ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

TRAINING TR-102 REPORT DAY 18 16 JULY 2025

Overview:

The eighteenth day of training focused on Sentiment Analysis, one of the most widely used applications of Natural Language Processing (NLP) and Artificial Intelligence.We learned how computers can identify, extract, and interpret emotions or opinions from textual data — determining whether the sentiment expressed is positive, negative, or neutral.

Learning Objectives:

• Understand the concept and importance of Sentiment Analysis.

• Learn how sentiment is classified using NLP and ML techniques.

• Explore approaches such as rule-based, machine learning, and deep learning models.

• Implement sentiment analysis using Python libraries like TextBlob and Vader.

• Analyze real-world applications in business, social media, and AI systems.

Introduction to Sentiment Analysis

Sentiment Analysis, also known as Opinion Mining, is the process of identifying and categorizing opinions expressed in a piece of text.It determines the writer's or speaker's attitude — whether it's positive, negative, or neutral — towards a particular topic, product, or event.

Approaches to Sentiment Analysis

1. Rule-Based Approach

- Uses predefined rules, lexicons, and sentiment dictionaries (e.g., words like "good" = positive, "bad" = negative).
- Simple but limited in handling context or sarcasm.

2. Machine Learning-Based Approach

- Uses algorithms like Naïve Bayes, Logistic Regression, or Support Vector Machines (SVM).
- Requires labeled datasets for training.

3. Deep Learning Approach

- Uses Recurrent Neural Networks (RNNs), LSTMs, or Transformers for better context understanding.
- Achieves high accuracy on large-scale data like tweets or reviews.

Applications of Sentiment Analysis

- Business Intelligence: Understanding customer opinions about products.
- Social Media Monitoring: Tracking public sentiment on trending topics.
- Political Analysis: Studying voter opinions or campaign reactions.
- Market Research: Analyzing feedback for new launches.
- Healthcare: Detecting emotional well-being from patient feedback.

Conclusion:

Day 18 deepened our understanding of Sentiment Analysis, showing how AI can interpret human emotions from language.
We learned to process and analyze textual data, distinguish between different sentiment types, and use Python tools for implementation.This session demonstrated how NLP and Machine Learning combine to extract valuable insights from unstructured data — a skill essential in today's AI-driven industries.