Green University of Bangladesh

Department of Computer Science and Engineering (CSE)
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Sentiment Analysis Using Artificial Intelligence (Project Proposal)

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Section: ***213 D1***

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Lab Project Status	
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Chapter 1

Introduction

1.1 Project Title

Sentiment Analysis Using Artificial Intelligence

1.2 Overview

Sentiment analysis, also referred to as opinion mining, is an approach to natural language processing (NLP) that identifies the emotional tone behind a body of text. This is a popular way for organizations to determine and categorize opinions about a product, service or idea. **Sentiment analysis, is a process of determining the emotional tone behind a series of words.** With the proliferation of social media and online reviews, sentiment analysis has become a crucial tool for understanding public opinion towards products, services, events, and more. **This project aims to leverage artificial intelligence techniques to analyze and classify sentiments expressed in text data.**

1.3 Motivation

In today's digital age, understanding customer sentiment is vital for businesses to make informed decisions about their products and services. Sentiment analysis offers a scalable and efficient way to process vast amounts of textual data to gauge public opinion. By automating this process using artificial intelligence, we can provide valuable insights to businesses, marketers, study insights in public opinions, democracy and decision-makers and various other field of works.

1.4 Problem Definition

1.4.1 Problem Statement / Problem Domain

The primary challenge in sentiment analysis is accurately categorizing the polarity of text data **(positive, negative, or neutral)** within a given context. This involves parsing through

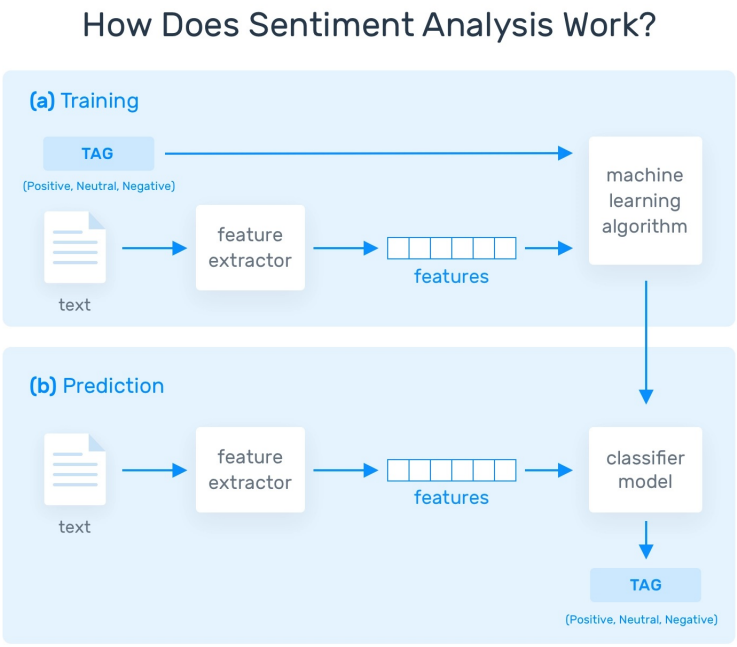

Figure 1.1:
Sentiment Analysis in a Nutshell

unstructured textual data, understanding the nuances of language, and classifying sentiments based on the underlying emotions conveyed.

1.4.2 Complex Engineering Problem

The complexity lies in developing a robust machine learning or deep learning model capable of handling the intricacies of natural language and capturing the subtle nuances of sentiment expression. Additionally, the model must be scalable and adaptable to different domains and languages, requiring careful feature engineering, algorithm selection, and optimization.

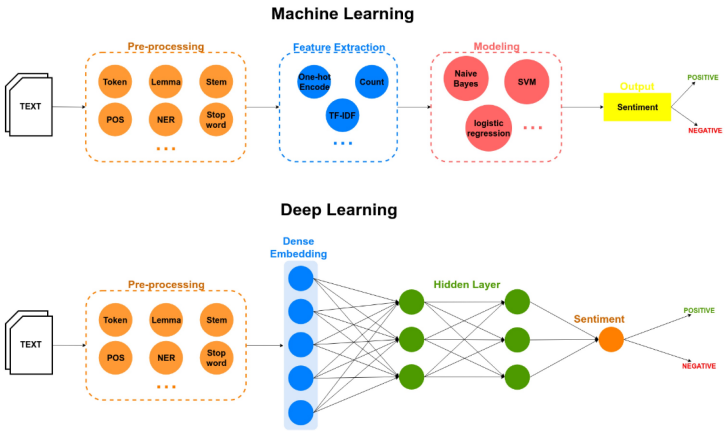

Figure 1.2:
Sentiment Analysis in Machine Learning vs Deep Learning

1.5 Design Goals / Objectives

The design goals and objectives include:

- Develop a sentiment analysis system capable of accurately classifying sentiments in textual data.
- Explore and implement various machine learning and deep learning techniques for sentiment analysis.
- Evaluate the performance of the sentiment analysis model across different datasets and domains.
- Design an intuitive and user-friendly interface for interacting with the sentiment analysis system.
- Investigate methods for handling challenges such as sarcasm, irony, and context-dependent sentiment.

1.6 Application

The proposed sentiment analysis system can be applied in various domains, including:

- **Social media monitoring:** Analyzing user sentiments towards brands, events, or trending topics.
- **Product reviews:** Automatically categorizing reviews as positive, negative, or neutral to gauge customer satisfaction.
- **Market research:** Extracting insights from customer feedback to inform marketing strategies and product development.
- **Customer service:** Analyzing customer interactions to identify areas for improvement and measure satisfaction levels.
- **Public opinion:** Identifying the underlying emotional state of the public about certain issue, phenomena, events, things, occurrence and labelling by subjecting them as information, opinion, emotions, hates, empathy and so on.
  (This part might be the hardest ones to articulate between them in this project. So, I will try to keep it flexible.)

1.7 Methodology

The project will involve the following methodology:

1. **Data collection:** Gathering textual data from sources such as social media, product reviews, and news articles.
2. **Preprocessing:** Cleaning and tokenizing text data, removing stopwords, and performing feature extraction.

3. **Model development:** Implementing machine learning or deep learning models for sentiment analysis, such as support vector machines, recurrent neural networks, or transformer-based architectures.

4. **Training and evaluation:** Training the model on labeled data and evaluating its performance using metrics such as accuracy, precision, recall, and F1-score.

5. **Deployment:** Integrating the sentiment analysis model into a user-friendly interface for real-world applications.

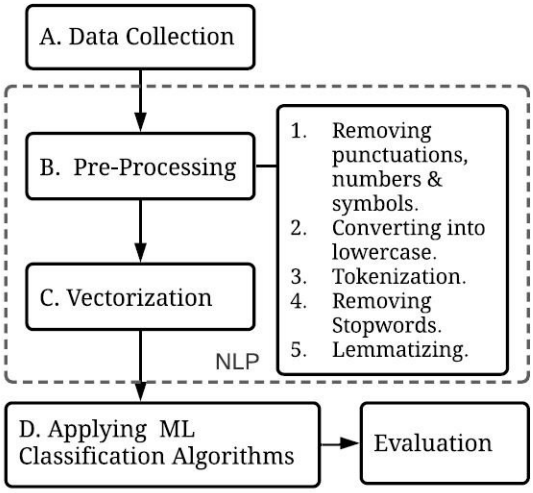

Figure 1.3:
Work Flow Diagram planning of Sentiment Analysis Using NLP and Machine Learning

1.8 Expected Outcome

The anticipated outcome of this project is a foundational understanding of sentiment analysis techniques and their practical application. As a beginner-level educational endeavor, flexibility will be crucial, allowing room for exploration, learning from mistakes, and iterative improvements. The primary goal is to develop a well-trained sentiment analysis model capable of accurately classifying sentiments in textual data, evaluating results demonstrating the performance of the model across different datasets and domains, develop a functional sentiment analysis model, albeit with potential shortcomings and areas for further enhancement with a user-friendly interface for interacting with the sentiment analysis system. Documentation will capture the journey, including challenges faced, lessons learned, and insights gained, providing valuable educational material for future projects and learning opportunities.