Remaining Battery Life

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Final Presentation

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Problem Being Addressed

- Neware data not easily accessible
- Lab computer physically connected to machine
- Unappealing UI

Web App to View Real-Time Data

Key Partners 🔗	Key Activities ☑	Value Propositions 🎁	Customer Relationships ❤	Customer Segments 👥
Neware Battery Tester & API	Access to Lab Computer, Trello, VSCode, Discord Problem Solving, Communication	All-In-One Dashboard Various Graphs Real-Time Data Extensible Accessible Anywhere, Anytime Easy-to-Use	Respond to Feedback Weekly Updates	Chao Hu & ISU Battery Research Team Future Commercial Market
	Key Resources 🏭		**Channels** 🚚	
	ISU Server Discord Service Tingkai Li		Zoom Meetings Discord Channel & Email Research Lab	

| Cost Structure 🏷		Revenue Streams 💰
Server Usage	ISU Lab Upkeep	Potential Future Product?
Database Storage	CanvasJS Full Version?	

Tools Used

- React packages: Material-ui, Grommet, CanvasJS, JSDoc
- React testing: React testing library
- Database: Spring boot, MySQL
- Database testing: Postman
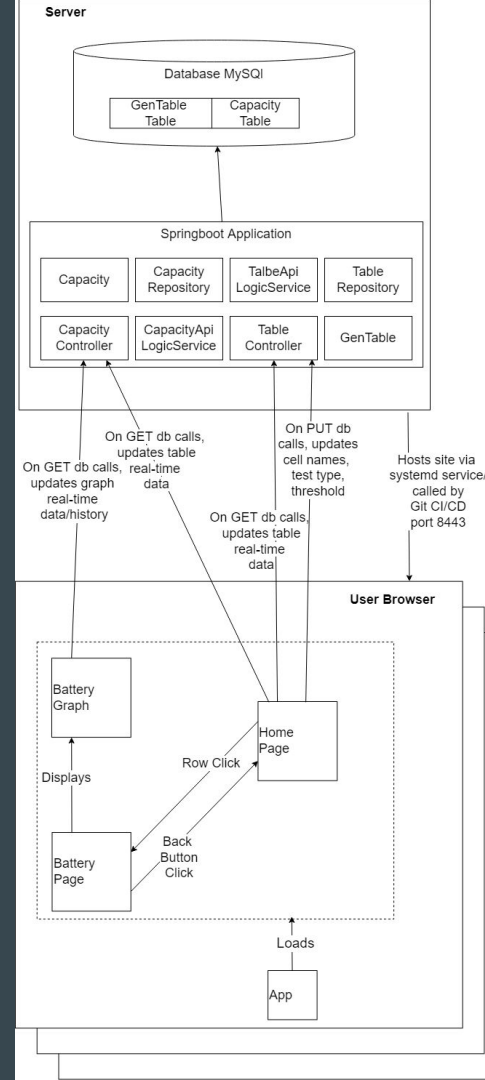- Development: TeamViewer, PuTTy, Visual Studio Code

Software Development Practices

- Modularity
- Unit Testing
- CI/CD & Git Issues
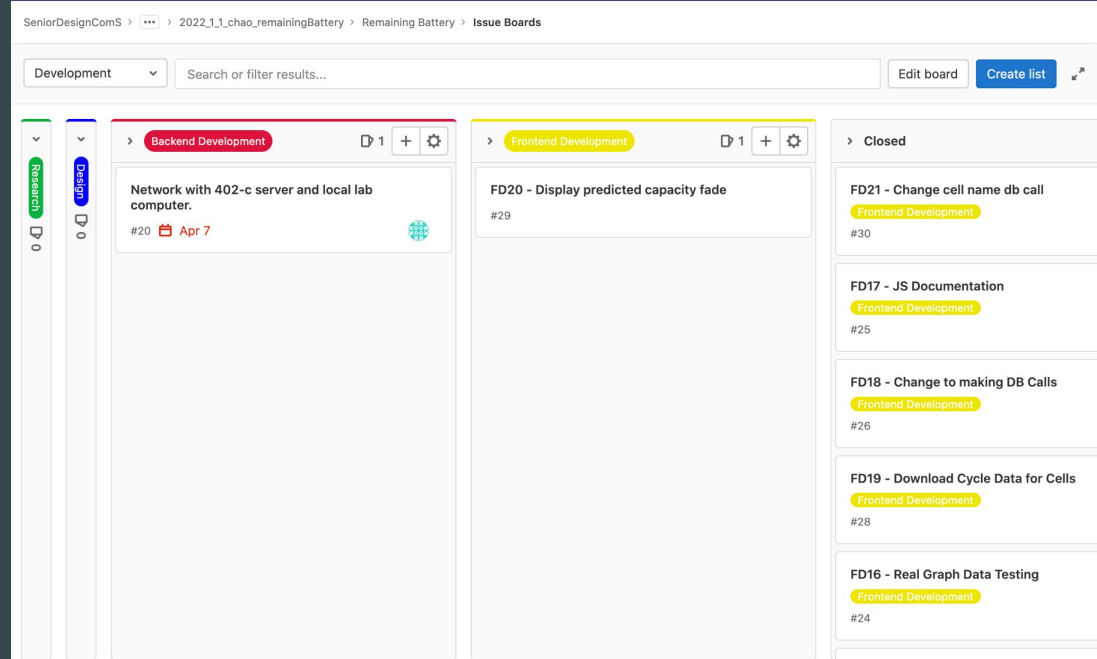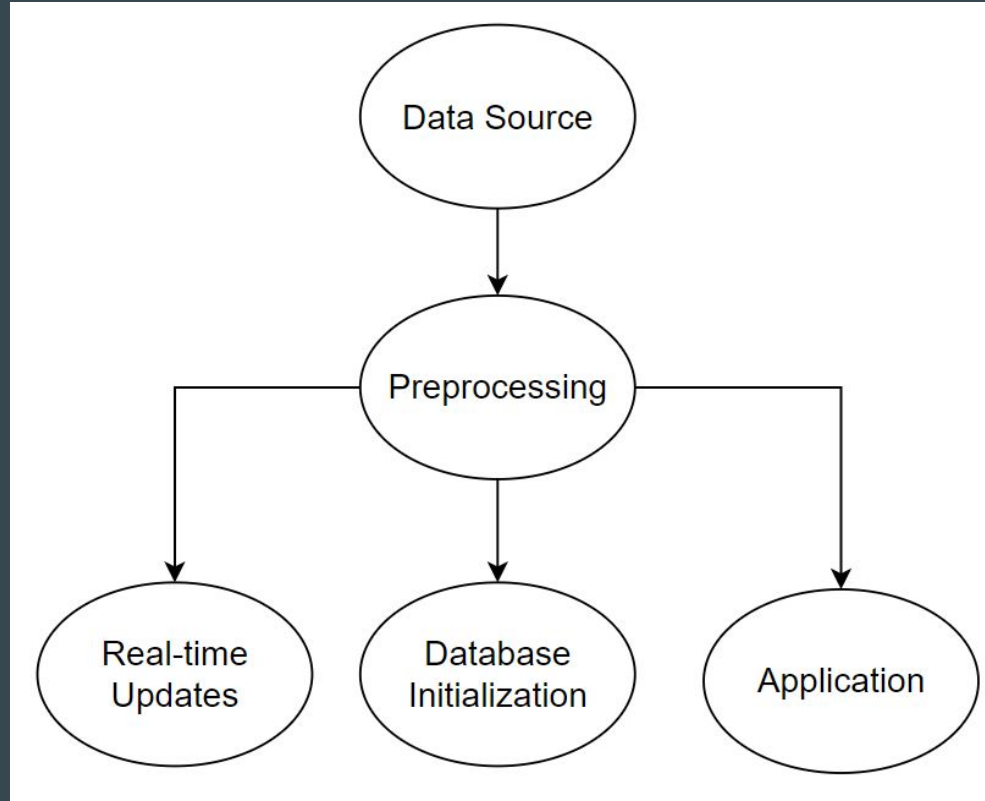
Frontend Design

- ReactJS application
- 2 main screens

Frontend Challenges

- Switch to new graph package, CanvasJS
    - Needed to use trial version
    - Couldn't get free license
- Created new class to solve graph problem
    - Extended CanvasJSChart
    - Increased modularity of code
- Display only data from a particular cell, not a channel
    - Database needed

Backend Design

Backend Design Contd.

- Data Source (data_reader.py)
  - Neware BTSAPI

- Preprocessing
  - XML to pandas' DataFrame
  - .nda files to pandas' DataFrame
  - Data resampling

Backend Design Contd.

- Database Initialization (data_init.py & handler.py)

- Real-Time Updates (runner.py)

- Application
  - Graph data (plot.py)
  - Capacity fade curve prediction (capacity_fade_prediction.py)

Backend Challenges

- Limited BTSAPI documentation.
- Limited BTSAPI functionalities.
- Lack of test environment.
- Ensuring correct graph data.
- Large amount of data.

Database & Networking

- Switch to create Database (Requirement Changed)
- Made two table for Database
  - Table
    - general information like channel id, name, threshold
  - Capacity
    - One to Many relationships with table. Save multiple data
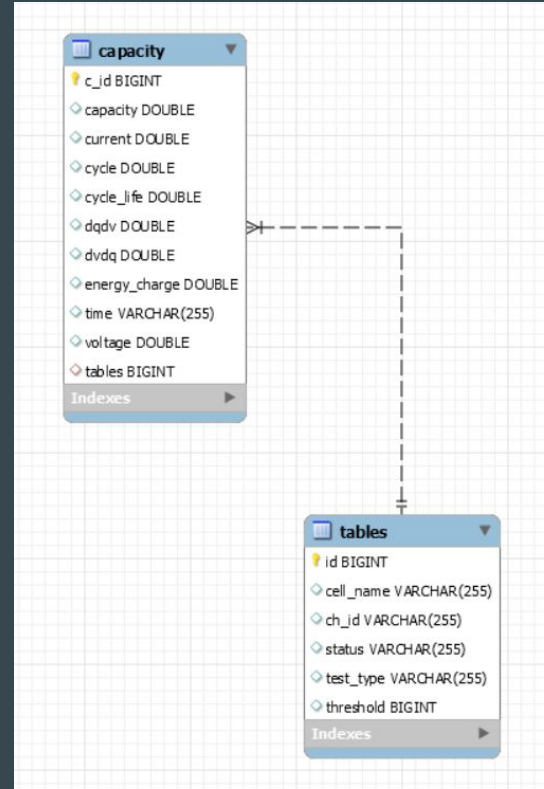
Database & Networking Challenge

- Challenges
  - Implement database & server in short time(1~2 week)
  - Handling a big data(approx ten million data)
  - Finding multiple port

Design & Implementation
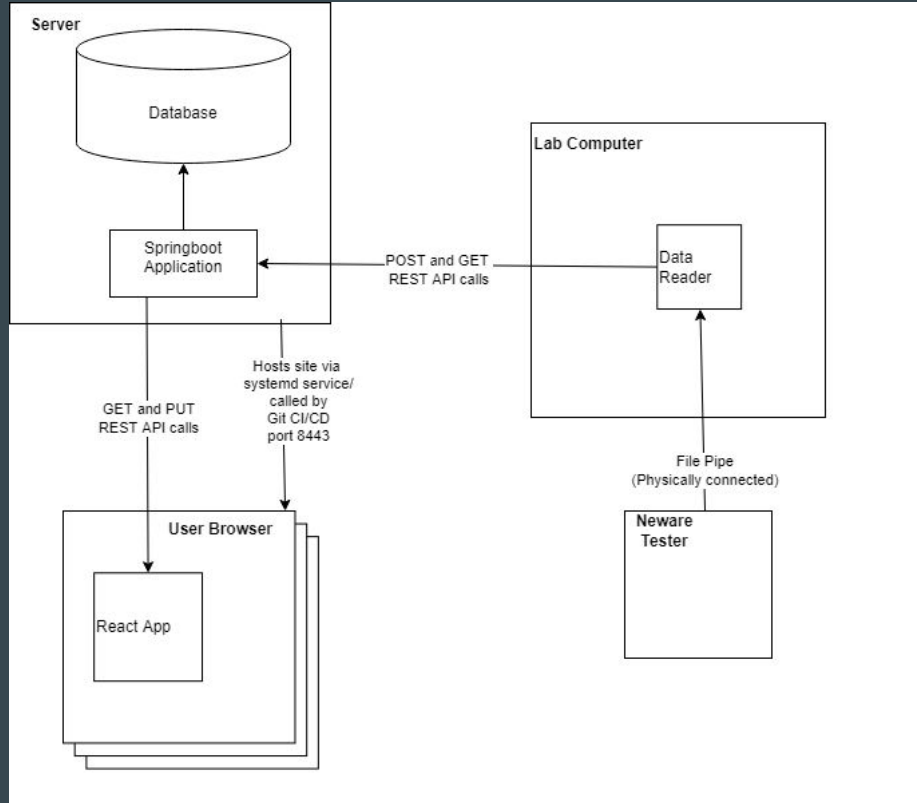
Achievements

- Created web tool to display real-time data in several forms
- Pulled real-time data from Neware tester
- Integrated components with database
- Utilized machine learning code to predict remaining life

General Challenges

- Understanding context of data
  - Types of graphs
  - Expected/reasonable values for data
- Remoting into lab computer
  - Teamviewer crashes
  - Only one user at a time

Contributions

Kathryn

- Fetch from database
- Designed Home page

Evan

- Refactored to CanvasJS
- Designed Battery info page
- Change cell name

Jihoo

- Built database & implemented networking

Aidan

- Push graph, table data to database
- Converted Neware data to usable format

Ken

- Pulled data from Neware testers
- Used ML data to send RUL predictions to database

Demo