

# Phases of Natural Language Processing (NLP)

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# Overview of NLP Pipeline

- Lexical & Morphological Analysis
- Syntactic Analysis
- Semantic Analysis
- Discourse Integration
- Pragmatic Analysis

# Lexical Analysis – Tokenization

- Splits text into tokens (words)
- Example:
- 'I am reading a book' → I | am | reading | a | book

# Lexical Analysis – POS Tagging

- Assigns grammatical roles to tokens
  - reading → Verb
  - book → Noun

# Morphological Analysis

- Stemming: running → run
- Lemmatization: better → good
- Helps normalize text

# Syntactic Analysis (Parsing)

- Analyzes sentence structure
- Identifies subject, verb, object
- Builds parse trees

# Syntactic Example

- Sentence: The cat sat on the mat
- Subject: The cat
- Verb: sat
- Phrase: on the mat

# Semantic Analysis

- Focuses on meaning
- Detects logical correctness
- Handles ambiguity

# Word Sense Disambiguation

- bank (money context) → financial institution
- bank (river context) → riverside

# Named Entity Recognition

- Identifies real-world entities
- Example:
- Sachin Tendulkar → Person
- Mumbai → Location

# Discourse Integration

- Connects meaning across sentences
- Resolves pronouns and references - Anaphoric resolution

# Discourse Example

- Ravi went to the market.
- He bought fruits.
- He → Ravi

# Pragmatic Analysis

- Understands intent, not literal meaning
- Considers real-world context

# Pragmatic Example

Can you pass the salt?

- Meaning: polite request

# Applications of NLP

- Chatbots
- Machine Translation
- Search Engines
- Sentiment Analysis

# Summary

- NLP processes text in multiple stages
- Each stage adds more understanding
- Essential for intelligent systems