Epilepsy Seizure Detection Alarm

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Abstract

The design and implementation of the seizure detection system using EMG sensors, the ESP32 microcontroller, and an IOT-based architecture represents a significant step forward in health monitoring technology.

This system allows users to monitor their health parameters, specifically focusing on seizure detection, which can greatly aid in managing epilepsy and improving patient safety. By providing real-time alerts and the ability to share health data with medical professionals, this system empowers patients to seek timely medical assistance when necessary.

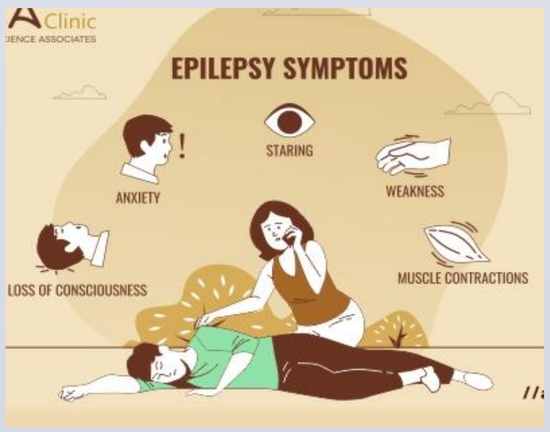
When the device detects seizure, it sends alarm to patient's relatives.

It differentiates between normal movements and seizures using Deep Learning Models.

When device detects seizure , it sends alarm.

Objective

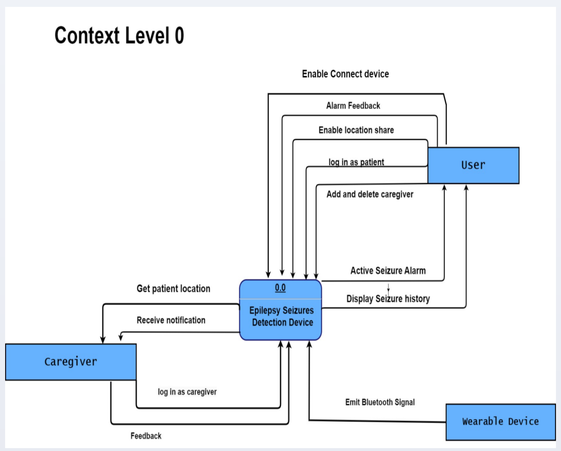
The main idea is to decrease bad cases as patient with generalized seizure can have many dangers.



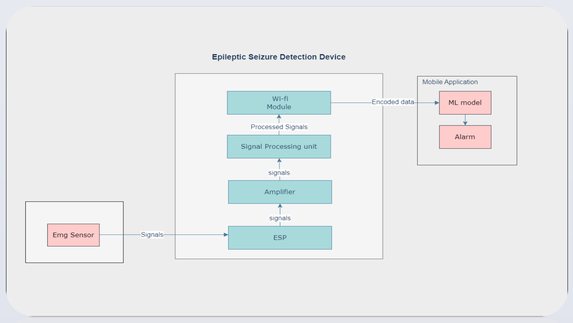
When the device detects seizure, it sends alarm to patient's relatives through mobile Application.

The main communication method of sending output (seizure or not) from firebase (Real Time Database) to the application via Internet network.

Methods



Data flow diagram(level 0)



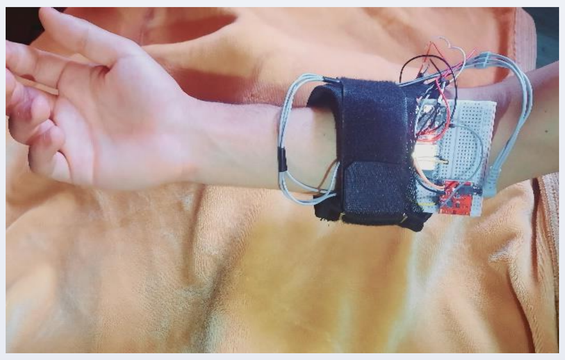
Block Diagram

References

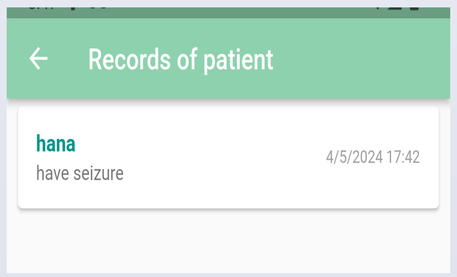
- **ESP32 Board**
- **EMG Module – Muscle Signal Sensor Kit**
- **Rechargeable lithium polymer battery**
- **Micro USB Lithium Battery Charging Module TP4056 with Battery Protection**
- **Breadboard**
- **Mosquitto broker**
- **Flask**
- **TensorFlow**
- **Firebase Realtime Database**
- **Flutter**

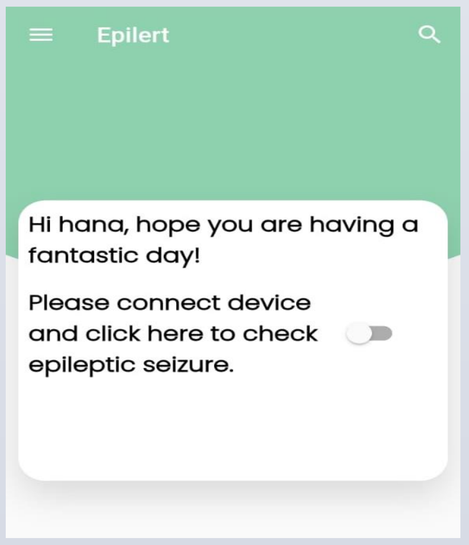
Results

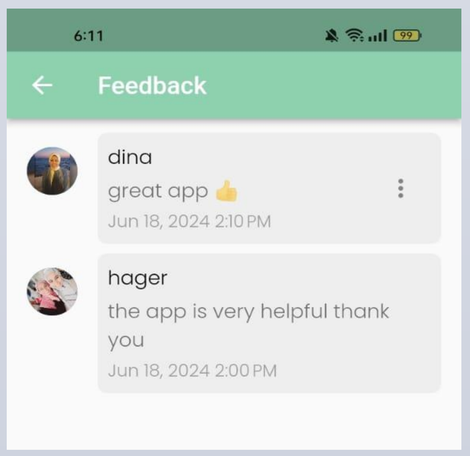
The epilepsy seizure detection alarm aims to help doctor decrease the dangers of seizure as we see it's Portable device connected with mobile application using IOT technologies.



It's important to save the patient from any side effects that will harm him as if it increased it will lead him to death. The Mobile application connected to the device and save the date of seizure to ease the process of diagnoses as it's increase reliability , and usability for users.







Conclusion

The system is particularly beneficial for individuals with epilepsy, allowing them to monitor their condition continuously. This continuous monitoring is crucial for managing chronic conditions and can help in reducing the risk of severe seizure epileptics by providing early warnings and facilitating prompt medical response.
The system can also be adapted for other health monitoring applications, making it a versatile tool for a wide range of patients, including those with chronic illnesses, elderly patients, and individuals with other health conditions that require regular monitoring.

In conclusion, this IOT-based seizure detection system showcases the potential of integrating advanced technologies to improve health monitoring and patient care. By addressing current limitations and pursuing future enhancements, this system can become a vital tool in managing epilepsy and other health conditions, ultimately contributing to better health outcomes and quality of life for patients.

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Thank you !