IOT Paralysis Patient Health Care Project

Abstract:

The IoT-based paralysis patient health care system is an innovative solution aimed at aiding paralyzed individuals in communicating essential messages to caregivers, nurses, or family members through hand movements. By integrating motion detection sensors with microcontroller-based circuits and IoT capabilities, the system allows patients to send alerts or messages wirelessly. The device interprets hand gestures using an accelerometer and gyroscope, then sends this data via RF transmission to a receiver. The receiver, connected with an ESP8266 Wi-Fi module, displays the data on an LCD and updates it to an IoT cloud server (IoTGecko), ensuring caregivers or loved ones are notified in real-time.

Aim:

To design and develop an IoT-based assistive device for paralysis patients that detects hand movements and communicates predefined messages to caregivers locally and online.

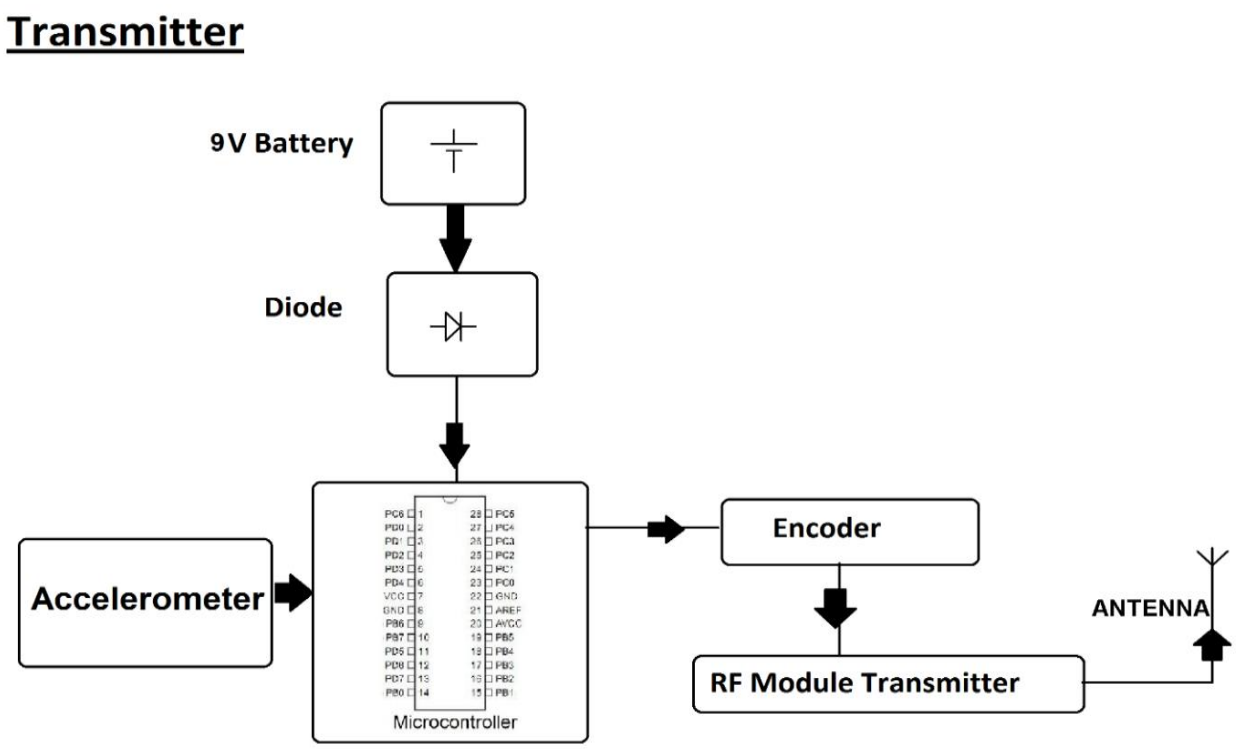
Objectives:

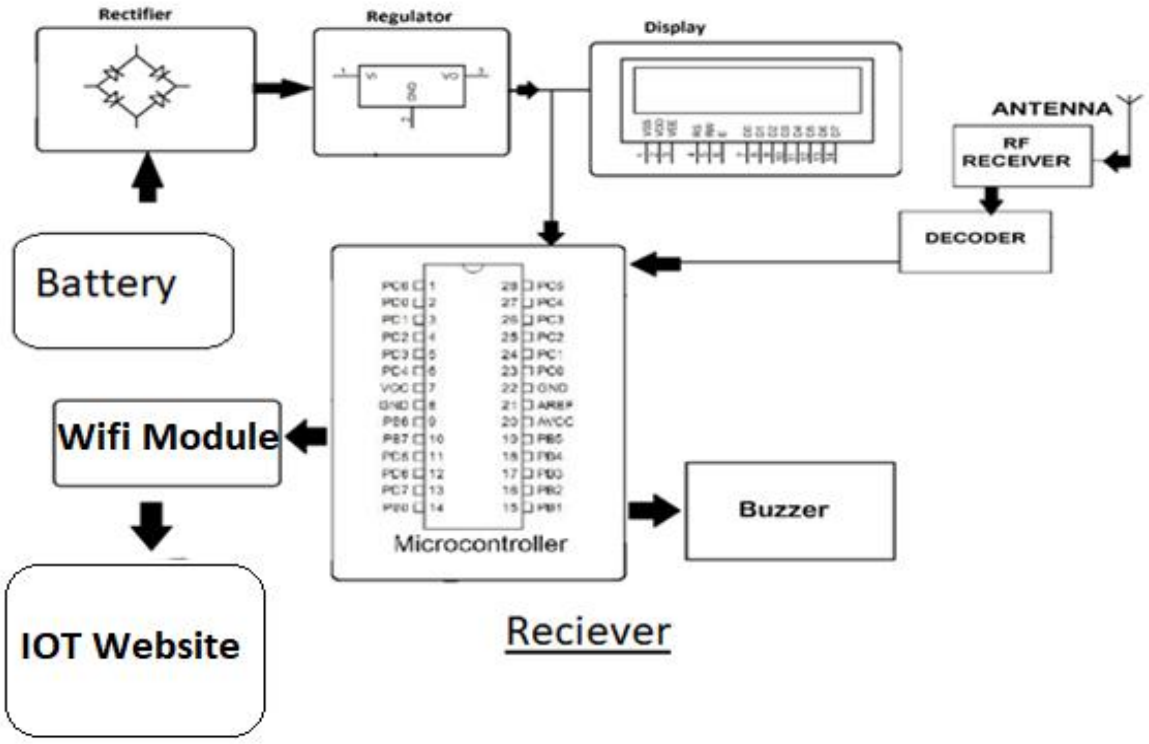
- To detect hand gestures using accelerometer and gyroscope sensors.
- To transmit gesture data wirelessly using RF modules.
- To process and display messages on an LCD at the receiver's end.
- To update patient messages to an online IoT platform using ESP8266.
- To ensure real-time notification to caregivers and family members.

Working Principle:

The system uses a hand-mounted accelerometer and gyroscope module to capture specific movements made by the patient. These movements are interpreted by the microcontroller and encoded into signals. The transmitter sends this data via RF to the receiver circuit, which displays the message on an LCD screen and simultaneously transmits it to the IoTGecko server using the ESP8266 Wi-Fi module. The caregiver or family member can then view the patient's request or status online in real-time.

Block Diagram:





Hardware Components:

- ATmega Microcontroller
- Accelerometer & Gyroscope (MPU6050 or similar)
- RF Transmitter and Receiver Modules
- ESP8266 Wi-Fi Module
- LCD Display (16x2 or similar)
- Crystal Oscillator
- Resistors, Capacitors, Diodes, Transistors
- Push Buttons, Switch
- LED Indicators
- PCB and Breadboards
- Power Supply Adapter / Transformer
- Cables and Connectors

ICs and IC Sockets

Software Components:

Arduino IDE (Compiler)

- Programming Language: Embedded C
- IoTGecko Server for Cloud Storage and Monitoring

Advantages:

- Enables communication for patients who are speech or movement impaired.
- Real-time monitoring from anywhere over the internet.
- Simple, cost-effective, and easy to use.
- Wireless and portable.
- Customizable for different gesture commands.

Disadvantages:

- Limited gesture recognition (predefined gestures only).
- Dependence on stable internet connection for IoT updates.
- RF communication range is limited.
- Requires charging or power source.

Applications:

- Hospitals for paralyzed or semi-paralyzed patient care.
- Home health care for bedridden or elderly patients.
- Rehabilitation centers to improve patient interaction.
- Assisted living facilities.

Future Scope:

- Integration with AI for dynamic gesture recognition.
- Voice-to-text communication for semi-verbal patients.
- Mobile app integration for easier monitoring.
- Use of LoRa or GSM for long-range communication.
- Addition of health sensors (heart rate, temperature) for advanced monitoring.

Conclusion:

This IoT-based health care device offers a smart and practical solution for paralysis patients to communicate essential needs without verbal interaction. By combining motion sensing, wireless transmission, and cloud-based monitoring, the system bridges the gap between the patient and caregivers, promoting better care and improved quality of life.