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THE DETECTION AND SIMULATION CONTROL FOR STRESS MANAGEMENT USING IOT

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Abstract

The effects of stress cause serious mental and physical harm to people. It is very difficult to see that a person is under stress. A person may appear physically healthy but not in good health because of stress within the body. Their mental stability is also affected and may lead to chronic illness due to ongoing stress. However, it is very important to monitor the levels of stress regularly which helps to diagnose any abnormalities that may lead to chronic illness in the future. IoT-based Wireless Networks (Internet of Things) provides a variety of opportunities to monitor stress levels regularly and pass on information to stakeholders for immediate action. The model is designed and developed to detect stress levels using a variety of sensors such as heart rate, blood pressure (BP), body temperature, and concentration of CO2 gas. Continuously based on the values of these sensors, stress levels are calculated and information is transmitted using IoT.

Keywords: Depression, IoT, Nervous System, Monitoring System.

1. Introduction

Depression is a major concern in today's society today. They are all busy with their work and almost all people including students, staff all work hard to meet their deadlines, targets, etc. In general, people are aware that they are under severe work stress and levels of stress, but they do not pay attention to their state of health [4]. They also forget to have medication at the right time which can lead to sometimes fatal side effects and death. Certain sensory levels such as heart rate, blood pressure, etc. can scare me if it is not controlled. When given the right medicine at the right time, it can help prevent heart attacks and reduce the risk of death. Therefore the design of stress diagnosis and health monitoring technology that can help people understand their mental and physical condition is very important [9]. In recent years, wireless technology has played a key role in a wide range of fields and biomedical interventions to provide better health care. Many machines are designed for continuous monitoring [5]. In most existing systems, data is recorded and stored on a standard server that is accessible only to staff and physicians [10]. In the proposed system, the model is designed to monitor heart rate, blood pressure, temperature and humidity, and respiration using various sensors that will be loaded onto the server via the WIFI module. The message can be sent to the affected person or doctor via the GSM module. The model consumes less energy and is designed to detect stress levels with good efficiency [11].

2. Layout analysis

According to a new report, stress is causing a rise in heart disease. The stress response is largely determined by physiological cues such as heart rate variability, blood pressure, body temperature, and respiration. Recent studies emphasize the significance of physiological signal monitoring utilizing C.

Heart Rate Monitor - AD8232, Arduino UNO, and pulse sensors. The Arduino UNO detects the Pulse Rate sensor's cardiac pulse rate and sends it to the Raspberry 3, indicating whether it is normal or abnormal. This information is delivered directly to the individual in question, who acts accordingly. Communication between patient and doctor was carried out in this method to alert the patient and doctor promptly by delivering the patient help to save persons' lives via e-mail, WhatsApp, texts, and graphs. The cloud graph, which is routinely examined by the physician or guardian, may be traced in real-time [27].

As previously said, the improvement in the patient's health and quality of life. Biomedical Engineering (BME) integrates engineering design and problem-solving skills with medical and biological research. The study concentrated on all of the patient's conditions that are capable of monitoring the cardiac rate. The fingertip was used to measure heart rate. The lights are emitted by the IR sensor through LEDs. Using an Arduino (AT Mega 328 microcontroller), this system detects the heartbeat rate per minute and then sends an SMS alarm to a Smartphone [13].

Furthermore, the technique for repeatedly recognizing the stressful event utilizing data given by a commercial wrist device with various sensors provides Heart Rate (HR), Galvanic Skin Response (GSR), Blood Volume Pulse (BVP), and other parameters. To collect laboratory data, the researchers employed a standardized stress-inducing test. They looked at two experiments, one in the laboratory and one in real life. The observation is that stress is purposely induced in laboratory research; therefore, physiological measurements are hardly disrupted. Another finding is that in a real-world experiment, utilizing context information with a context-based classifier enhances stress detection by 16% [14].

Furthermore, the patient will have to wait for a long period at the hospital for a meeting with the doctor. The patient cannot wait in the event of a serious situation. In any patient situation, they should wait until the physician is assigned and the patient may meet with the physician. For a better outcome, the author offered a simulation model written in MATLAB. The patient provided temperature, blood pressure, ECG, heart rate, and other data to the simulation model through sensors. They keep a large database of connected symptoms and apply an apriority algorithm to create the association rule. Also, obtain the prediction based on the user's preferences. Symptom. This simulation model gives textual information to the patient, allowing him or her to read it and take the necessary precautions. This study is extremely beneficial for patients in severe conditions who cannot wait for a second longer and who are unable to walk or stand for an extended period to see the doctor [15].

Another relevant study found that Heart Rate Variability (HRV) biofeedback training is associated with a significant reduction in self-reported stress and anxiety.

The effect of heart rate variability biofeedback training on stress and anxiety discusses a promising method for treating stress and anxiety with wearable devices [16]. In addition, I worked on Galvanic Skin Response (GSR) and ZigBee for controlling people's unique emotional conditions. The author created a stress sensor based on Galvanic Skin Response (GSR) that is controlled via ZigBee. They utilized the Jennie JN-5148 board to capture data and deliver it to the computer. This board also serves as a link between the coordinate board and the sensor board. They conducted several tests on 16 persons and obtained a success rate of 76.56 percent for the GSR device's ability to detect individuals' emotional states. Another worked on a wireless sensor network (WSN) to continuously monitor patient physiological circumstances using ZigBee. When a caregiver is present but cannot maintain continual eye contact with the patient, they utilize a heartbeat sensor, a temperature sensor, and a saline level sensor to monitor the patient's health. These sensors transmit data to the caretaker's mobile device through Bluetooth.

3. Results and Discussion

Cardiac monitors have recently been used to diagnose current and help predict future, beneficial health concerns in both homes and hospitals [25]. Several businesses are developing commercial devices to respond to a variety of challenges, especially in the field of medical applications, where wireless technology is still relatively new.

Biomedical Engineering is a medical field application that combines engineering design and problem-solving skills with medical and biological science to improve patient health care and quality of life. Biofeedback has recently gained popularity as a relaxing aid. Biofeedback-assisted relaxation exercises can help users reduce stress and improve the effectiveness of physical and mental relaxation. Advances in healthcare management technology can help people avoid future health concerns. This also helps physicians to take appropriate action or measures concerning the patient's health promptly.

The Internet of Things based on the Smart Healthcare system has had a huge impact on the increasing demand for wearable devices in recent years. Wearable Internet of Things (IoT) devices generate significant amounts of personal health data for their users. When it comes to using IoT resources, enabling technologies such as cloud computing, fog computing, and big data is the key to success.These enabling services, whether provided by remote or local servers, facilitate clinical processes in the health care system. IN the long-term health care information system, data transfer, signal processing techniques, and machine learning models are used to manage patient medical data. Traditional remote health care information systems are stored on the remote server.

4. Conclusions

From now on, even with our technological advancement, there is no reliable and cost-effective solution available for finding pressure. Although there are many mobile apps available about e-Health, there is no application to accurately measure pressure. Our work uses pre-identified pressure markers to determine the level of stress with a cheap hardware and relatively high accuracy. Since this method involves the EEG, we analyze the user's positive attitude with the help of brain rhythms. This is the reason for improved accuracy and, soon, there will be invisible solutions to detect stress levels with a small hardware. We have reduced the computer hardware modules required by writing effective stress analysis programs and by exchanging high-precision transactions at the expense of complex devices.

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