Sentiment Analysis using NLP

Description

- Develop a pipeline for sentiment analysis on text data (e.g., product reviews, social media posts).
- Implement classification of sentiment (positive, negative, neutral).
- You can split your data into testing, training, and validation sets.
- Perform necessary pre-processing on the data to prepare it for analysis.
- Optimize the pipeline for efficient sentiment classification.
- Feel free to use any technique of feature extraction or representation.
- You can use Deep Learning Methods and compare their performance with traditional NLP approaches. (optional)

What to turn in:

1. Project documentation (details given below)
2. Report of any resources you use
3. Your source code in a Jupyter Notebook with comments

Project Documentation:

Ensure that the documentation is clear and easy to follow. Raw Python output or unformatted screen dumps are not acceptable. Do not include code in the documentation. Provide enough details for the reader to understand your methodology and reproduce your results or achieve similar outcomes. Avoid vague statements like "I used a text classification algorithm" without specifying which algorithm. Focus on the technical aspects rather than implementation details.

Document Structure:

1. Introduction: State the problem and your objectives for the sentiment analysis task
2. Data description: Describe the dataset used (source, number of instances, features, division between training and testing, etc.)
3. Baseline experiments: State the goal, present initial experiments, and provide conclusions
4. Advanced experiments: For each experiment, include goal, methodology, results, and conclusion
5. Overall conclusion

Additional Requirements:

- List all tools and libraries used (you may use any tool or programming language you're comfortable with)
- List any external resources or pre-trained models used

- Include captioned tables and figures for clarity
- Compare your results to existing benchmarks in sentiment analysis when possible

Reflection Questions:

After completing your experiments, answer the following: 1. What was the biggest challenge you faced in implementing sentiment analysis? 2. What insights did you gain about NLP and sentiment analysis through this project?