

1. Define Natural Language Processing (NLP)

Natural Language Processing (NLP) is a subfield of Artificial Intelligence (AI) that focuses on enabling computers to understand, interpret, process, and generate human language in a meaningful way.

2. History and Evolution of NLP

NLP began with rule-based systems and symbolic approaches in the 1950s–1980s. It evolved into statistical methods using machine learning in the 1990s–2000s and now primarily relies on deep learning and transformer-based models such as BERT and GPT.

3. Key Challenges and Applications of NLP

Challenges include ambiguity, context understanding, sarcasm, multiple languages, and noisy data. Applications include chatbots, machine translation, sentiment analysis, speech recognition, information retrieval, and question answering systems.

4. Language, Knowledge, and Grammar in NLP

Language refers to the structure and vocabulary of human communication. Knowledge involves world understanding and context. Grammar defines syntactic and semantic rules that help machines understand sentence structure and meaning.

5. Stages of NLP

The stages include lexical analysis, syntactic analysis, semantic analysis, discourse integration, and pragmatic analysis, each contributing to deeper language understanding.