



Beykoz University

FACULTY OF ENGINEERING AND ARCHITECTURE

Department of “Computer Engineering”

“CAPSTONE PROJECT - Requirements List”

60610CPEOZ-CME0168

**Social Media Sentiment Analysis in Azerbaijani
Language using NLP - Python**

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****1. Introduction:****

1.1 **Background and Motivation:**

- ***Functional Requirement:** Clearly define the scope of the project, emphasizing the need for sentiment analysis on social media content.
- ***Non-functional Requirement:** Ensure the project aligns with the ethical considerations of sentiment analysis and respects user privacy.

1.2 **Objectives of the Project:**

- ***Functional Requirement:** Outline the goals of integrating NLP techniques, Python programming, and sentiment analysis on social media content in Azerbaijani.
- ***Non-functional Requirement:** The system should be scalable to accommodate a growing dataset of social media content.

****2. Foundations in NLP:****

2.1 **Insights from "Speech and Language Processing":**

- ***Functional Requirement:** Apply foundational NLP concepts, such as syntactic and semantic analysis, as outlined in the referenced book.
- ***Non-functional Requirement:** Ensure the system processes text efficiently to handle large volumes of social media data.

2.2 **Sentiment Analysis Techniques Overview:**

- ***Functional Requirement:** Implement rule-based approaches and machine learning models for sentiment classification.
- ***Non-functional Requirement:** The sentiment analysis model should be trained on a diverse dataset to enhance generalization.

****3. Stanford NLP Library Integration:****

3.1 **Importance in Social Media Sentiment Analysis:**

- ***Functional Requirement:** Integrate the Stanford NLP library for part-of-speech tagging, named entity recognition, and sentiment analysis tasks.
- ***Non-functional Requirement:** The system should be compatible with the latest version of the Stanford NLP library to leverage its updated features.

3.2 **Practical Applications and Usage:**

- ***Functional Requirement:** Implement practical applications of the Stanford NLP library for efficient text processing.
- ***Non-functional Requirement:** The system should provide real-time sentiment analysis to accommodate the dynamic nature of social media content.

****4. Advanced NLP Concepts:****

4.1 **Word Embeddings:**

- ****Functional Requirement:**** Integrate techniques for capturing semantic relationships using word embeddings.
- ****Non-functional Requirement:**** The system should leverage pre-trained word embeddings for efficiency in processing.

4.2 **Deep Learning Architectures:**

- ****Functional Requirement:**** Implement neural network architectures, such as LSTM networks, for more nuanced sentiment analysis.
- ****Non-functional Requirement:**** The deep learning models should be trained on a GPU for faster processing.

****5. Social Media Text Processing:****

5.1 **Challenges and Strategies:**

- ****Functional Requirement:**** Implement strategies from the literature for handling informal language and noisy data.
- ****Non-functional Requirement:**** The system should include a preprocessing module to clean and normalize social media text.

5.2 **Adaptation for Azerbaijani Language:**

- ****Functional Requirement:**** Account for linguistic and cultural nuances specific to the Azerbaijani language.
- ****Non-functional Requirement:**** The system should support Unicode and character encoding for processing Azerbaijani text.

****6. Integration of Azerbaijani Language:****

6.1 **Sentiment Analysis Data Recognition:**

- ****Functional Requirement:**** Develop strategies for recognizing sentiment analysis data relevant to the Azerbaijani language.
- ****Non-functional Requirement:**** The system should include a comprehensive dataset of Azerbaijani social media content for training and testing.

6.2 **Linguistic and Cultural Considerations:**

- ****Functional Requirement:**** Integrate linguistic and cultural considerations into the sentiment analysis model.
- ****Non-functional Requirement:**** The system should be adaptable to linguistic variations in Azerbaijani sentiment expressions.

****7. Software and Tools:****

7.1 **Google Colab:**

- ***Functional Requirement:*** Utilize Google Colab for collaborative development and access to GPU resources.
- ***Non-functional Requirement:*** Ensure compatibility with Google Colab's runtime environment.

7.2 **Python and NLP Libraries:**

- ***Functional Requirement:*** Develop the project using Python as the primary programming language.
- ***Non-functional Requirement:*** Choose and integrate NLP libraries (e.g., NLTK, spaCy) based on their compatibility with Azerbaijani language processing.

This comprehensive requirements list outlines the functional and non-functional aspects of the Social Media Sentiment Analysis project, emphasizing the integration of NLP techniques, Python programming, and the use of specific tools like Google Colab.