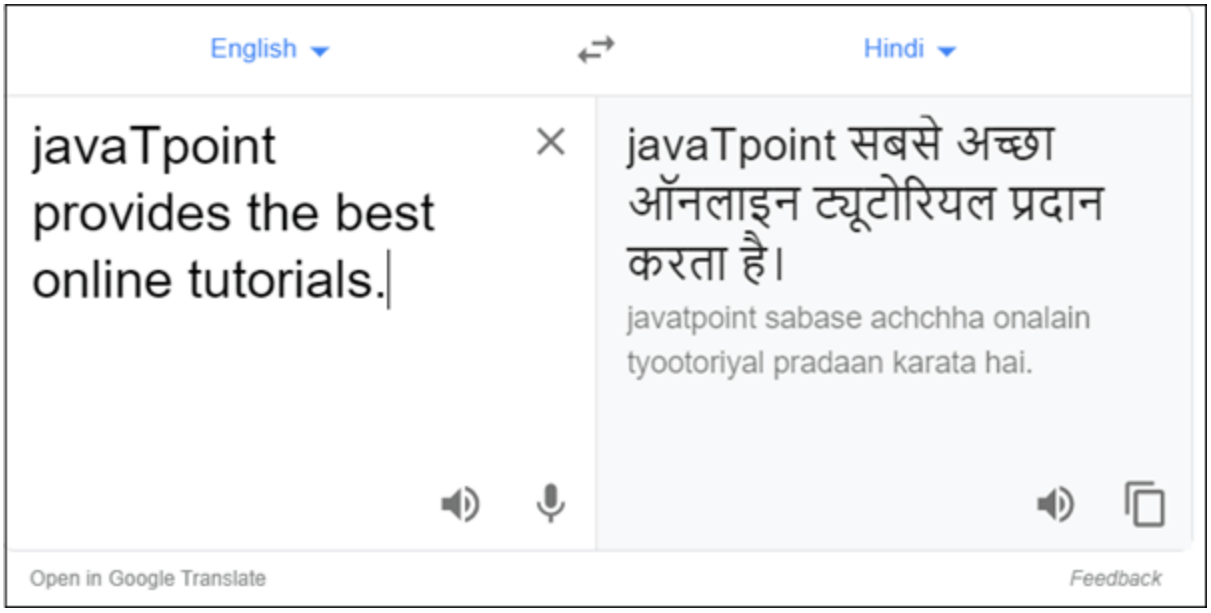
3. Sentiment Analysis

Sentiment Analysis is also known as **opinion mining**. It is used on the web to analyse the attitude, behaviour, and emotional state of the sender. This application is implemented through a combination of NLP (Natural Language Processing) and statistics by assigning the values to the text (positive, negative, or natural), identify the mood of the context (happy, sad, angry, etc.)



4. Machine Translation

Machine translation is used to translate text or speech from one natural language to another natural language.



Example: Google Translator

5. Spelling correction

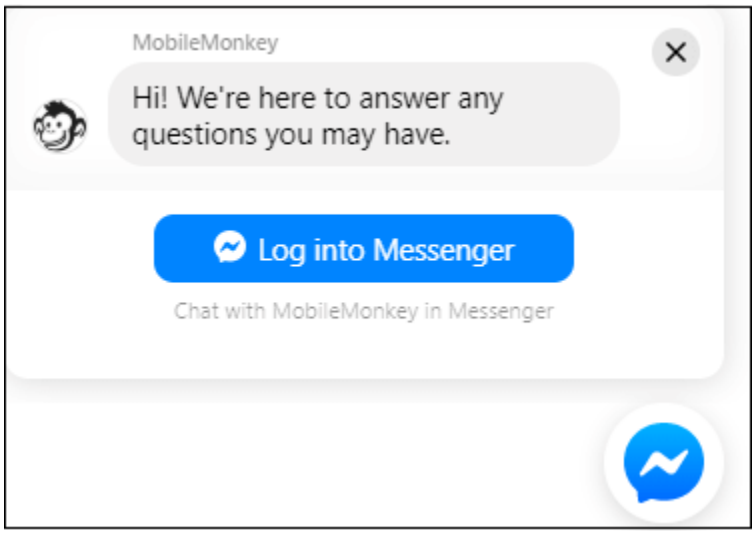
Microsoft Corporation provides word processor software like MS-word, PowerPoint for the spelling correction.

6. Speech Recognition

Speech recognition is used for converting spoken words into text. It is used in applications, such as mobile, home automation, video recovery, dictating to Microsoft Word, voice biometrics, voice user interface, and so on.

7. Chatbot

Implementing the Chatbot is one of the important applications of NLP. It is used by many companies to provide the customer's chat services.



8. Information extraction

Information extraction is one of the most important applications of NLP. It is used for extracting structured information from unstructured or semi-structured machine-readable documents.

9. Natural Language Understanding (NLU)

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

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Virtual Agents

Virtual agents go by various names. They are often referred to as chatbots, conversational AI, intelligent assistance, conversational agents, and so forth. Depending on the vendor or solution, these names are interchangeable.

What is a virtual agent?

A virtual agent is a type of software that uses natural language processing (NLP) to understand customer intent and search inquiries. They support the human employees in customer service departments by answering basic questions and performing standard procedures.

With virtual agents available to take care of less complex customer inquiries, human agents are freed up to assist with more complicated customer requests.

How does a virtual agent work

As a digital customer service representative, chatbots respond to customers as though they were a real, live agent working for the company.

They can assist with password recovery, account questions, sales recommendations, and solve a variety of customer problems. Some of the best features of chatbots are their ability to assist 24/7, answer questions instantly and accurately, and provide a positive customer experience due to their efficiency.

Virtual agents are mere digital assistants with one critical additional component – conversational AI. Conversational AI is an essential element that takes a virtual agent from a simple chatbot to a powerful, intelligent tool that helps customers with accuracy, ease, and instant responses.

Key benefits for organisations

A virtual agent has many use cases and can bring plenty of benefits to a business.

To help you determine whether your contact centre needs to invest in a virtual agent, let's take a look at the benefits in more detail.

Improve customer experience

A virtual agent can help to improve customer experience and satisfaction in a number of ways:

- Fast responses: one of the most important factors in determining a good customer experience is a fast response to queries. Virtual agents can answer customers instantly, making them a reliable way to provide fast responses.
- Reduce contact centre queues: both phone and live chat queues are a big turn off for customers. In fact, 60% of customers aren't even willing to wait on hold for

just one minute. One of the best ways to reduce contact centre queues is to provide a virtual agent. As the virtual agent deals with FAQs and simple queries, it puts less demand on other channels and significantly reduces, if not eliminates, queues.

- Gather customer insights: virtual agents are a good way to gather information and data on customer behaviour and journeys. What are the most frequent questions it answers? What webpages trigger the greatest number of interactions? Insights such as this can show you where in the digital customer journey your customers encounter problems. You can then work to improve these areas and offer pre-emptive customer support.

Reduce demand on agents

As a virtual agent can handle many customer requests, it is a great tool for reducing the demand on human agents in a busy contact centre.

This will give agents more time to deal with complex customer problems and improve employee morale.

Of course, an AI virtual assistant can never completely replace agents - but it can be a useful complement to human-powered customer support.

Round the clock support

Being able to offer 24/7 customer support with a virtual agent is a clear benefit for your contact centre.

An automated virtual agent can operate without human input, which means it can take over all customer support during your closing hours.

This is also particularly useful if you have customers in different time zones.

Lead generation

Virtual agents can be used to capture more online leads.

It does this by collecting customer information, either via pre-chat forms or through the conversation itself.

This information can then be used to re-target potential customers in the future with nurture marketing campaigns, updates and product promotions.

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YouTube video Recommendation

1. What is Natural Language Processing (NLP)

https://www.youtube.com/watch?v=b0P8W87uj7Y&list=PL9MV02KSi1-jpS6P_7gTbtcbze0puUjUB&index=4

2. What is Natural Language Processing (NLP)

https://www.youtube.com/watch?v=bPpwZxasJo0

3. Tokenization

https://www.youtube.com/watch?v=UtE65mcPpmA&list=PL9MV02KSi1-jpS6P_7gTbtcbze0puUjUB&index=4

4. Stemming and Lemmatization

https://www.youtube.com/watch?v=EpB8pDIw5NQ&list=PL9MV02KSi1-jpS6P_7gTbtcbze0puUjUB&index=5

5. Removing Stopwords

https://www.youtube.com/watch?v=ONp7hg6ztEM&list=PL9MV02KSi1-jpS6P_7gTbtcbze0puUjUB&index=7

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NLP PLAYLIST

1. Natural Language Processing - YouTube

2. https://www.youtube.com/playlist?list=PLKnIA16_RmvZo7fp5kkIth6nRTeQQsjfX