

REAL-TIME VOICE GUIDANCE SYSTEM FOR THE VISUAL DISABLED PERSON

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INTRODUCTION

Project is dedicated to developing a navigation application tailored for individuals with visual impairments. Utilizing the Real-Time Kinematic (RTK) positioning system along with an array of sensors integrated into smartphones, our application delivers precise and reliable location tracking.

Traditional GPS technology typically exhibits a margin of error ranging from 10 to 20 meters, which poses a considerable challenge for visually impaired users. Furthermore, these individuals often find it difficult to interact with standard phone applications. To address these issues, our application combines the RTK system with comprehensive sensor data to significantly enhance accuracy and reduce errors in positioning.

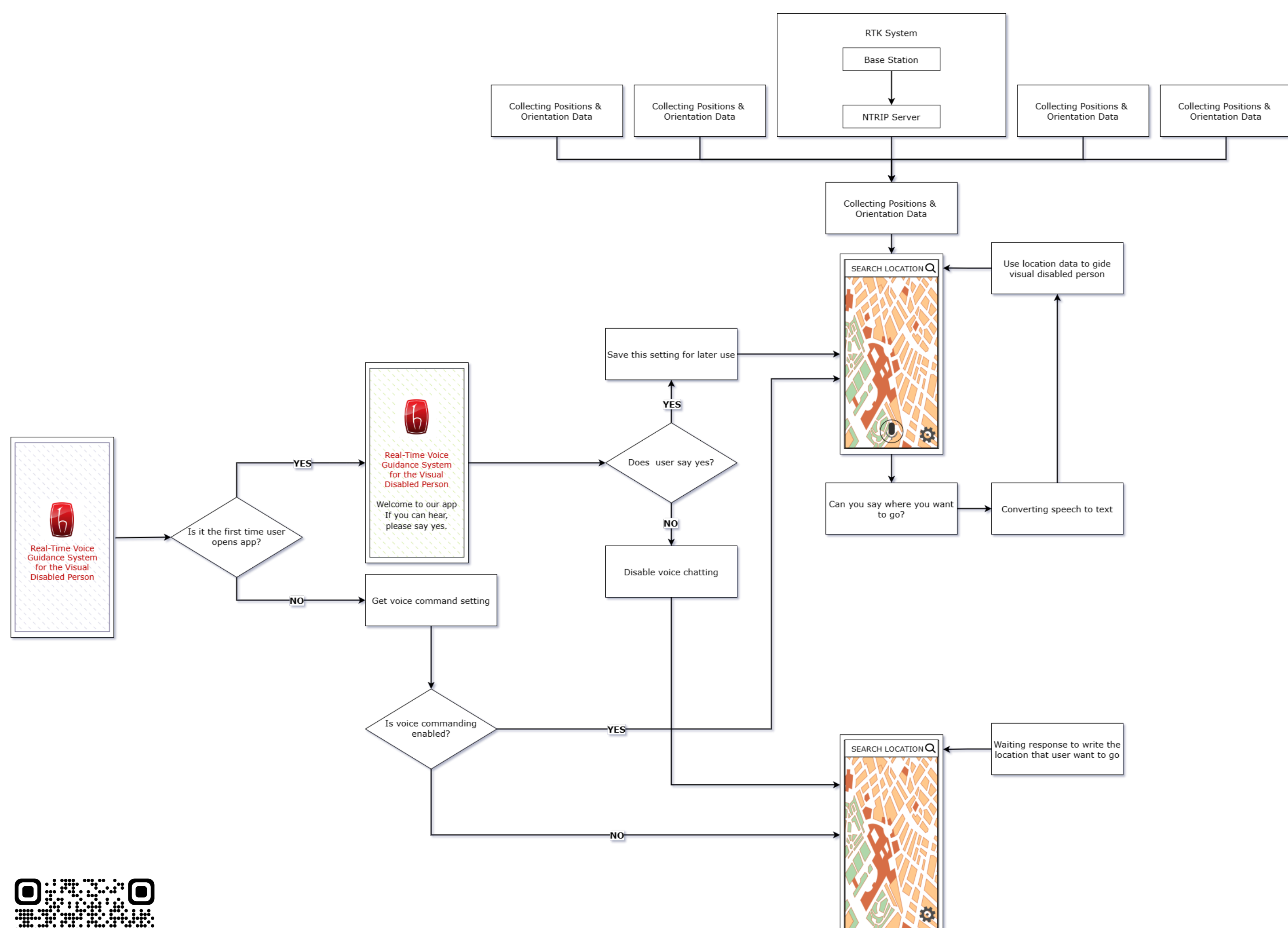
DESIGN REQUIREMENTS

The traditional GPS location data usually has a margin of error of 10-20 meters, which can be a significant barrier for visually impaired individuals who cannot easily use phone apps. Visually impaired people need more accurate positioning system.

Since the visually impaired people cannot see phone screen, traditional map apps is not enough for them. So the app should be used by voice commands. The app also should use orientation of the phone along with the GPS to guide person to right direction.

SOLUTION METHODOLOGY

Since the app need precise positioning, this app tries to use all of possible components of the phone to reduce this margin of error on traditional GPS apps along with voice communication. Here is the general flow of the app:

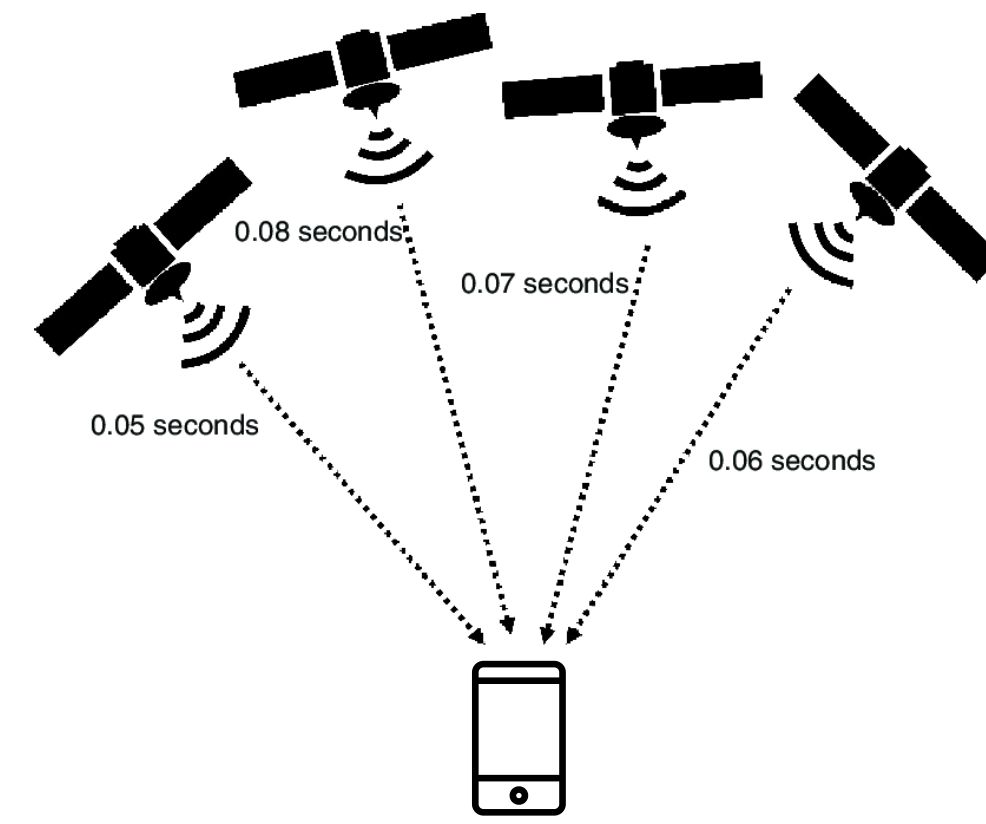


KEY COMPONENTS

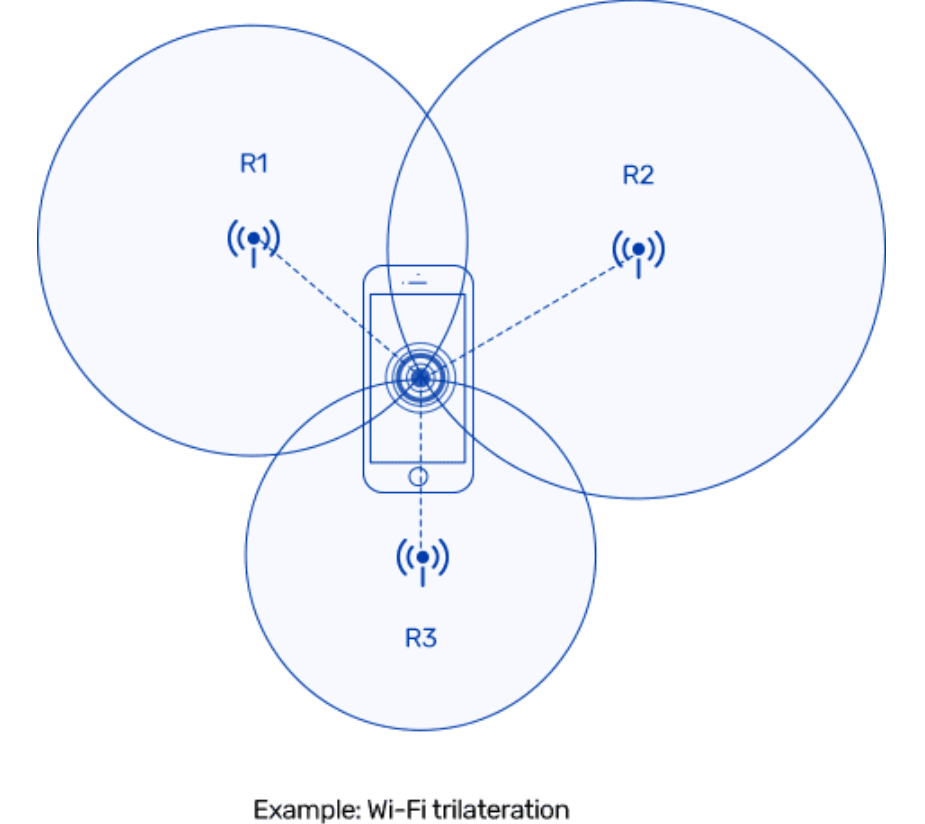
• For Positioning:

- GPS (Global Positioning System) Sensor
- Gyroscope & Accelerometer MEMS (Micro-Electro-Mechanical Systems) Sensors
- Magnetometer Sensor
- RTK System
- Wi-Fi Trilateration

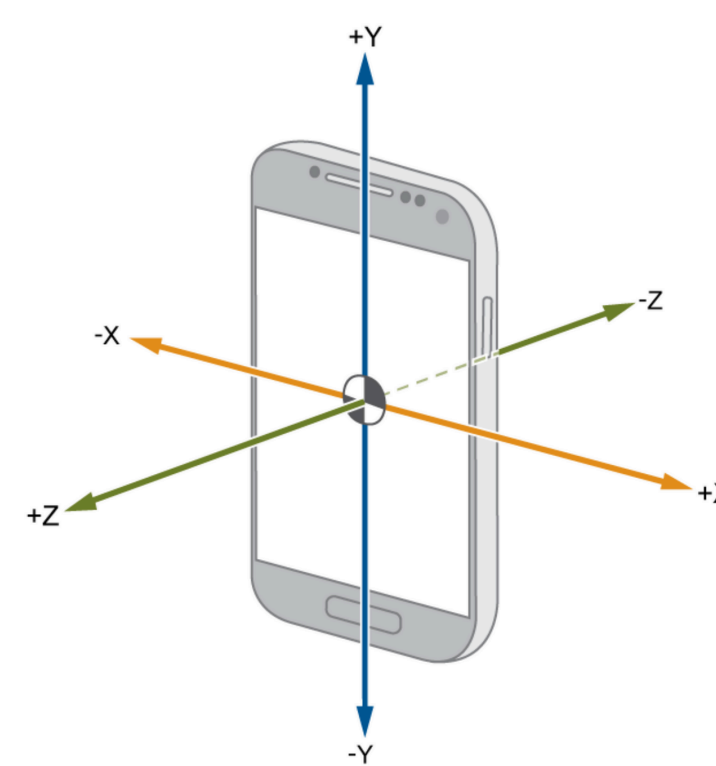
• Voice Communication



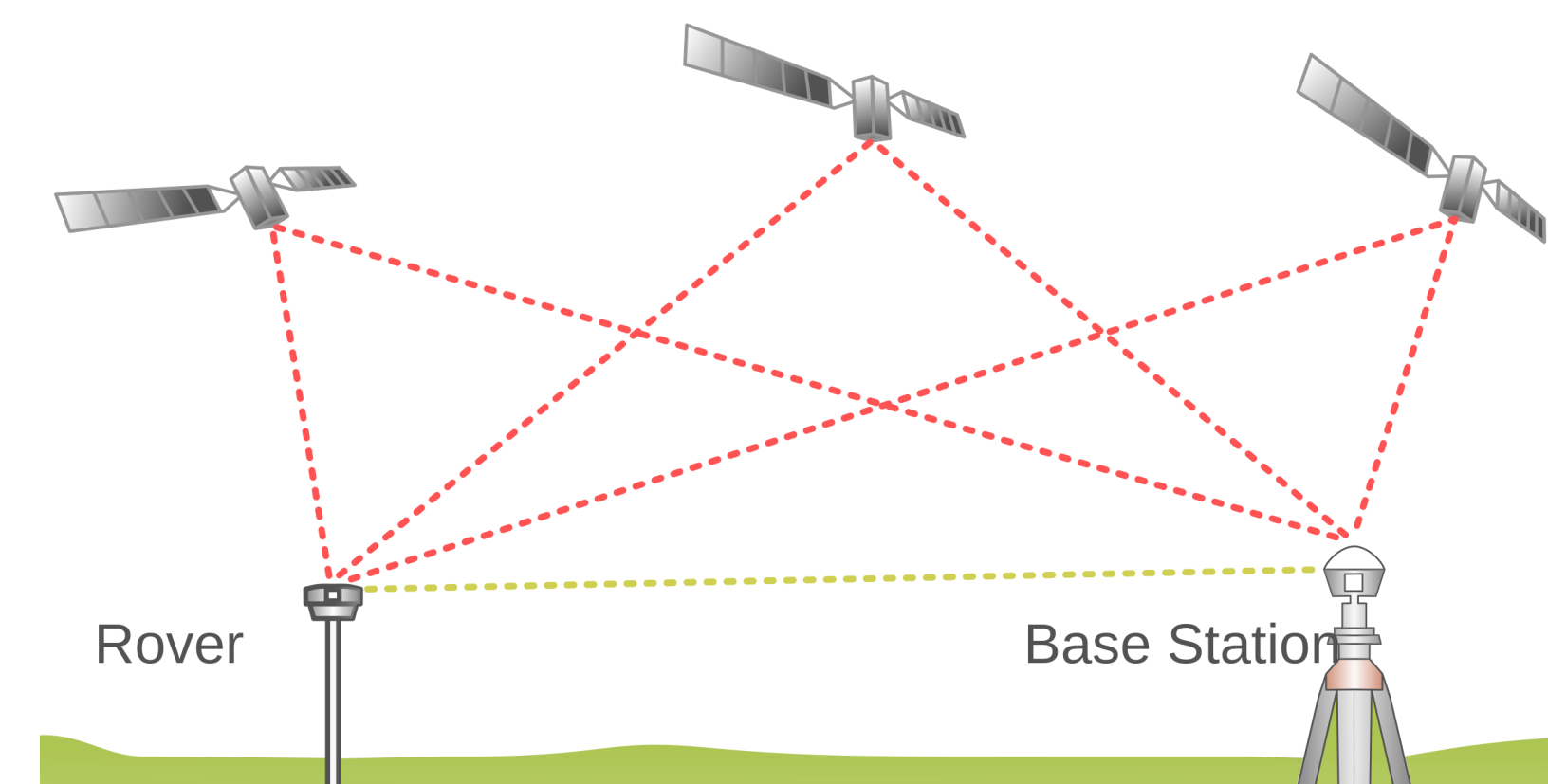
GPS Sensor



Example: Wi-Fi trilateration
Wi-Fi Trilateration



MEMS Sensors



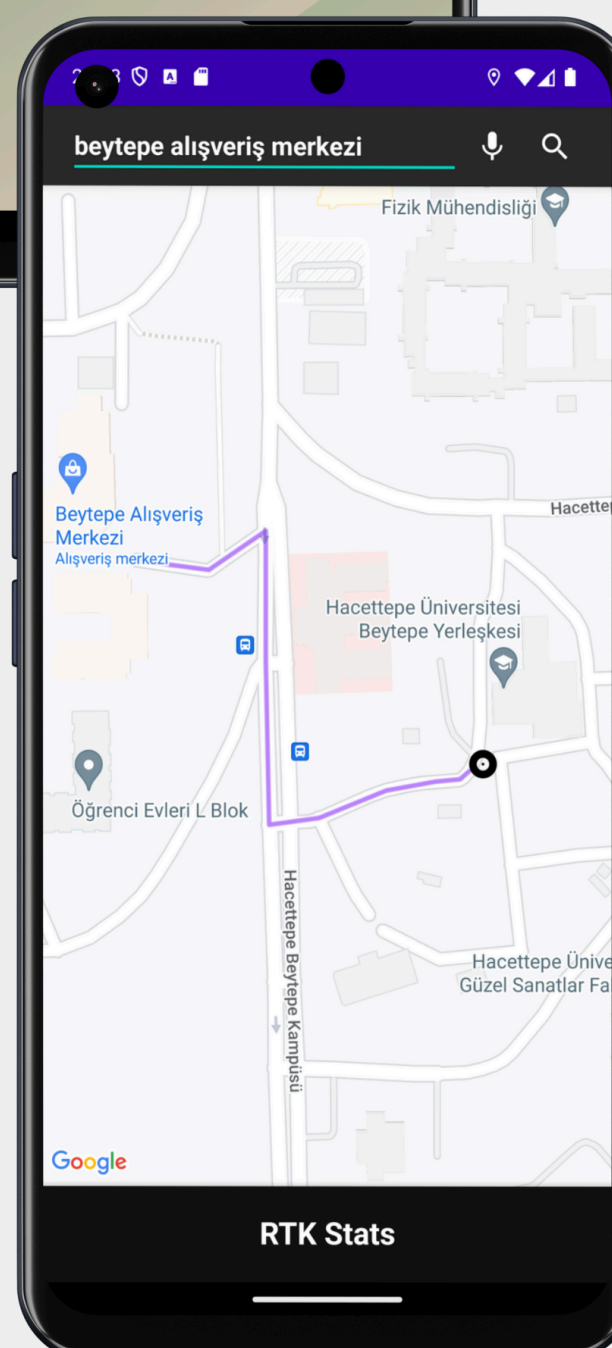
RTK System

RESULTS

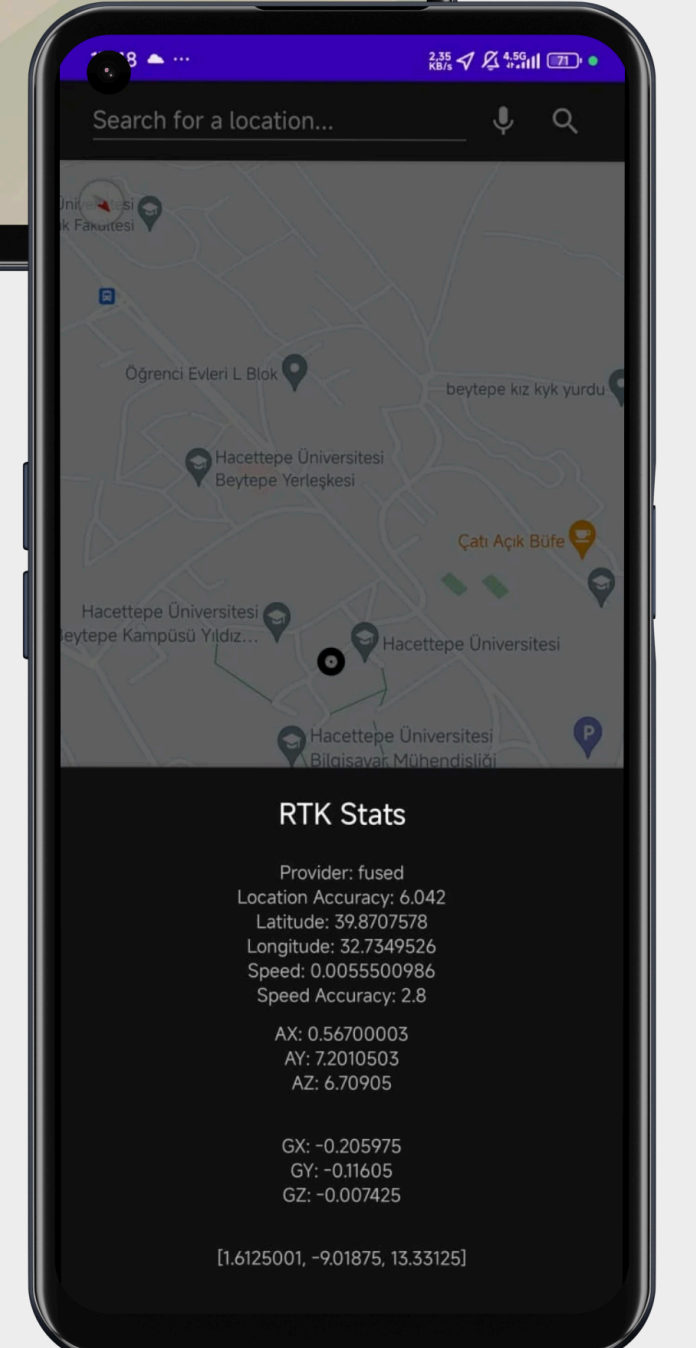
First Opening



Next Opening



Main Activity



Sensor Logs

