# Natural Language Processing

- Natural Language Processing (NLP) refers to AI method of communication with an intelligent systems using a natural language such as English.
- Processing of Natural Language is required when we want an intelligent system like robot to perform as per our instructions, when we want to hear decision from a dialogue based clinical expert system, etc.
- The field of NLP involves making computers to perform useful tasks with the natural languages humans use.
- The input and output of an NLP system can be −
  - Speech
  - Written Text

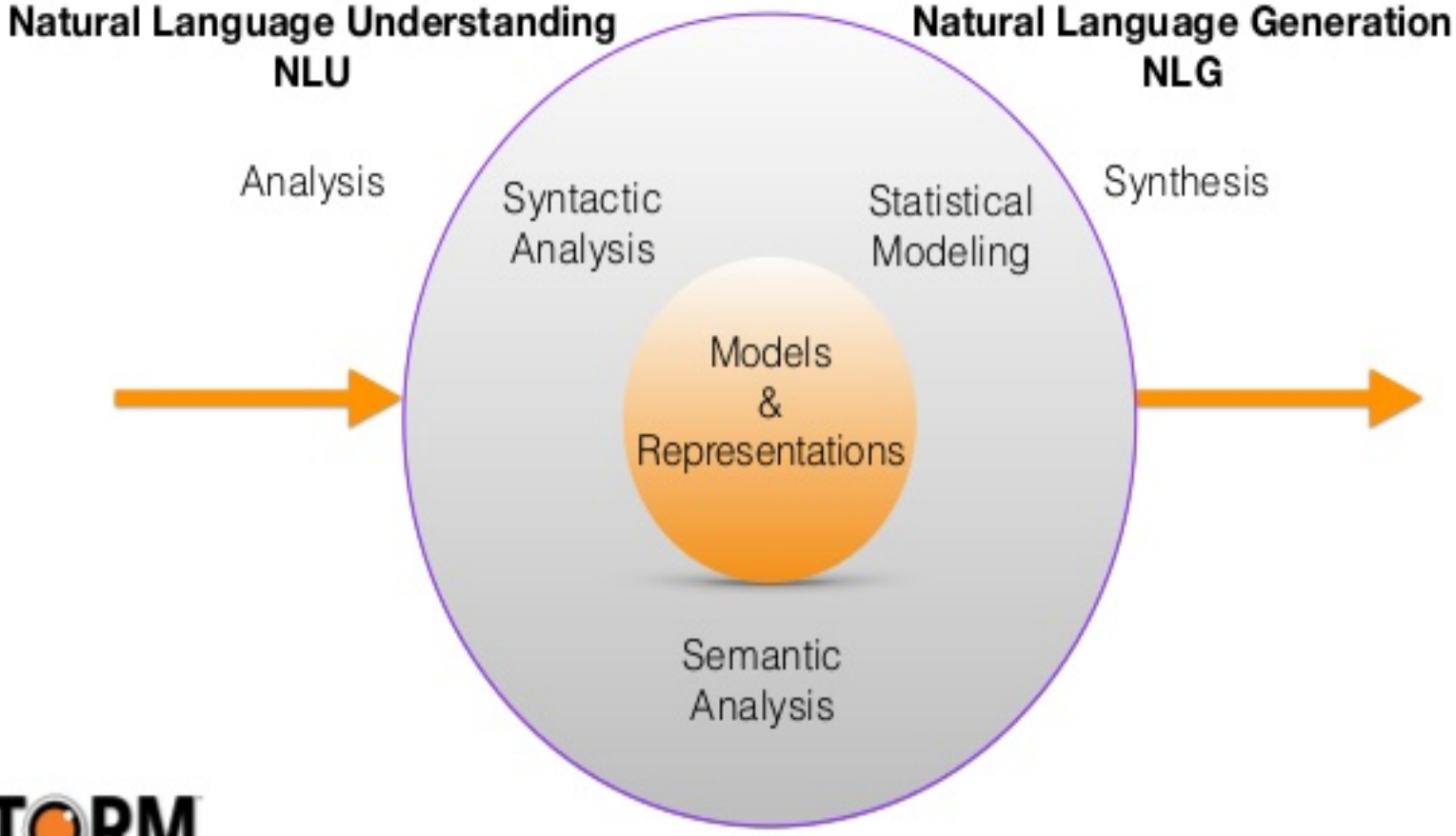
# Components of NLP

**1.NLU** — Natural Language "**Understanding"**

**2.NLG** — Natural Language "**Generation"**

1.NLU:-NLU is the understanding the meaning of what the user or the input which is given means. That is nothing but the understanding of the text given and classifying it into proper intents.

2.NLG:It is the process of producing meaningful phrases and sentences in the form of natural language from some internal representation




STORM
INSIGHTS INC.

# Difficulties in NLU

1.Lexical ambiguity − It is at very primitive level such as word-level.

For example, treating the word “board” as noun or verb?

2.Syntax Level ambiguity − A sentence can be parsed in different ways.

For example, “He lifted the beetle with red cap.” − Did he use cap to lift the beetle or he lifted a beetle that had red cap?

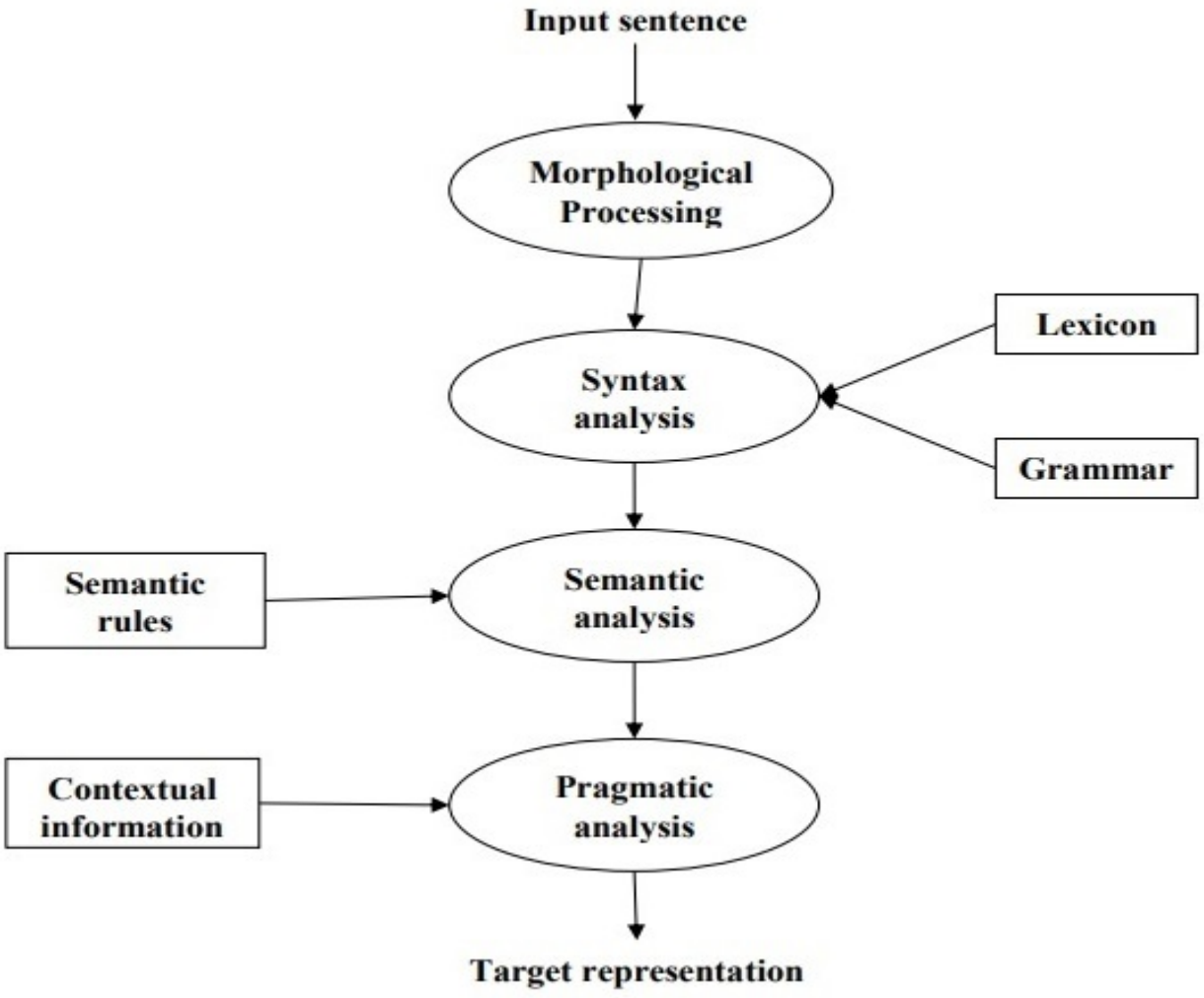
3.Referential ambiguity − Referring to something using pronouns.

For example, example, Rima went to Gauri. She said, “I am tired” − Exactly who is tired?

One input can mean different meanings.

Many inputs can mean the same thing.

# NLP Phases


Input sentence
Morphological Processing
Lexicon
Syntax analysis
Grammar
Semantic rules
Semantic analysis
Contextual information
Pragmatic analysis
Target representation

1. **Morphological Processing**

It is the first phase of NLP. The purpose of this phase is to break chunks of language input into sets of tokens corresponding to paragraphs, sentences and words. For example, a word like **"uneasy"** can be broken into two sub-word tokens as **"un-easy"**.

**2.Syntax Analysis**

- The purpose of this phase is two folds: to check that a sentence is well formed or not and to break it up into a structure that shows the syntactic relationships between the different words. For example, the sentence like **"The** school **goes to the boy"** would be rejected by syntax analyzer or parser.

**3.Semantic Analysis**

The purpose of this phase is to draw exact **meaning,** or you can say dictionary meaning from the text. The text is checked for meaningfulness. For example, semantic analyzer would reject a sentence like "Hot ice-cream".

**4.Pragmatic Analysis:**

It deals with using and understanding sentences in different situations and how the interpretation of the sentence is affected.

Pragmatic analysis simply fits the actual objects/events, which exist in a given context with object references obtained during the last phase (semantic analysis).

For example, the sentence "Put the banana in the basket on the shelf" can have two semantic interpretations and pragmatic analyzer will choose between these two possibilities.

# NLP Applications

- Language Translator
- Social Media Monitoring
- Chatbots
- Survey Analysis
- Targeted Advertising
- Hiring and Recruitment.
- Voice Assistants.
- Grammar Checkers.