



NSHM KNOWLEDEGE CAMPUS

DURGAPUR-GOI(College Code: 273)



CONTINUOUS ASSIGNMENT -1

PRESENTED BY	
Student Name	ABHIJIT KAYAL
University Roll No.	27330822006
University Registration No.	222730110002
Branch	BACHELOR OF TECNOLOGY IN COMPUTER SCIENCE & ENGINNERING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)
Year	4 TH
Semester	7 TH
Paper Name	NATURAL LANGUAGE PROCESSING
Paper Code	PECAIML 801A



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

1950s–70s: The Beginning

Rule-based systems using handcrafted grammar rules struggled with language complexity and ambiguity

1

2

1980s–2000s: Statistical Era

Machine learning enabled computers to learn language patterns from large datasets, marking a major breakthrough

3

2010s–Today: Deep Learning Revolution

Large language models like GPT transform NLP with unprecedented human-like text generation capabilities

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

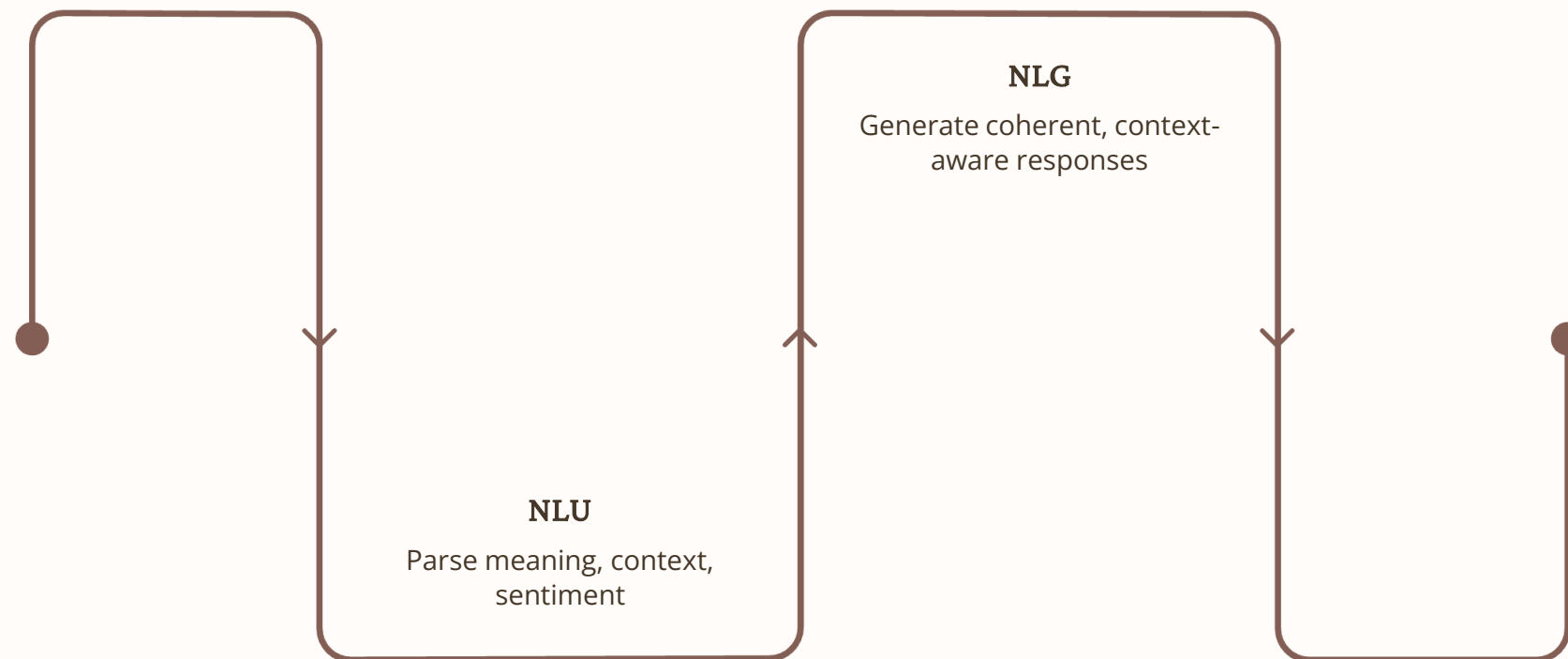
Identifying people, places, and dates within text



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