

Written Capstone Project Report

Senior Seminar

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Prompt: Review what problem you worked on, what your final project does, what you learned in the course of working on this project, and what you would do differently or next if you were to either start over or continue working.

The act of journaling has long been recognized as a valuable tool for self-reflection and emotional well-being. However, traditional journals often lack the ability to provide users with insightful feedback and analysis of their emotional state. Sentimento was developed to bridge this gap by offering a dynamic and engaging journaling experience. This report aims to provide a comprehensive review of the problem we worked on, the functionality of the final project, our learnings throughout the development process, and our plans for future improvements.

Our team set out to address the limited functionality of traditional journals in providing meaningful insights into users' emotional well-being. We identified the need for a journaling platform that could not only capture users' thoughts but also analyze and visualize their emotional states over time. Traditional journals often lack the means to provide users with immediate feedback or analysis of their emotional state, which restricts their ability to track emotional patterns and gain valuable insights. Sentimento aims to address this by incorporating natural language processing and emotion detection algorithms to analyze journal entries and provide users with real-time feedback.

Sentimento is a desktop application that reinvents the journaling experience by incorporating advanced features to enhance emotional analysis and visualization. Upon logging into Sentimento, users are greeted with a clean and user-friendly interface. They can easily navigate to the journal entry page, where they can type and submit their thoughts and feelings.

Sentimento utilizes natural language processing techniques to scan journal entries for emotive words. These words are then categorized into percentages representing different emotions such as happiness, sadness, anger, fear, and surprise. The application generates a color for each day based on the RGB values associated with these emotions, providing users with a visual representation of their emotional state.

Furthermore, Sentimento allows users to log in or create an account tied to a database. This feature enables users to store and access their journal entries at any time, providing a seamless experience across devices. Users can view their past entries, track their emotions over time, and gain valuable insights into their emotional well-being.

One of the key features of Sentimento is the ability to generate a "Color of the Day" based on the emotional content of each journal entry. This color represents the overall mood of the day and provides users with a quick visual summary of their emotional state. By tracking these colors over time, users can identify patterns and gain a deeper understanding of their emotional well-being. Sentimento also offers the functionality to view journal entries on a weekly, monthly, or yearly basis. Users can explore trends and changes in their emotions over time, allowing for self-reflection and personal growth. Additionally, users have the option to customize their color scheme, further personalizing their journaling experience.

Throughout the development process, our team focused on extensive research, learning, and building the React frontend as a proof of concept. We researched and tested different natural language processing and associated Python libraries to find the most suitable solution for our project. After thorough evaluation, we decided to integrate the En-Textcat-GoEmotions library, which is a spaCy pipeline trained on the goemotions dataset from Google Research. This library provided accurate emotional analysis of the journal entries, allowing us to categorize emotive words and generate the appropriate color representation.

In addition to frontend development, we invested time in familiarizing ourselves with Flask and SQLite for the backend functionality. We created a simple Python program that accepts a journal entry file and returns a table of values indicating the user's emotional state based on the text. This program was integrated into the Flask app, allowing the frontend to make requests and receive the emotional analysis results. However, we encountered challenges with the database implementation. While we successfully performed some database operations, we did not have a fully functional database ready for the demo. We had initially opted for SQLite as our database solution but later decided to switch to Postgres, which caused some delays in the development process. Despite these challenges, we learned valuable lessons about database management and integration, and we are committed to resolving these issues in future iterations of Sentimento.

Throughout the development process, we maintained a collaborative and structured approach to project management. We designated clear responsibilities among team members, ensuring that each aspect of the project was properly addressed. Regular meetings and constant communication allowed us to stay on track and address any challenges or roadblocks promptly.

By setting due dates and conducting progress status reports, we were able to track our progress and make necessary adjustments to meet our milestones.

While Sentimento has reached a functional state with its current features, there are several areas we plan to further enhance and expand upon in the future. These include:

- **Graphs and Trendlines:** We aim to provide users with visual graphs and trendlines to represent their emotional patterns over different time intervals, such as weekly, monthly, and yearly. This will enable users to gain deeper insights into their emotional well-being and identify long-term trends.
- **Resources for Emotions:** In addition to emotional analysis, we plan to incorporate resources such as articles, YouTube videos, and relevant links based on the emotions expressed in the journal entries. This feature will provide users with additional support and guidance in managing their emotions.
- **Integration with Other Apps:** We recognize the value of integrating Sentimento with other productivity and mental health apps. By seamlessly connecting with existing platforms, we can provide a more comprehensive experience for users, allowing them to consolidate their journaling and emotional well-being efforts.
- **Goal Tracking:** We plan to introduce a goal tracking feature, enabling users to set personal goals related to their emotional well-being and track their progress over time. This will further empower users to actively work towards their emotional growth and development.
- **Database Functionality:** We are committed to resolving the database challenges we encountered during the development process. Our goal is to ensure a robust

and efficient database system that can handle large volumes of user data while maintaining data integrity and security.

- **Separate Builds for Production and Development:** To streamline the deployment process, we plan to implement separate builds for production and development environments. This will allow for easier testing and debugging during the development phase and ensure a stable and optimized application for production use.
- **Functional User Accounts:** While we have implemented the login feature, we aim to enhance user account functionality by providing additional options such as password recovery, account customization, and seamless synchronization across multiple devices.

Sentimento represents a significant step forward in reinventing the journaling experience. By incorporating natural language processing, emotion detection, and visual representation of emotions, we have created a powerful tool for users to gain insights into their emotional well-being. Despite the challenges we faced during the development process, we have learned valuable lessons and have a clear roadmap for future improvements. Sentimento has the potential to make a positive impact on individuals' mental health by providing them with a deeper understanding of their emotions and supporting their personal growth and well-being. With further enhancements and refinements, we are confident that Sentimento will continue to evolve as a leading journaling platform in the market.