**AI Tools Assignment Report**

**Student Details**

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**1. Project Title**

**Exploring AI Tools for Text Analysis and Visualization**

**2. Objective**

The objective of this assignment was to explore practical applications of AI tools in natural language processing (NLP) by developing a system capable of analyzing text sentiment and visualizing results through an interactive web app.

**3. Tools and Technologies Used**

| **Tool** | **Purpose** |
| --- | --- |
| **Python 3.13** | Core programming language |
| **Pandas & scikit-learn** | Data analysis and decision tree modeling |
| **spaCy** | Named Entity Recognition (NER) |
| **TextBlob** | Sentiment analysis |
| **Streamlit** | Frontend interface for visualization |
| **Gamma AI** | Presentation creation tool |
| **Jupyter Notebook** | Interactive experimentation and testing |

**4. Implementation Process**

**Task 1 – Exploring AI Tools**

In this phase, a Python script (task1\_iris\_decision\_tree.py) was created to demonstrate data preparation and model training using the **Iris dataset**. The script trained a decision tree classifier to predict flower species, visualizing model performance and demonstrating the power of scikit-learn.

**Task 2 – Text Sentiment Analysis**

A Jupyter Notebook (task2\_sentiment\_analysis.ipynb) was developed using **TextBlob**. The model analyzed a set of text samples, classifying them as *positive*, *negative*, or *neutral*. It also measured **polarity** and **subjectivity** scores to determine emotional tone.

**Task 3 – Streamlit Web App**

A creative Streamlit app (streamlit\_app/app.py) was built to let users type any sentence and instantly get a sentiment result.  
The app displayed:

* The original input text
* Polarity and subjectivity scores
* A friendly sentiment interpretation

This made sentiment analysis more interactive and visually engaging.

**5. Key Results & Findings**

* Successfully implemented three distinct AI tools: **scikit-learn**, **spaCy**, and **TextBlob**.
* Developed a **fully functional web app** that performs real-time sentiment analysis.
* Learned how to integrate multiple AI frameworks into a single cohesive system.
* Enhanced understanding of **machine learning workflows** and **NLP pipelines**.

**6. Challenges Faced**

* Model installation issues (e.g., missing spacy and en\_core\_web\_sm model).
* Compatibility with Python 3.13 requiring environment setup.
* Streamlit dependency installations (textblob, spacy) for successful app deployment.

These challenges were overcome through systematic debugging and dependency management.

**7. Conclusion**

This project demonstrated the power and versatility of modern AI tools in analyzing and understanding language. From data modeling with decision trees to building an NLP web app, the assignment fostered hands-on experience with real-world AI techniques and creative problem-solving.