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Research Paper

Remote Health Watchdog Framework for Seizure Patient Using Electronic Sensors

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Abstract

Epilepsy is due to the neurological disorder of a patient which makes the patient uncontrolled and makes unconscious. The patient should get support through an ongoing framework. The brilliant epilepsy recognition and ready framework is a propelled innovation by which an electronic device is introduced. Utilizing that pack, the life of the individual who is truly affecting with the condition can be anticipated. As per World Health Organization (WHO), epilepsy is a standout amongst the most well-known essential sicknesses of the focal sensory system around the world, which is exasperated by the sudden variable that portrays the event of an epileptic occasion. In this manner, the capacity to recognize scene preceding its beginning is introduced as a relief variable to the upsetting effects that emerge from this situation. The casing will be tolerable, confirms the condition and also alerts to the the family doctor. To realize all the above plan, mainly utilized four modules: three sensors, data analysis and ARDUINO module with GSM and GPRS module.

Keywords: *Epileptic seizure, WHO, GSM and ARDUINO.*

1. Introduction

We introduce a framework [1] to the impression of seizures. It additionally recommends to singular authorities regarding the patient's [2] status. The framework described here is a portable gadget [3] that predicts the seizure occasion right away. The gadget utilizes the indications or symptoms of the person to perceive the occasion of epilepsy. At the point when the device recognizes the symptoms [4], through a flag. The flag is then arranged utilizing the control instrument.

2. Literature Survey

Current innovations for securing signals from the person are especially created. Numerous devices are accessible to recognize the heart beat and strong developments in a non-intrusive and precise way as well. [5]. One such method is heartbeat [6] oxymetry. Utilizing this strategy, heart beat can be precisely observed. Solid writhings are gathered utilizing small scale electromechanical sensors (MEMS) immovably connected to the body. The sensors utilized are little in size and can be solidly joined to the body. The increasing speeds coming about because of epileptic shakings are detected [1] .
Any variation in pulses which is brought about is distinguished and affirmed with the MEMS flag[3]. At the point when the seizure is affirmed, alert SMS is transmitted to the caregivers for starting essential defensive measures for the patient.

3. Proposed Architecture

The configuration comprises of equipment and programming segments. The gadget equipment primarily comprise of three sections specifically, (1) Heart beat sensor (2) Seizure detector (3) Processor (4) GSM module.



Fig. 1 Smart epilepsy detection and alert system

(1)Heart beat sensor: The pulse of the serene ought to be precisely observed. Therefore, an oxygen meter of the pulse is utilized. Pulse oximeter measures the pulse by recognizing the diversity in the absorbance of IR by blood amidst systolic & diastolic heart works out. The level of blood moving through the veins more often than not varies amidst every pulse.

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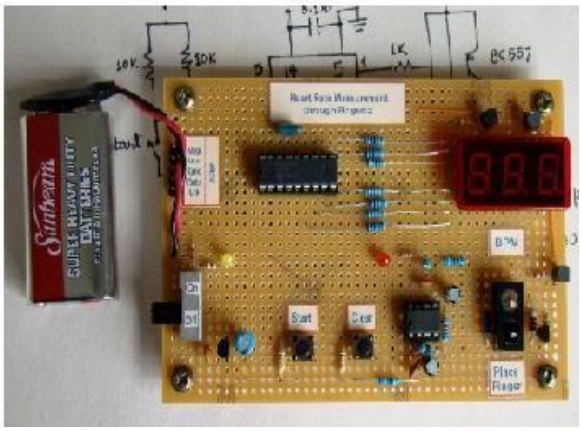


Fig.2. Heart rate measurement from fingertip

The pulse oximeter composite here keeps on utilizes intellectual supervision. The IR hub transmits the IR radiation reflected by the circulation system. Infrared moving absorbance is measured, permitting the wellbeing of absorbance as of the blood of the veins alone and (when in doubt) nail cleaning. The pulse oxygen meter circuit includes a trans protection, voltage stick, differentiate amplifier, and channel enhancer. Each of these stages fall together from the whole heartbeat oximeter circuit. The circuit works with a 5 V supply. With a particular last goal to get a faultless heightening without noise, the OP07 operational intensifier and the FET LF 356N operational information enhancer are picked. Reinforcer with escalating component of 50 is depicted. The typical execution of the sensor is appeared in the table underneath.

(2) Seizure Finder: Neuron disorder is solid programmed advancements that happen amidst epilepsy. Strong improvements are distinguished utilizing the MEMS accelerometer (scaled down electromechanical sensor). The sensor is a scaled down scale-machined structure of polyethylene silicon surface in view of the highest point of a silicon wafer. Organize fragile demodulation systems are used to reconsider the flag and pick the course of the accelerating.

(3)Processor: Micro-controller(MC) PIC18F4620 generates signals to sensors. The MC requires a 10-bit Analog to Digital Converter and comparator circuit to deal with rays. PIC18F4620 joins work in Analog to Digital converter & comparator. The processor is customized at 4 MegaHz. The average heart mood repeat is about 1.4 Hz.

(4) GSM Module: GSM /GPRS(TTL–Modem is SIM900 Quad-band GSM/GPRS contraption.

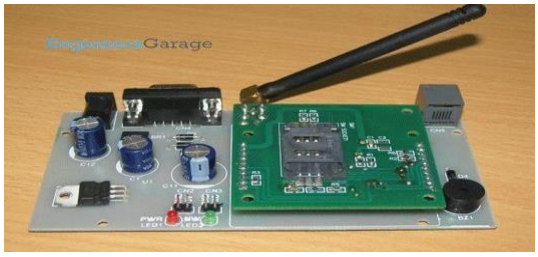


Fig.3. Model of GSM

The model of GSM gives a statistical way to find the location of user exactly.

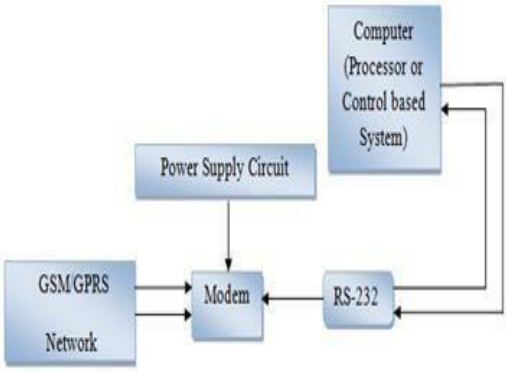


Fig.4. GSM Module

4. Design Implementation

The taking care of unit utilizes the method of reasoning carry out in the item for correct disclosure of seizures. Item check the data from the Pulse oxy meter The patient requires to press a catch. If the patient can't do in that capacity as a result of occasion of seizure, then response movement at MEMS sensor, it distinguishes the solid twitch is gotten and separated. The figuring utilizes the normal technique to choose the varieties of the standard with exactness. R = (P1 + P2)/2 where
P1 = past heart rate P2= next heart rate.

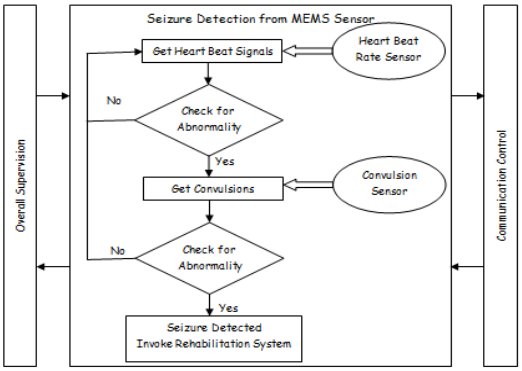


Fig 5. Seizure discovery and rehabilitation block diagram

The inward FIFO puts away to 16 tests, so that the framework processor does not have to peruse the information afterevery test. Temperature information might be expected to prop-erly translate SpO2 information, however the temperature does not should be tested all the time—once per second or like clockwork ought to be adequate. In heart-rate mode tem-perature data is a bit much.

This casing comprises of a heart rate sensor, a muscle convulsion sensor, a transmitter, a beneficiary, a convenient data gadget, an alert gadget and a modified vehicle control outline. All these parts are coordinated with a processor. The desire structure for epilepsy can be performed basically by combining the parts that go with it.

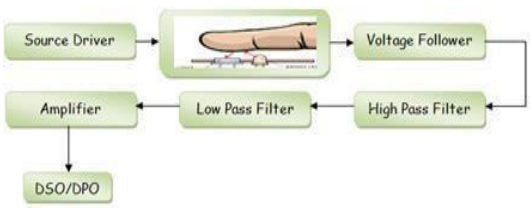


Fig. 6 Pulse oxymeter

The patient will be observed using pulse oymeter and sensors. The signals datais captured and at serverpredicts the seizure.

5. Hardware Interrupt

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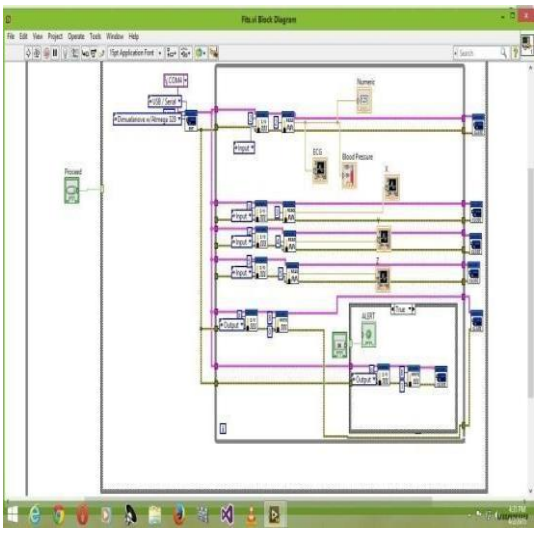


Fig. 7. Lab VIEW circuit diagram

6. Results

Likewise, to run the framework when the individual finds the circumstance, at that point you can see the condition amid the MEMS and ECG screens gave on thescreen of the tablet in the research center see module.

The sensor observes the patient body and records the details. Utilizing seizure pioneer computation, it verifies for variety from standard in blood circulatory strain

7. Conclusion

pragmatic wearable and a light weight contraption is delivered, it will help a considerable number of losses of epilepsy worldwide. With the contraption carefully guarded an epilepsy setback can move uninhibitedly as common people stresses. The framework is effectively expandable to consolidate GPS framework and to catch and sends patient status. We can additionally broaden the venture when the patient is in moving.

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