MamaSave: A Smart Maternal Health Monitoring and Emergency Alert System

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Problem

Many pregnant women in Uganda face delays in accessing emergency maternal care, leading to preventable complications and maternal deaths. Limited monitoring of vital signs and delayed response during emergencies affect both mothers and unborn babies.

Project Objectives

- Develop a wearable belt to monitor pregnant women's vitals.
- Enable real-time emergency alerts using GSM and GPS.
- Provide a mobile app for caregivers and midwives to access health data.
- Store and visualize health records via Firebase.

Project Requirements

- **R1.** ESP32-S3 with MAX30102 (Heart Rate & SpO2), Temperature, and Moisture Sensors
- **R2.** GSM (SIM800L) and GPS (NEO-6M) modules for emergency alerting
- **R3.** Firebase for real-time data storage
- **R4.** Flutter-based mobile app with dashboards for Midwife, Mother, and CHW

Target Users

| Pregnant Mothers	Midwives	Caregivers
Primary beneficiaries who will use the wearable device for continuous home-based monitoring.	Key responders who receive emergency alerts and location data, enabling rapid intervention.	Individuals who receive alerts and assist mothers during emergencies.

system layout
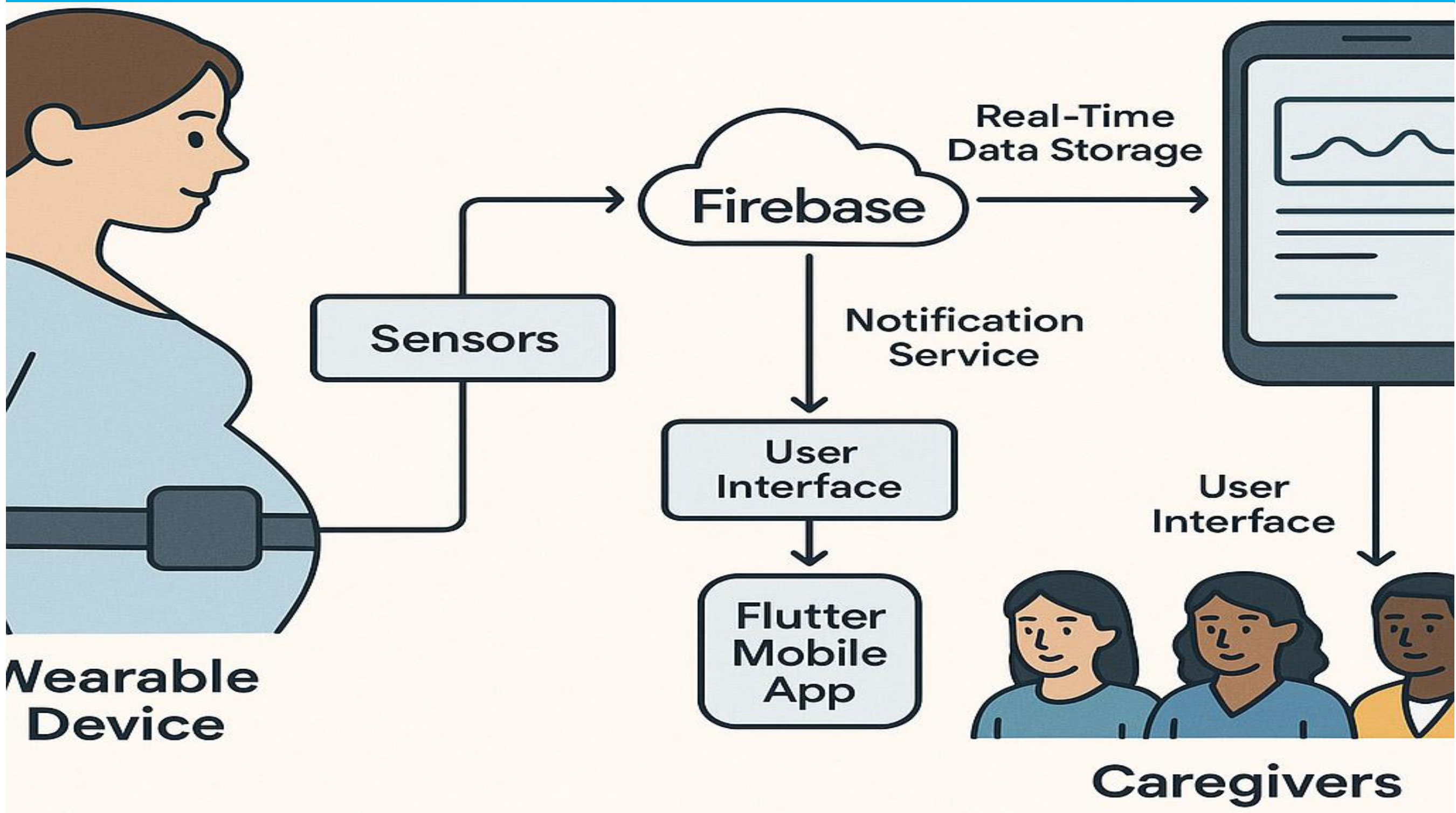
Results

1	2	3
System accurately monitored heart rate, SpO2, and temperature.	Flutter app visualized data using charts and logs for caregivers.	SMS alerts with GPS worked in both Wokwi and real-device setups.

Future Work

- Bluetooth/mobile app interface for comprehensive health record storage and visualization.
- Integration with national health databases for broader impact.
- Development of a community-level dashboard for NGOs and health workers.
- Research into AI-based prediction models for high-risk pregnancies.

Results
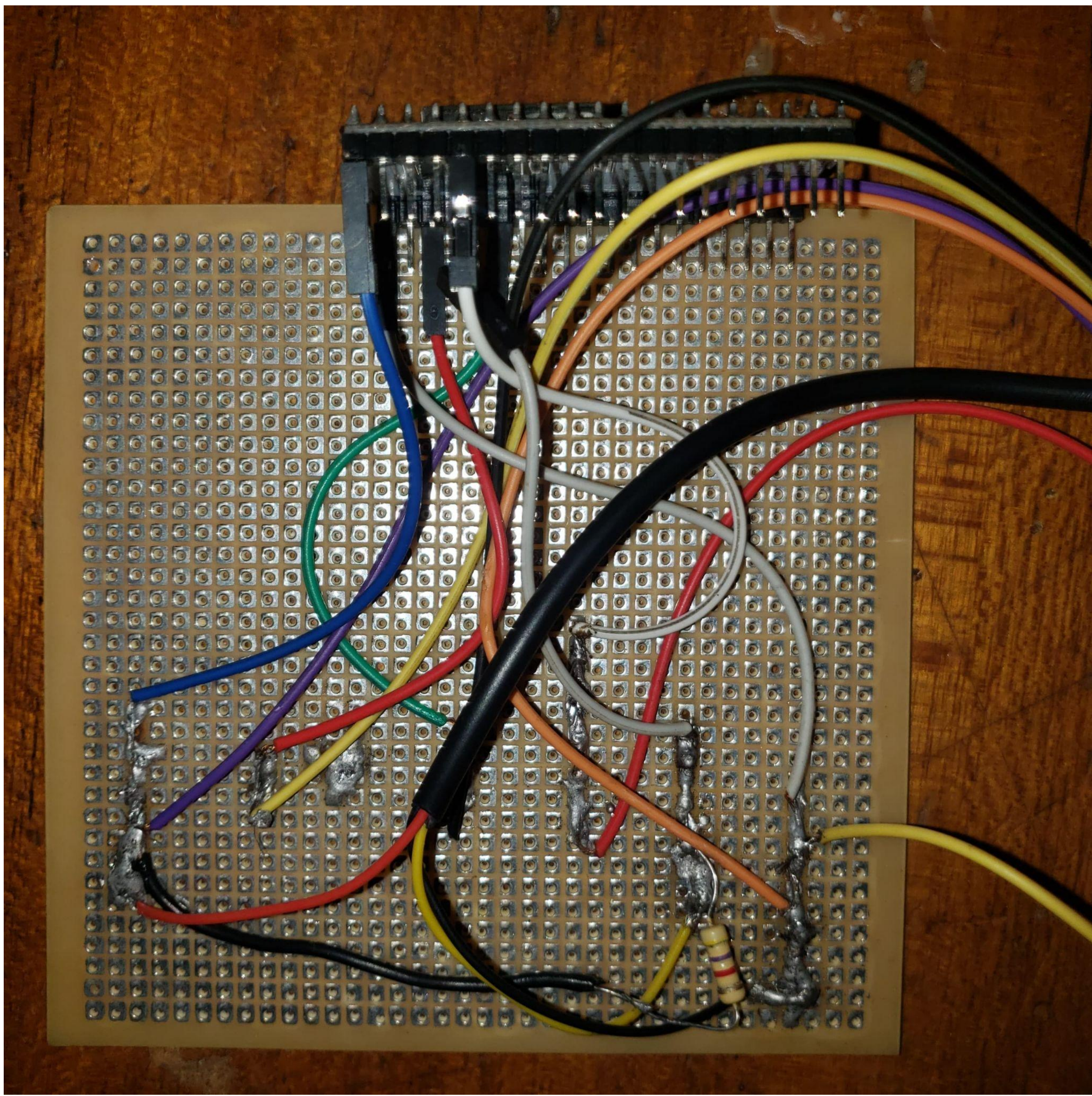
Conclusion

- The MamaSave system effectively monitors maternal health and sends emergency alerts in real-time. Data supports the hypothesis that timely monitoring and alerts can enhance maternal health outcomes, especially in underserved areas.

References

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