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# BeaconFit

By: Spencer Evenson

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# Project Overview

1. Different content should be played at each beacon location.
2. Consider different information based on nearness to beacon.
3. Indicate in some way that there are two or more beacons nearby and allow user to choose.
4. The application should filter out beacons not associated with the application.
5. The engine should map beacons to content.
6. The application should check for updates when started so that additional locations can be added without reinstalling the app.



# Why I Chose This Project Path

- Playing sports throughout my whole life
- Early exposure helped me understand how to use different stations and what exercises to perform
- Many people feel intimidated or confused when first entering a gym
- This app aims to bridge that knowledge gap by guiding users on what each station does and how to use it properly



# Key Features

 Proximity-based workout suggestions

 Intuitive workout tracking interface

 Performance history and analytics

 Workout recommendations

## Home

### Current Stations

BeaconL10

Signal: -31 dBm



You are currently at this station

View Details

Start Workout

### Recently Paused Workouts

Bench Press Station

Paused 15 seconds ago



Resume Workout

### Suggested Next Workout

Bench Press Station

Strength



Home



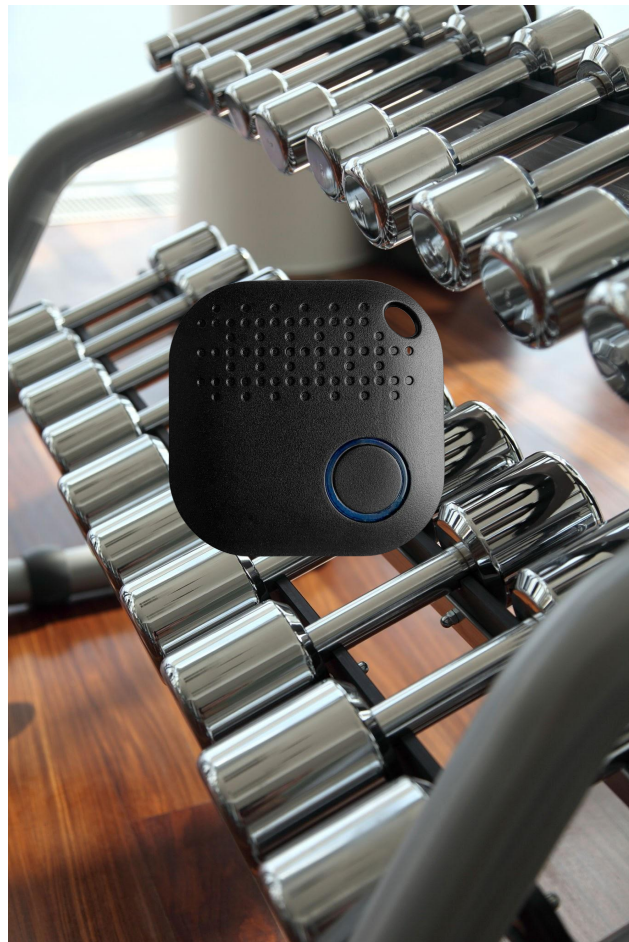
Stations



History

# System Architecture

- iOS App (Swift/SwiftUI)
- Node.js Backend
- MongoDB Database
- Bluetooth Beacons

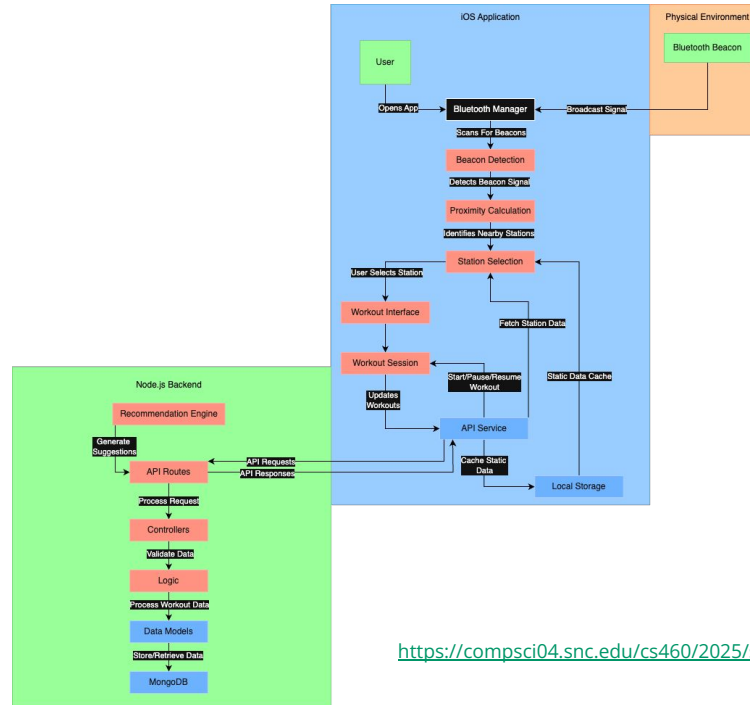


# MongoDB Data

```
{
  "_id": "67e9f5a1af1f97bc9d2bb672",
  "stationId": "station1",
  "name": "Bench Press Station",
  "type": "strength",
  "equipmentName": "Flat Bench Press",
  "location": {
    "area": "Free Weights",
    "position": "southeast corner"
  },
  "imageUrl": "images/bench_press.jpg"
}
```

```
_id: ObjectId('67e9f5a1af1f97bc9d2bb672')
stationId: "station1"
name: "Bench Press Station"
type: "strength"
equipmentName: "Flat Bench Press"
▼ location: Object
  area: "Free Weights"
  position: "southeast corner"
imageUrl: "images/bench_press.jpg"
```

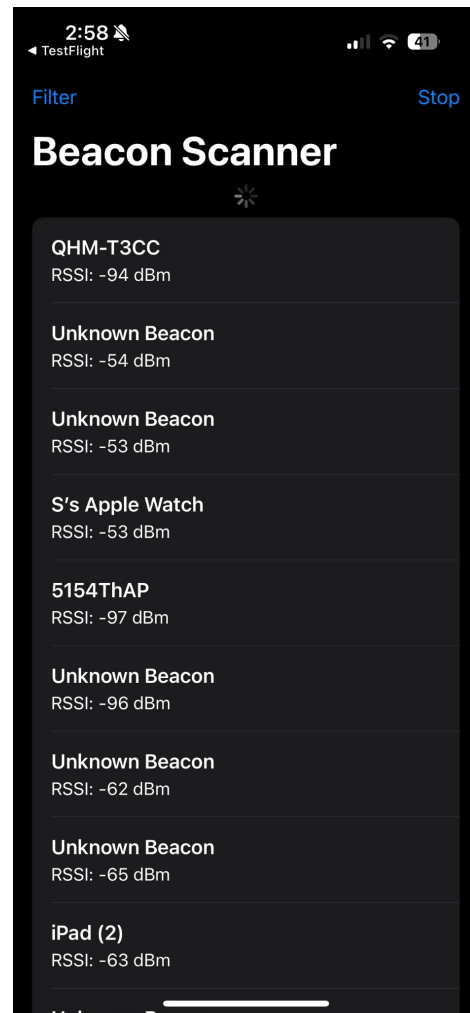
# Data Flow Diagram



<https://compsci04.snc.edu/cs460/2025/spencerevenson/assets/dataflow.svg>

# Meeting Project Requirements

- ✓ Different content at each beacon location
- ✓ Content based on proximity
- ✓ Multiple beacon handling
- ✓ Beacon filtering
- ✓ Beacon-content mapping engine
- ✓ Automatic updates





# Development Process



# Challenges Faced

- iOS Permission Handling
- Bluetooth Testing Limitations
- Apple BLE Privacy Restrictions
- State Persistence
- Date/Time Handling
- Data Synchronization



# Lessons Learned



Permission setup is critical



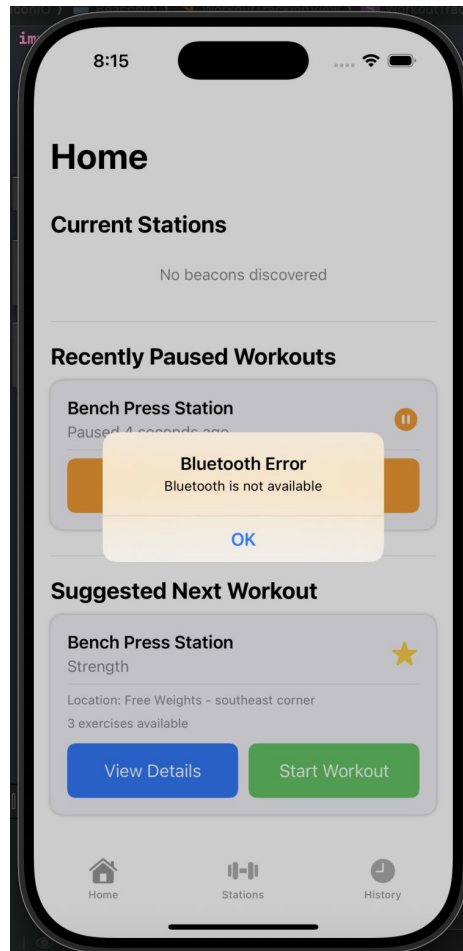
Server deployment verification



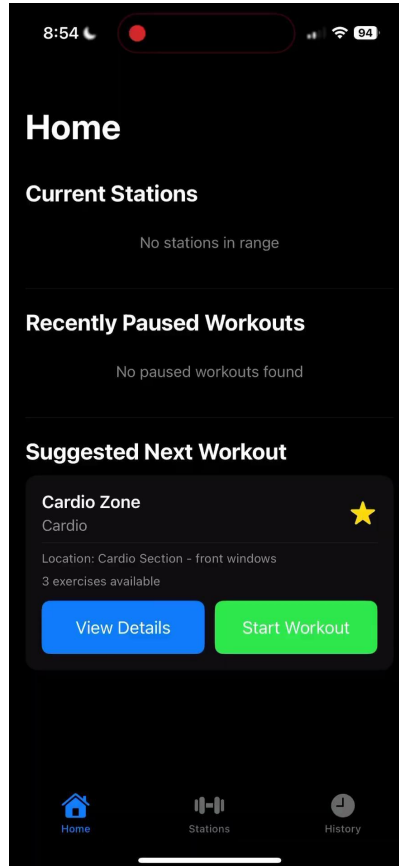
Develop core UI before Bluetooth



Test in real environments



# Demo



# Future Enhancements

🔑 User authentication

👥 Social features

📈 Advanced analytics

🕒 Wearable integration



# Advice for Similar Projects



Handle permissions early



Develop UI before Bluetooth



Test on physical devices



Verify server deployments



Plan for privacy restrictions

# Questions?

**Thank You!**