Data Visualizer Rover

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DATA VISUALIZER ROVER

Data **collection**, **processing** and **visualization** system with mobile interface

Main Objectives :

- Long range controllability (Global access).
- Mobile app for controlling, video surfing and data visualization.
- Real Time data processing.
- Customizable functionality
- Open source rover system.

WHY ROVER :

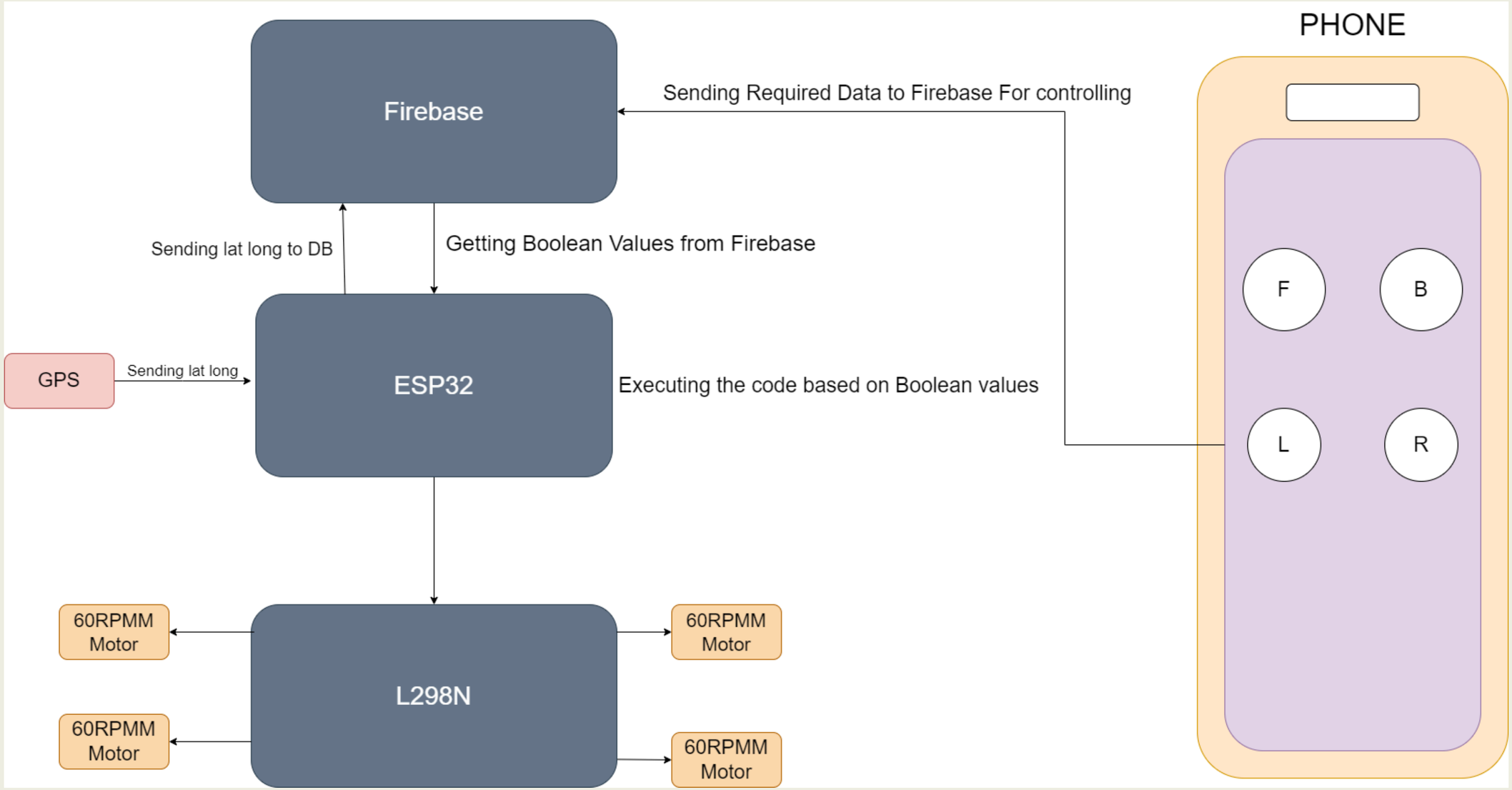
The **debate between rovers and drones** in this century boils down to the balance between surface exploration and aerial reconnaissance, each offering unique advantages and limitations in their quest for scientific discovery beyond Earth.

Advantages :

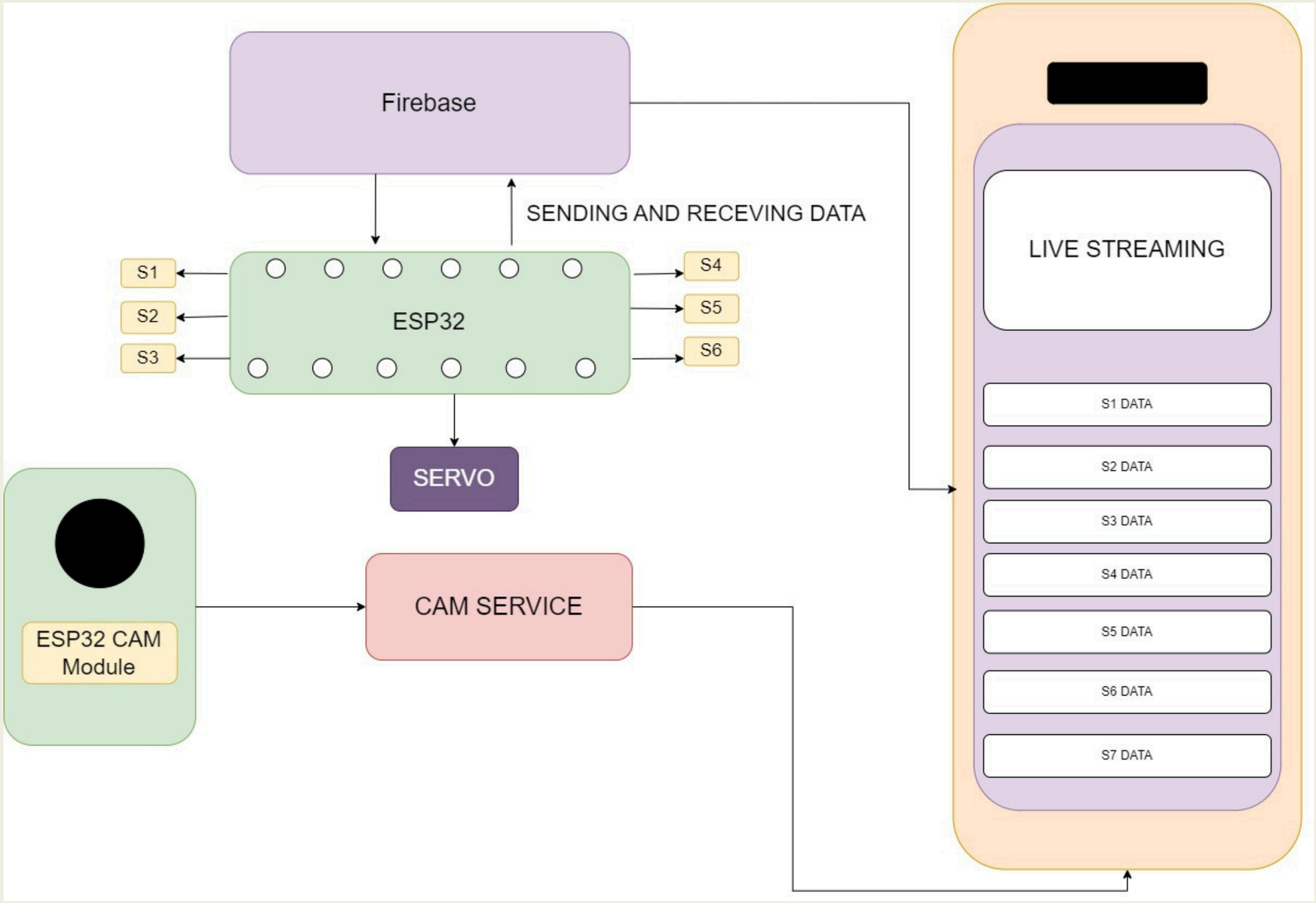
- Terrain accessibility
- Extended exploration duration : Durability
- Payload capacity
- Environmental condition
- Physical interaction
- Communication reliability

DESIGN

PART 1: NAVIGATION & CONTROLLING



PART 2: CAMERA ACCESSIBILITY & LIVE STREAMING



DESIGN

PART 3 : SENSORS & INSTRUMENTATION

Imaging Sensor : Esp32 CAM & Ultrasonic sensor

Environmental Sensor : Temperature & Humidity sensor & Gas sensor

Radiation Sensor : PIR (Proximity Infrared Sensor)

Geological Sensor : Soil Moisture Sensor

Display Panel : OLED

DESIGN

PART 4 : SOFTWARE

Mobile Application : Android Studio

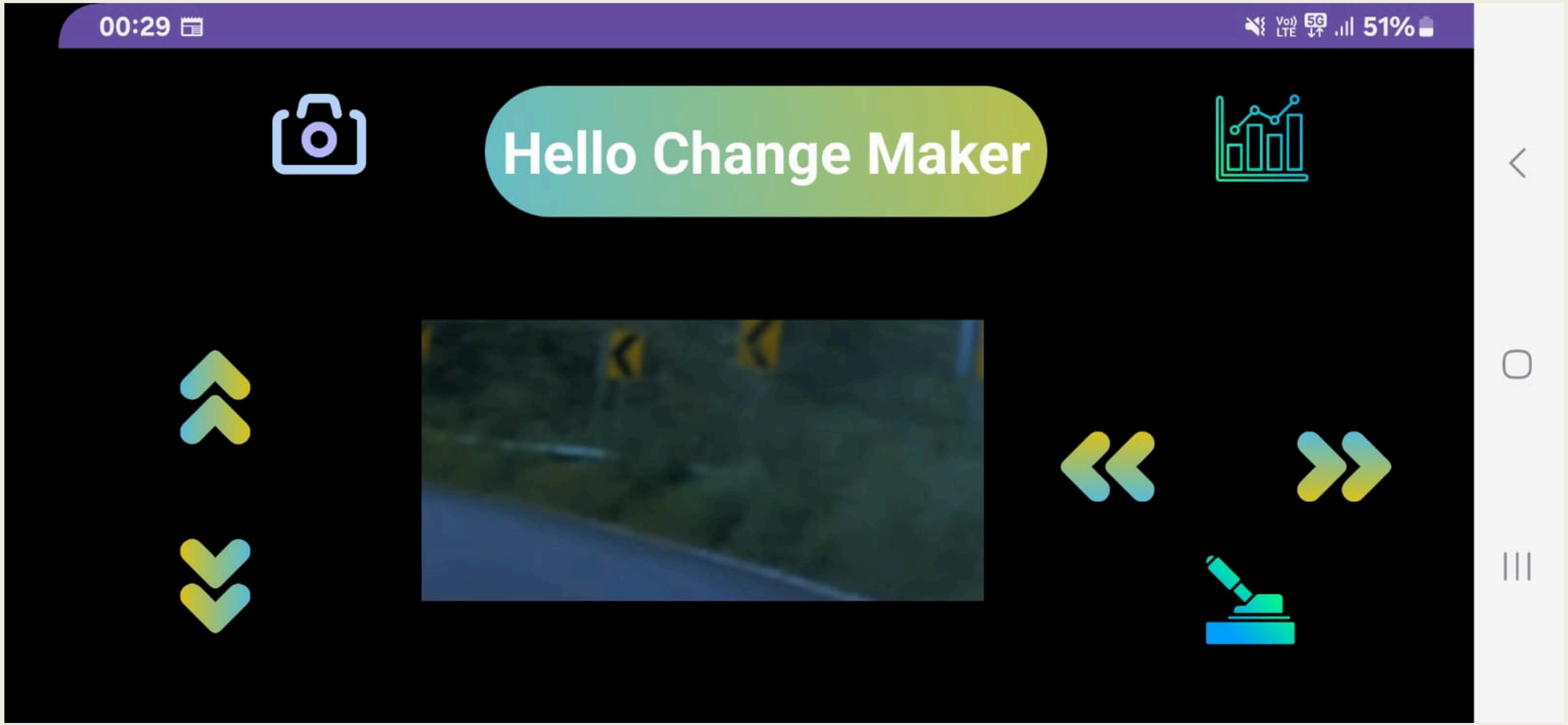
Camera Video Rendering : NGROK

Realtime Database : Firebase

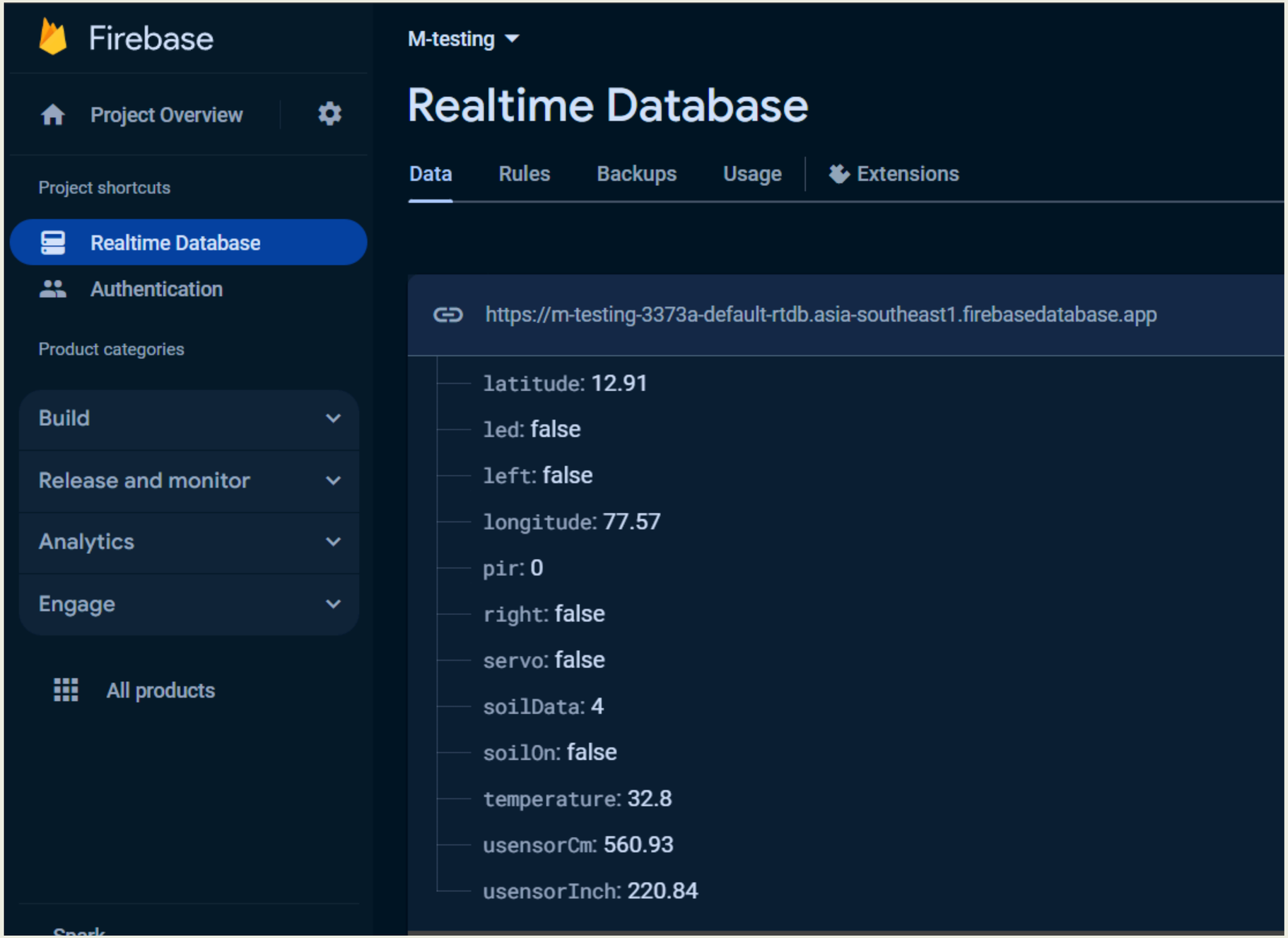
3D Modeling : Fusion 360

3D Printing : Elegoo Cura

APP USER INTERFACE



FIREBASE


Firebase
M-testing
Project Overview
Realtime Database
Data
Rules
Backups
Usage
Extensions
Project shortcuts
Realtime Database
Authentication
Product categories
Build
Release and monitor
Analytics
Engage
All products
https://m-testing-3373a-default-rtdb.asia-southeast1.firebasedatabase.app
latitude: 12.91
led: false
left: false
longitude: 77.57
pir: 0
right: false
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soilOn: false
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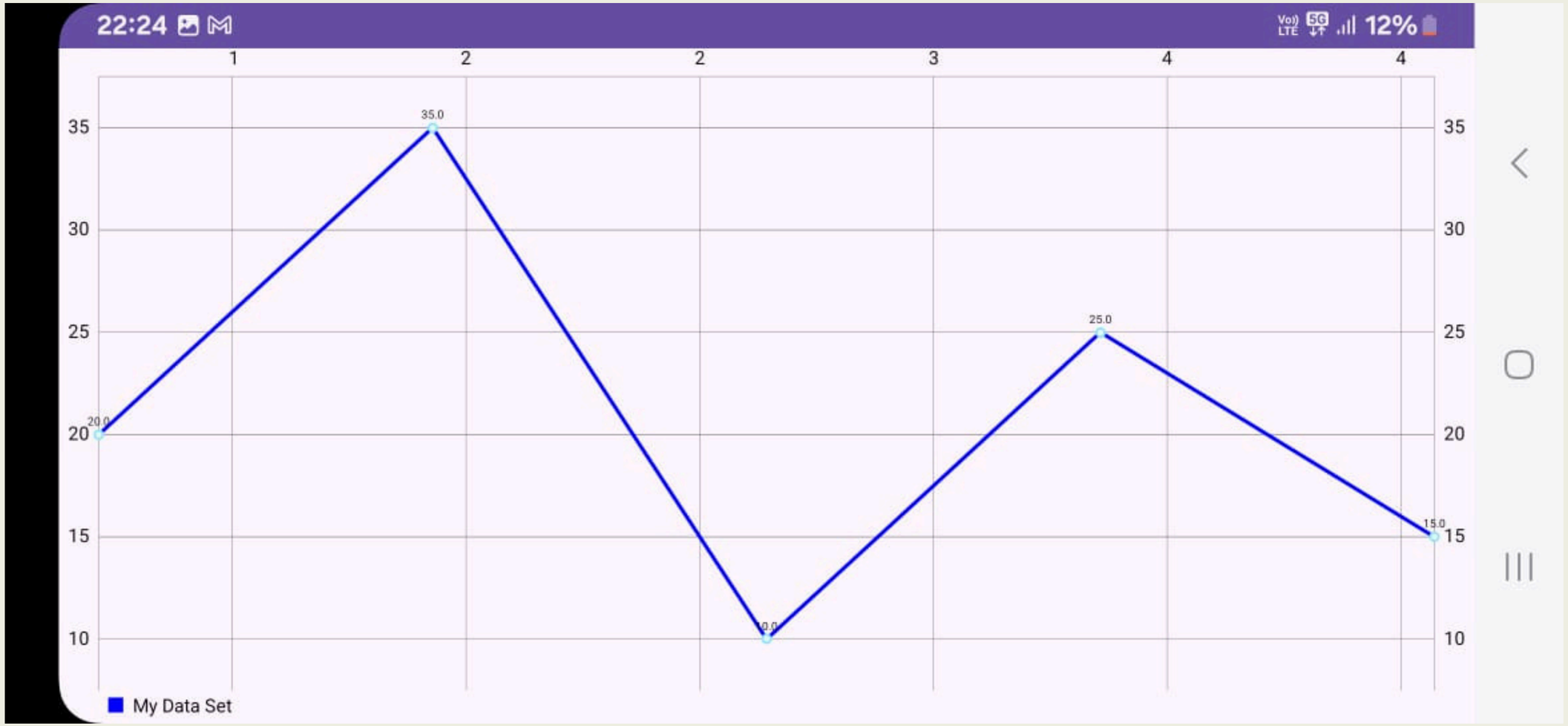
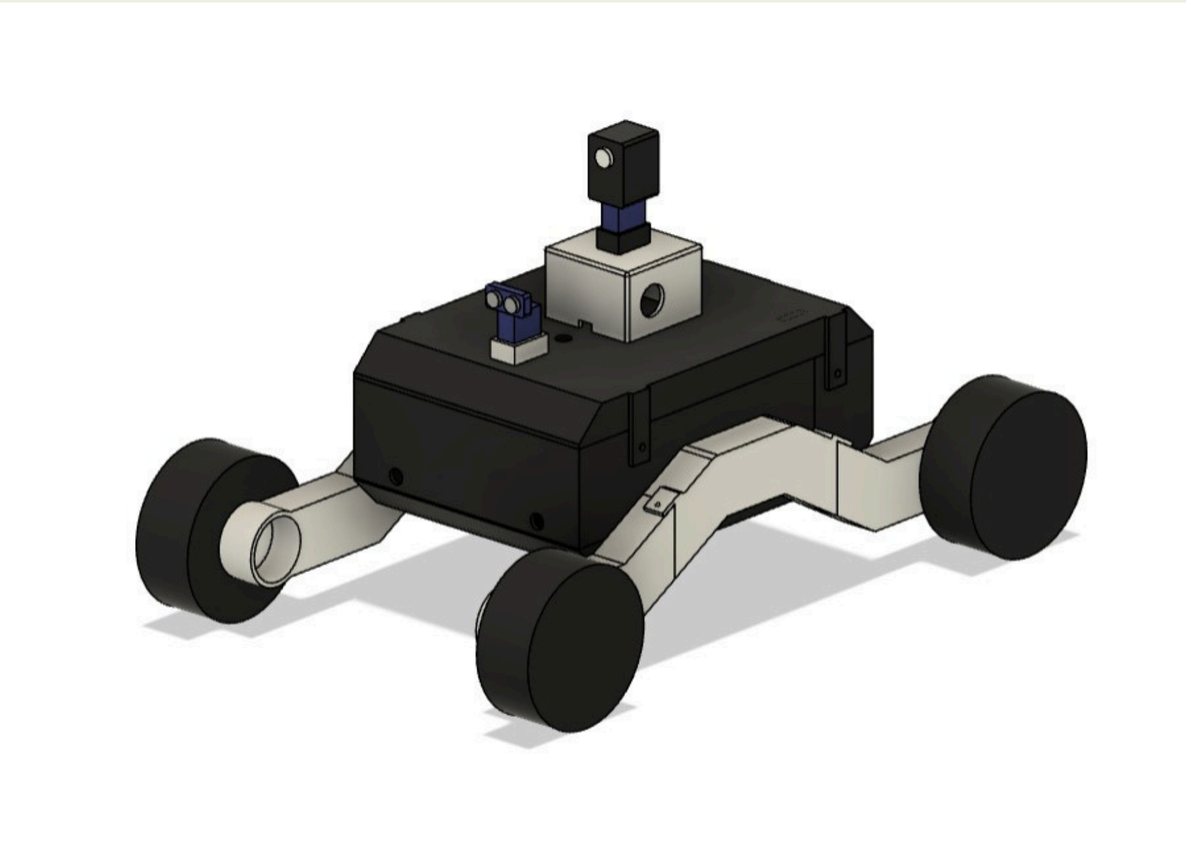
usensorInch: 220.84

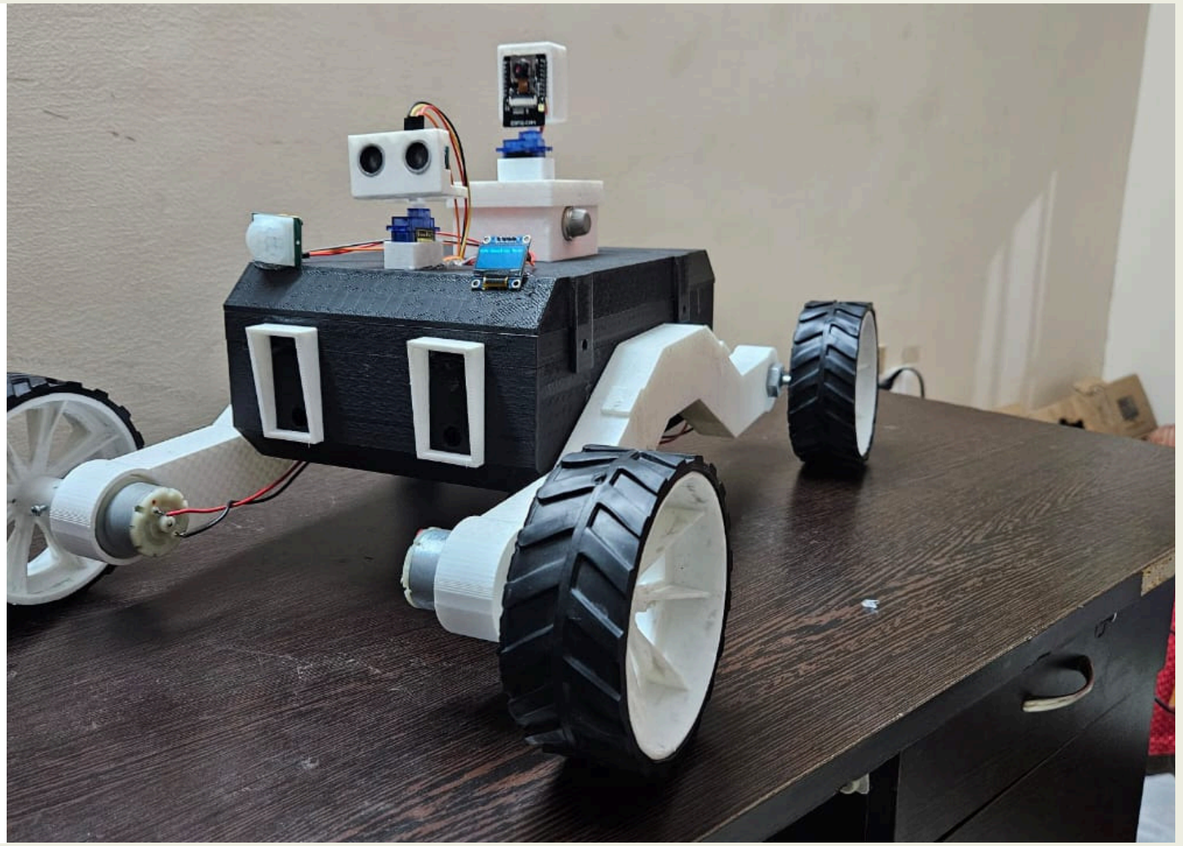
DATA VISUALIZATION USING OUR APP



MODEL



3D Model



Real Image

FUTURE SCOPE

Integration of LIDAR Sensor for 3D Mapping : GSL (Geographical Survey Language)

Autonomous Navigation and Path Planning : Designing algorithms

Machine Learning for Environmental Analysis : Data processing

Enhanced Communication and Connectivity : Realtime with zero latency

Multi-Rover Collaboration : Communication protocols and coordination algorithms

CONCLUSION

In summary, this project represents a significant leap forward in rover technology, offering **open-source versatility, global controllability, and advanced data processing capabilities.** With a dedicated **mobile app for seamless contro**l and **data visualization,** coupled with the integration of LIDAR for 3D mapping and other future enhancements, our rover is poised to revolutionize environmental exploration and monitoring.

THANK YOU