**Final Report Group 8 “WeatherVision”**

By: Bilal Ahmed, Jeth Balabagno, Hazzem Cordash, Elijah Kruse, Timothy Xiong, Julian Moreno-Johns

# Introduction

In our senior capstone project, we developed a weather application integrated with a trip planner. After consulting with our professor, we established the project's feasibility. Last semester involved detailed planning, while this semester focused on implementing those plans. Demonstrating our practical computer science skills was our primary objective. This report details our process of transforming ideas into a functional real-world application.

## Potential Societal Impact

Our project, creating a weather app with a trip planner, aims to make a real difference for people and society. By helping users plan trips with weather in mind, we aim to enhance travel safety. This means travelers can make smarter choices, potentially reducing accidents caused by bad weather. Plus, promoting better travel habits aligns with broader goals of sustainability and safety on the roads.

# Project Development

## Design Methodology

Our project's design journey kicked off with brainstorming sessions and the creation of high-level design diagrams, gradually refining them into lower-level plans. Every team member actively participated in this phase, offering their unique insights.

The backend team, including Julian, EJ, and Tim, worked on design documents for software and database design. The frontend team, consisting of Bilal, Hazzem, and Jeth, focused more on the page prototypes and the state machine diagram.

Following the design phase, we began coding. The backend team set up the server and defined basic models, while the frontend team developed the home and weather page displays. We completed the core components of our application and then integrated additional features like the trip planner and user profile settings through iterative development.

## Technologies Used

We chose **JavaScript** as the primarylanguage, leveraging its versatility and widespread adoption in web development. We employed **Node.js** as our runtime environment, using its capabilities to execute JavaScript code server-side. For building our application framework, we turned to **Express.js**, which provided us with a good platform for developing server-side applications. **SQLite** served as our database management system, offering efficient storage and retrieval of user and trip data. For testing, we used the **Mocha** framework. Additionally, we integrated **OpenWeatherMap** APIs to access real-time weather data, enabling users to plan their trips based on current weather forecasts. Our frontend team put together many **HTML** pages and used maps from **HERE API** to display geographical data.

## Technical Components, Features, and Architecture

On the backend, Sequelize ORM with SQLite forms the backbone of database management, ensuring data reliability and integrity. Express.js orchestrates the backend server, defining routes for authentication, profile management, and weather data retrieval. And again, integration with the OpenWeatherMap API gives the application with real-time weather updates, enhancing user experience. The backend's testing suite validates Sequelize models, employing assertions and try-catch blocks to ensure functionality and integrity across various scenarios.

Meanwhile, the frontend interface offers users a dynamic and intuitive experience. HTML documents outline distinct functionalities. User account management functionalities are facilitated through input forms. And HERE API is leveraged for map display, enhancing user interaction and engagement. The frontend dynamically populates user information, ensuring a personalized touch to the user experience.

Overall, the integration of frontend and backend components results in an application that offers users a reliable platform for journey planning while considering real-time weather conditions.

# 

# Teamwork Retrospective

## Individual Contributions

Our team worked well together and we each did our part. Here are some of the contributions each individual made towards the project:

**EJ:**

* Designed Database Diagrams
* Updated the Trello Board
* Helped with Presentation Preparation
* Implemented Backend Functionalities
* Created Backend Unit and Acceptance Tests
* Formatted and Refactored Backend Code

**Julian:**

* Set up OpenWeatherAPI key
* Helped implement “Current Weather” logic.
* Helped implement “Trip Planner” logic.
* Implemented “User Dashboard” component and logic.
* Helped with some front end components (mainly nav bar).
* Helped with presentations and presented

**Tim:**

* Backend Login
* Backend Trip Planner
* Backend Debugging (This took A LOT of time)
* Designed Class Diagram
* Helped with Database Diagram

**Jeth:**

* Worked on Database Diagram
* Designed Prototypes
* Helped with Front End Programming
* Designed and Implemented the Profile Page
* Helped with the Trip Planner, adding dates
* Made many Presentations and Presented in Class

**Bilal:**

* Frontend for Login Page + Home Page
* Frontend for Current Weather Page
* Frontend for Trip Planner
* Designed State Diagrams
* Designed Logo & Icons
* Refactored Frontend code

**Hazzem:**

* Frontend Login
* Frontend Current Weather page
* Frontend Trip Planner
* General frontend assistance all around
* Assisted with State Diagrams

## Meeting Schedule

Meetings were utilized like a typical sprint meeting. We met Tuesdays and Thursdays at 6PM CST online through zoom. All of these meetings were online due to conflicts of work and commuting. We mainly went through all the tickets we are working on or finished on the trello board. If we needed any help or collaborations, we extended the meetings to our individual front and back end teams. These meetings overall averaged about 30 minutes max for the trello board updates and discussion on assigning tickets. For the collaboration and questions about the code, it averaged about 1 hour, 2 hours max. Some days if we needed immediate help, we would hop on call whenever to help each other out.

## Key Challenges

First challenge we had to face was learning a lot of these new technologies. Node.js was new to a lot of us, doing external research and learning to adapt to the new environment was a huge slump we had to overcome that took us weeks. But after the use of it and experience, we had it down and it's something that’s going to be in our development tool kit for the rest of our careers.

Next challenge we faced was balancing our time with our times to develop our application. With this project there is no time that you have certain due dates like in our classes we had in the past. We had to really make the time to do our own work that we had to finish.

Continuing on with balance a lot of us had full time jobs, religious commitments, and athletics we had to balance as well. Again, with no due dates and scheduling on these matters, we had to learn how to balance those with this project as well. It might have been hard at the start, but we are confident to say that we are better because of it.

## Teamwork Reflection

Throughout our project, the team consistently showcased commendable collaboration and effective communication. Each member did their part, helped others if they needed it, and were not afraid to ask questions.

Although our teamwork was generally effective, there were certainly areas where we could have improved. Firstly, maintaining better organization by consistently updating and utilizing our Trello board would have enhanced our workflow. Secondly, paying closer attention to update guidelines and expectations would have ensured that our work aligned more closely with project requirements. Lastly, beginning our tasks earlier in the week could have provided us with more time for thorough planning and execution. Implementing these improvements would have likely resulted in better grades for our updates and reduced stress associated with last-minute project management.

However, we will learn from this experience and incorporate these lessons into future projects beyond this course, striving for greater success in the professional world.

# Conclusion

In conclusion, our journey with the "WeatherVision" project has been both challenging and rewarding. From the initial stages of brainstorming and design to the culmination of development and teamwork, we've witnessed the transformation of our ideas into a tangible application. Our aim to showcase practical computer science skills through this project has been met with considerable success.