

# NSHM KNOWLEDEGE CAMPUS

## DURGAPUR-GOI(College Code: 273)

### CONTINUOUS ASSIGNMENT -1

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# Introduction to Natural Language Processing

Unlocking the power of human language for machines

# What is NLP?



NLP is a branch of artificial intelligence enabling computers to understand, interpret, and generate human language in text and speech.

It bridges human communication and machine comprehension, powering technologies like chatbots, voice assistants, and translation tools that we interact with daily.

# Why NLP Matters Today

**80%**

## Unstructured Data

Of all human-generated data is text or speech

**\$158B**

## Market Growth

Projected global NLP market value by 2032

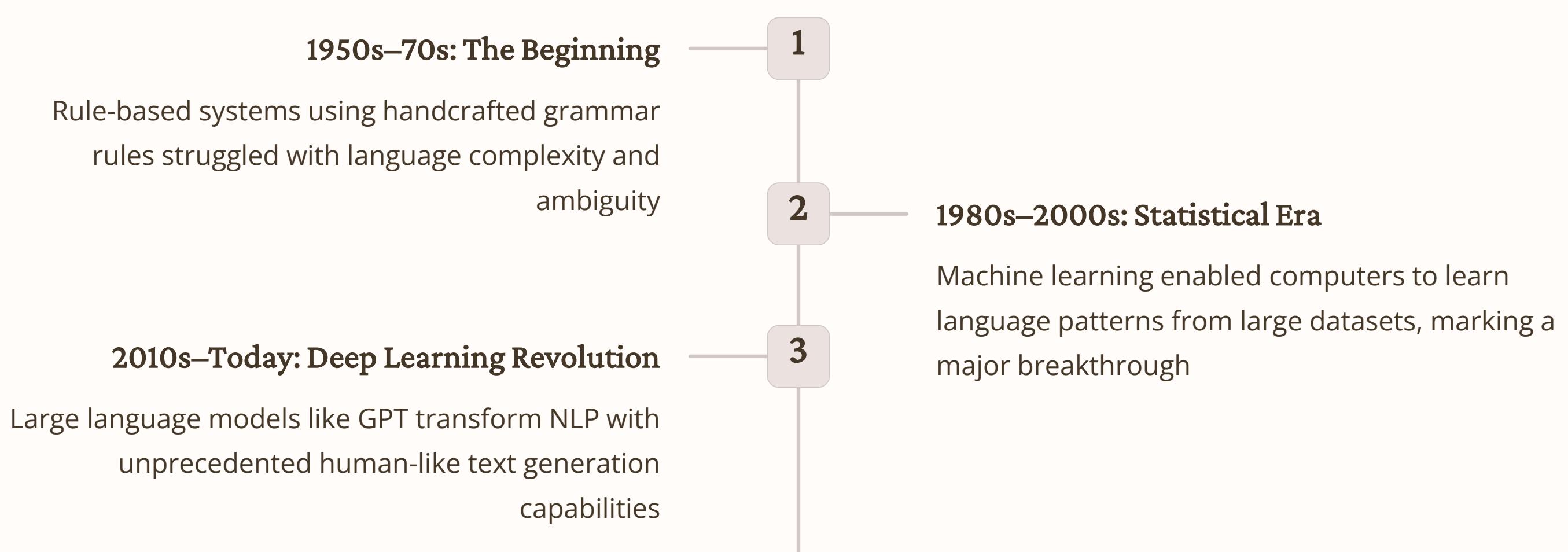
**\$29.7B**

## Current Market

Global NLP market size in 2024

NLP is essential to unlock insights from vast unstructured information, driving innovation across industries and creating unprecedented opportunities for businesses and developers.

# The Evolution of NLP: From Rules to AI



# Core NLP Techniques



## Tokenization

Breaking text into words or phrases for computational analysis



## Text Classification

Categorizing text into predefined groups like spam detection



## Sentiment Analysis

Detecting emotions and opinions expressed in text



## Named Entity Recognition

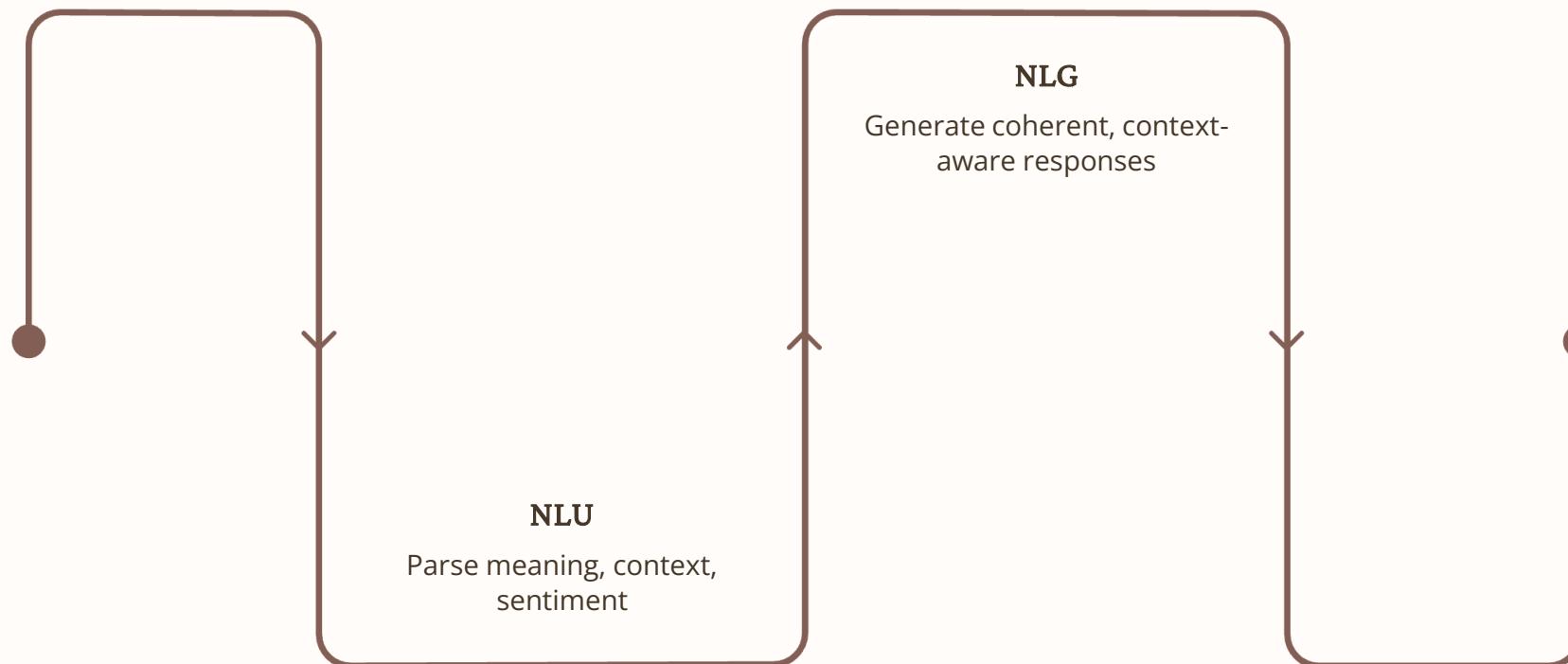
Identifying people, places, and dates within text



## Text Generation

Creating coherent new text based on learned patterns

# How NLP Works: Understanding & Generating Language



## The Two Pillars of NLP

Natural Language Understanding (NLU) parses and interprets meaning, context, and sentiment from input text.

Natural Language Generation (NLG) produces coherent, context-aware responses or summaries.

Modern NLP combines linguistics, machine learning, and deep learning to create powerful language models.



# Real-World Applications of NLP

## Virtual Assistants

Siri, Alexa, and Google Assistant understand and respond to voice commands naturally

## Customer Service Chatbots

Automate routine queries, improving efficiency and customer satisfaction

## Machine Translation

Break language barriers with tools like Google Translate

## Social Media Monitoring

Analyze public sentiment and emerging trends in real-time

# Hands-On with NLP Today

## Getting Started

Tools like Python and Hugging Face Transformers enable developers to apply pretrained models for tasks like text classification and generation with just a few lines of code.

- ☐ **Ethical Considerations:** Bias mitigation, data quality, and responsible AI deployment are critical to building fair NLP systems.



# The Future of NLP



## AI Agents

Integration with autonomous agents for complex task completion

## Multilingual Models

Enhanced contextual understanding across languages and cultures



## Industry Expansion

Growing role in healthcare, finance, education, and beyond

## Explainability

Emphasis on fairness and transparency in NLP systems

# NLP is Transforming How We Communicate with Machines

NLP empowers machines to understand human language, making technology more accessible and intelligent. As NLP continues to evolve, it will reshape industries and daily life, unlocking new possibilities for human-computer interaction.

The journey into NLP is just beginning—your exploration can help shape the future of language technology.



# THANK YOU