Social Media Sentiment Analysis and Content Performance Dashboard

**Project Definition Document (PDD)**

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**Project Consultant:** BSc CS, Riad Ibadulla

**Project Proposed by:** Self  
**Proprietary Interests & Agreements:** No proprietary interests or external agreements.  
**Promises & Commitments:** The project will strictly adhere to university guidelines and ethical considerations.  
**Word Count:** 825 words

**1. Proposal – Problem to be Solved**

**1.1 Problem Statement**

The rise of social media has increased the need for real-time sentiment analysis. Individuals and businesses struggle to track audience engagement and comments across platforms like Twitter, YouTube, Reddit, Instagram, and WhatsApp. Existing tools:

* Provide **basic sentiment analysis** but lack deep insights.
* Are **platform-restricted**, requiring users to check each service separately.
* Do not offer **actionable recommendations** based on sentiment trends.

This project aims to build a **website that reviews content creators’ public comments using sentiment analysis**. The system will have two tiers: **Basic and Premium (where it would be behind a paywall)**.

* **Basic (MVP to be delivered first)**: Provides a **percentage breakdown of sentiment** (positive, negative, neutral, constructive, indifferent) and ranks user engagement using a **hexagonal radar chart** or a **percentage loading circle** and other **engagement scores**.
* **Premium (Future Extension)**: Offers an **in-depth sentiment breakdown**, AI-generated summaries, insights on **narrative management**, and a **personalised chatbot** (LLM-based assistant) to advise users on content.

I believe such a website application would be a content creator goldmine.

If time permits, additional features will be implemented beyond the MVP.

**1.2 References to Existing Work**

The project builds upon already existing sentiment analysis frameworks:

* **NLTK & TextBlob** (Loper & Bird, 2002) – Basic sentiment processing.
* **VADER Sentiment Analyzer** (Hutto & Gilbert, 2014) – Optimized for social media.
* **Hugging Face Transformers** (Wolf et al., 2020) – State-of-the-art NLP models.
* **Chart.js for visualization** – Widely used for dynamic charts in web applications.

These references provide the foundation for the sentiment analysis model and visualisation techniques to be used in this project.

**2. Proposal – Project Objectives**

**2.1 Main Objective**

This project aims to **develop a web-based application** that allows users to analyse sentiment on social media comments and visualize trends using an interactive dashboard.

**2.2 Sub-Objectives**

1. **Develop a Flask-based backend** for sentiment analysis using Python NLP libraries.
2. **Design a PostgreSQL database** to store user inputs and sentiment results.
3. **Create a web interface** using HTML, CSS, and JavaScript for input and visualization.
4. **Integrate Chart.js** for displaying sentiment trends dynamically.
5. **Implement a hexagonal radar chart** for a **detailed sentiment overview**.
6. **Deliver the Basic (MVP) version first** and add additional Premium features if time permits.
7. **Ensure API scalability** for potential cross-platform expansion.
8. **Develop a premium AI-driven chatbot** for personalized insights.

Each objective will be assessed based on its **functionality, performance, and user feedback**.

**3. Proposal – Project Beneficiaries**

|  |  |
| --- | --- |
| **Beneficiary** | **Benefit** |
| Content Creators | Understand audience sentiment and impression. |
| Social Media Managers | Improve brand perception and engagement. |
| Businesses | Analyse customer feedback at scale. |
| Marketing Analysts | Track real-time sentiment trends in social media. |
| Researchers | Study online sentiment variations and user behaviour. |

**4. Proposal – Work Plan**

**4.1 Development Timeline**

|  |  |  |
| --- | --- | --- |
| **Phase** | **Tasks** | **Timeframe** |
| **Setup** | Install Flask, PostgreSQL, and Chart.js. | Weeks 1-2 |
| **Backend** | Develop API endpoints for sentiment analysis. | Weeks 3-4 |
| **Database** | Design & implement PostgreSQL schema. | Weeks 5-6 |
| **Frontend** | Develop HTML/CSS/JavaScript UI. | Weeks 7-8 |
| **Feature Expansion** | Implement Twitter API integration. | Weeks 9-10 |
| **Testing & Refinement** | Conduct UI/UX and API testing. | Weeks 11-12 |
| **Deployment** | Deploy using Heroku/Render & finalize docs. | Weeks 13-14 |

A Gantt chart detailing project milestones is available down below.

A graph with blue squares

Description automatically generated with medium confidence

**5. Proposal – Risks to the Project**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Learning Curve with Flask | Medium | Medium | Follow online tutorials & documentation. |
| API Rate Limit Issues | High | High | Use pre-existing datasets for testing. |
| Ethical Concerns | Medium | High | Analyse **only public comments**, ensure GDPR compliance. |
| UI Development Delays | Medium | Medium | Use Bootstrap to streamline UI development. |
| Unexpected Errors | High | High | Maintain frequent backups & debugging logs. |

**6. Legal, Social, Ethical, and Professional Issues (LSEPI)**

**6.1 Data Privacy and Compliance**

* The project will **only analyse publicly available data** to comply with GDPR.
* No personally identifiable data (PII) will be collected or stored.

**6.2 Ethical Issues**

* **Bias in sentiment analysis models**: Multiple models will be tested to ensure fairness.
* **Potential misuse of the tool**: Terms of Service will include prohibited use cases.

**7. Research Ethics Checklist**

|  |  |
| --- | --- |
| **Ethical Consideration** | **Actions Taken** |
| **Use of Public Data** | No private user data will be stored. |
| **Data Storage** | Sentiment results stored **without usernames**. |
| **Bias in AI models** | Models will be tested for fairness. |

**8. References**

* **Loper, E., & Bird, S. (2002). NLTK: Natural Language Toolkit.**
* **Hutto, C., & Gilbert, E. (2014). VADER: A Parsimonious Rule-based Model for Sentiment Analysis of Social Media Text.**
* **Wolf, T., et al. (2020). Transformers: State-of-the-Art Natural Language Processing.**

**9. Approval of the PDD**

By submitting this PDD, I confirm that:

* The project meets the **module requirements**.
* Ethical considerations have been addressed.
* Any major changes will require **approval from my project consultant**.

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**Date:** 01/02/2025