MICHIGAN STATE UNIVERSITY

Project Plan Presentation

United Airlines Training Forecast Model

The Capstone Experience

Team United Airlines Training

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From Students…
…to Professionals

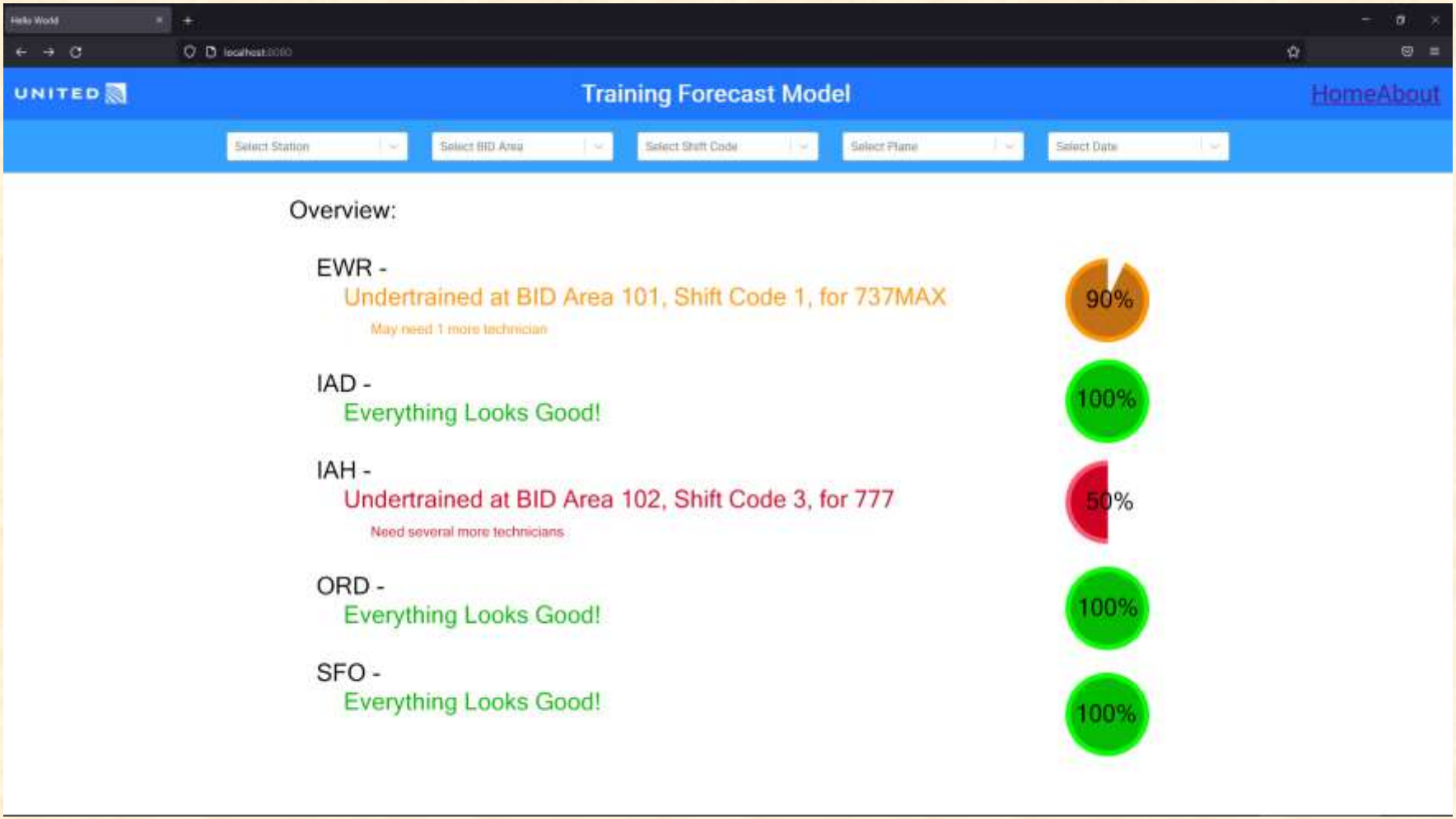
Functional Specifications

- United Airlines training team will be able to use this application to ensure each station has sufficient line and base technicians to operate on the flights
- The application will give a risk dashboard to display which station(s) are at greatest risk moving forward
- Each station can also have a more detailed report pulled up to analyze risk on a by shifts and by fleet level

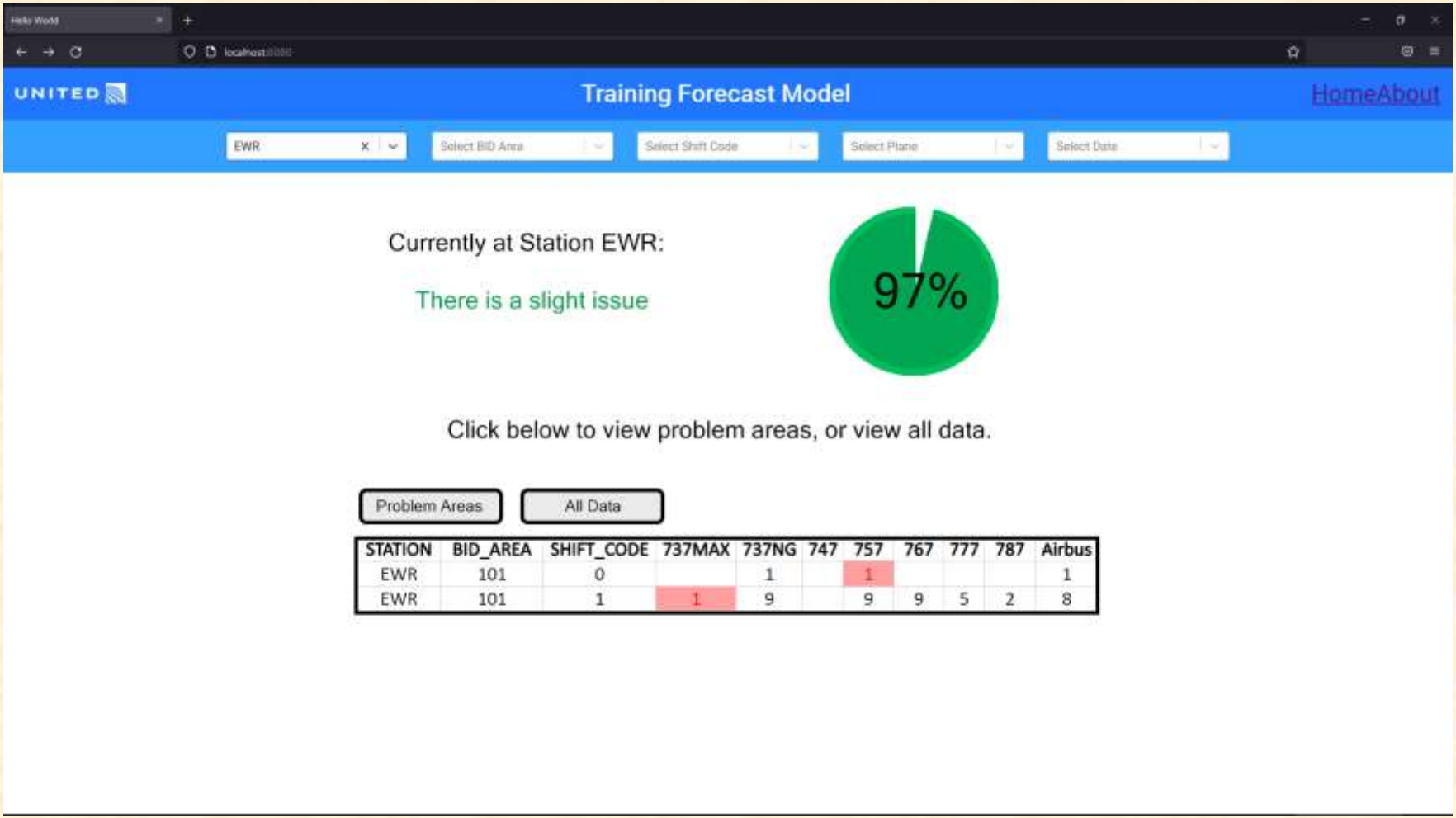
Design Specifications

- The training forecast model will be built as a Web Application to help better forecast where training needs to be focused on during the right time across several United Hubs.
- With the use of the Web Application, the training team will be able to select and sort by various categories to view a forecast of the current technicians' training situation.
- The forecast will display the users the number of technicians as well as the potential understaff situation that could occur.

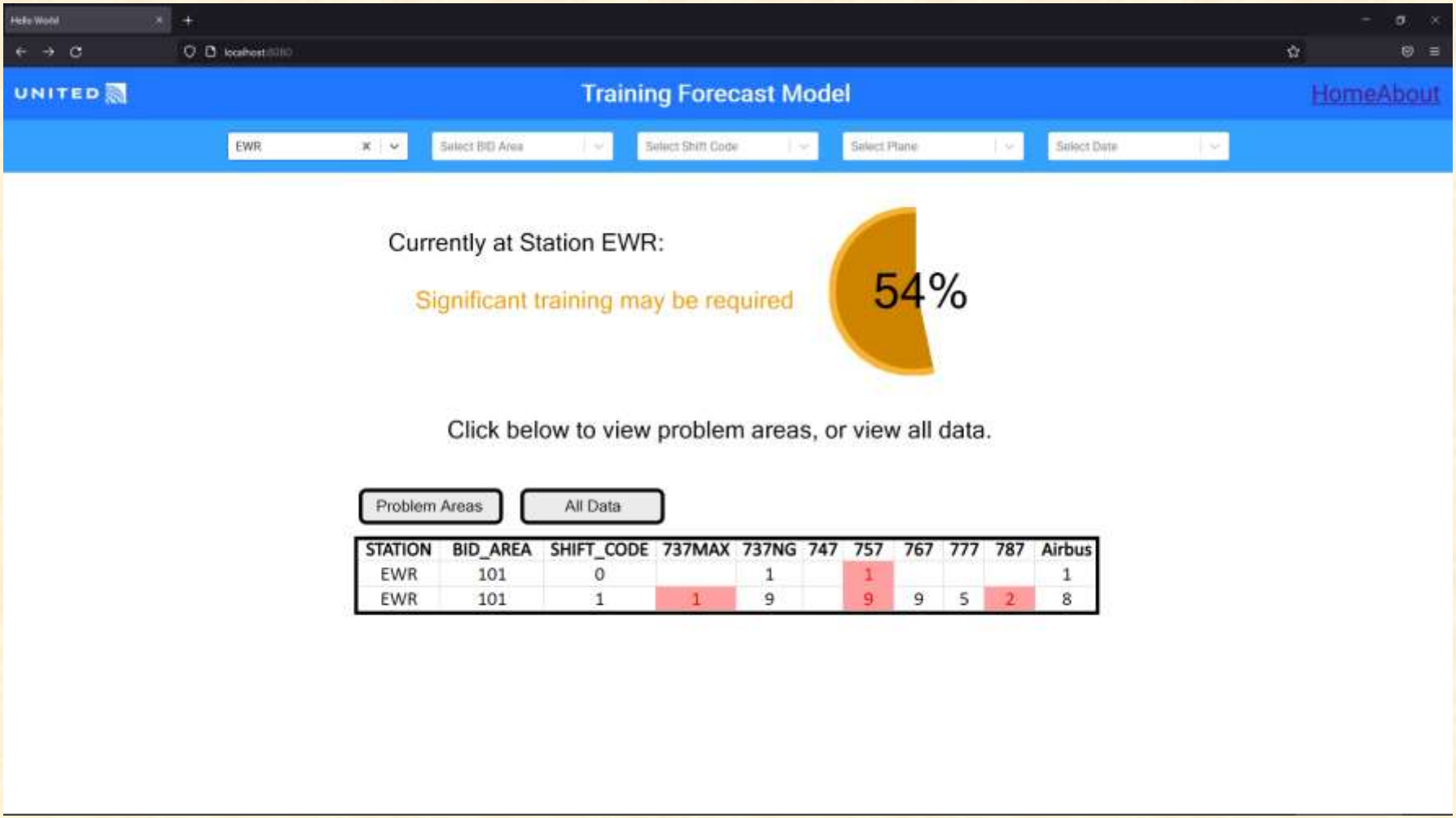
Screen Mockup: Overview Page



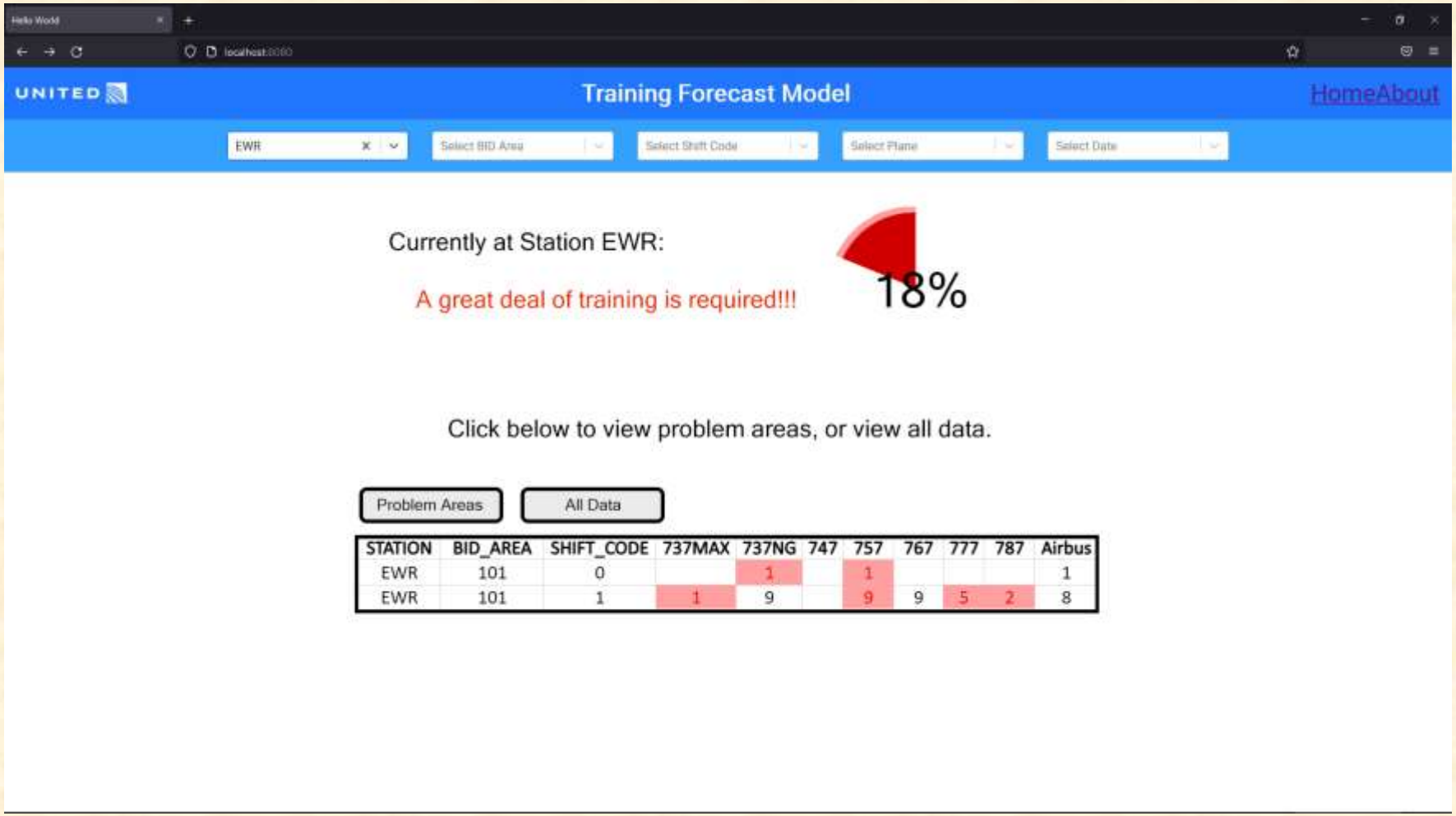
Screen Mockup: Training Forecast



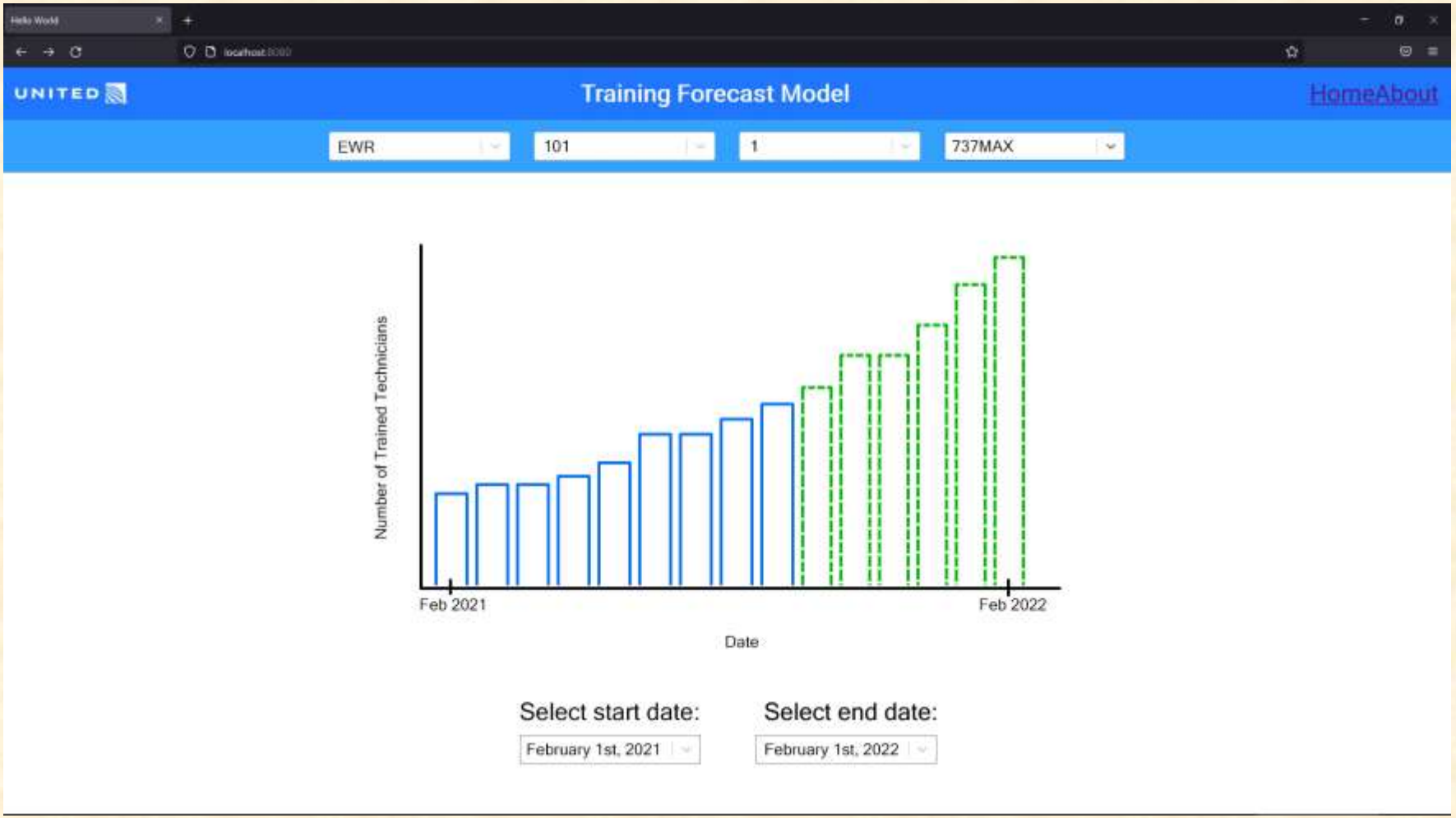
Screen Mockup: Training Forecast



Screen Mockup: Training Forecast



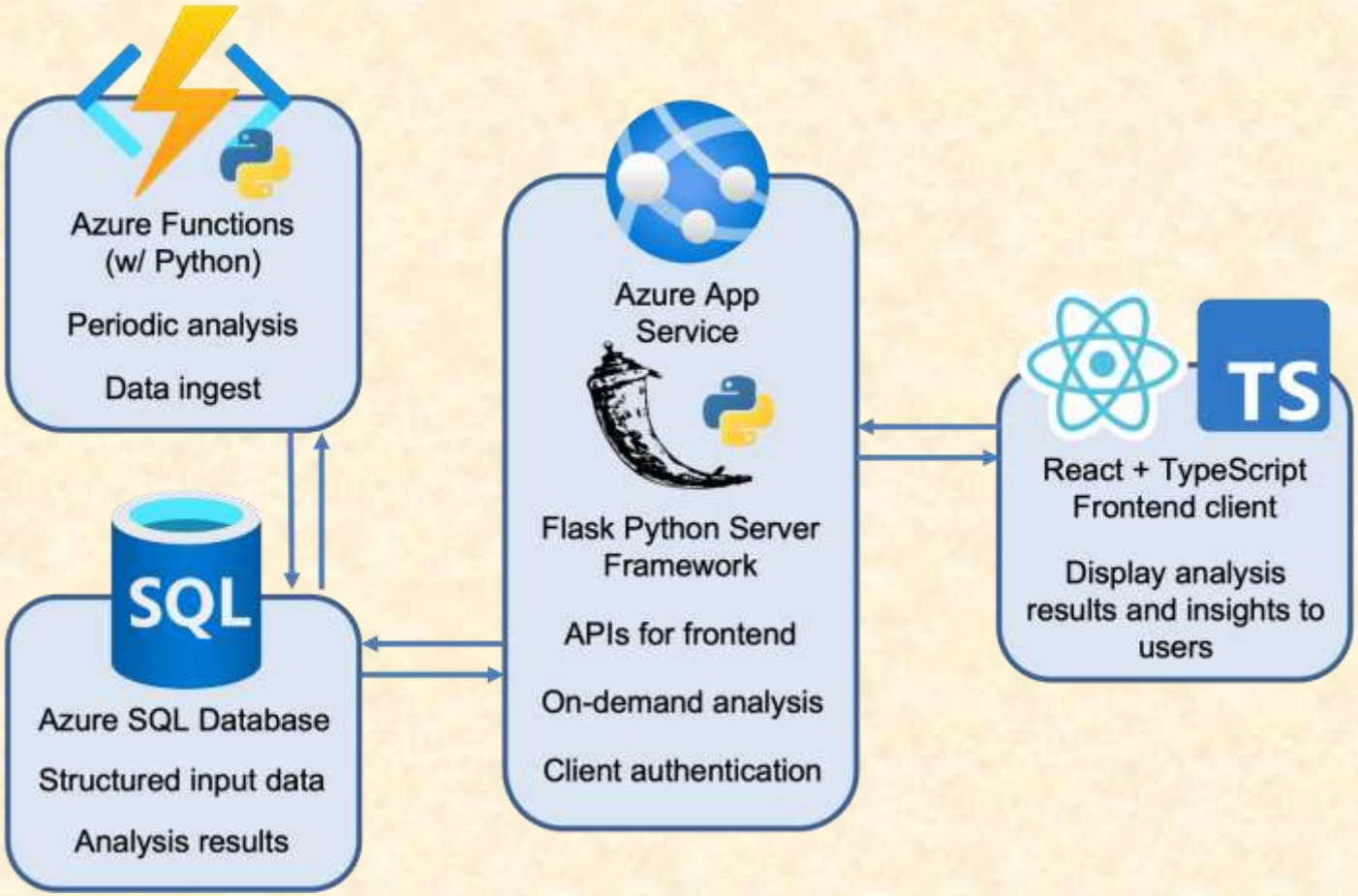
Screen Mockup: Prediction



Technical Specifications

- We store data on flight schedules and trained technicians in an Azure SQL Database
- Azure functions are responsible for ingesting this data and performing periodic analysis
- We use a Flask web server in Azure App Service to manage client authentication and serve the APIs for our frontend
- Analysis code is written in Python and can be reused by our server and our serverless functions
- User authentication will utilize Azure AD and its integration with other Azure services
- Our frontend client is written in TypeScript with the React framework

System Architecture



System Components

- Cloud Services
  - Azure App Service
    - PaaS offering that will host our backend server and serve our APIs
  - Azure SQL DB
    - Microsoft compatible SQL database
    - Store structured input data and analysis results
  - Azure Functions
    - Serverless functions, will use for periodic analysis and data ingest
- Software Platforms / Technologies
  - React with TypeScript
    - Frontend JavaScript framework, will use with TypeScript for typing support
  - Flask
    - Python framework for web server development
  - Azure SDK for Python
  - Python Data Science Libraries
    - Pandas, NumPy, etc. used for analysis
- Development Software
  - Visual Studio Code

Risks

- Determine the number of necessary technicians for different bases
  - Different airports have different amounts of traffic, and there is a lot of data to sort through to ensure the number is calculated correctly
  - Request a walk-through on the document from the client and make sure all team members comprehend the format
- Connecting the backend with the frontend
  - Connecting the two separate systems will be challenging, as they will be mostly developed independent of each other
  - Devs on both sides will meet to live code integration. Some proof-of-concept API connections for testing should take place early in the process.
- Authentication of API Calls and Frontend Access
  - Data we are handling is sensitive and should not be able to be seen by those unauthorized, and be held securely
  - Will use Azure AD to authenticate users and rely on Azure App Service and other built-in features to ensure security

Questions?