

REAL-TIME EMG DATA COLLECTION AND MONITORING SYSTEM USING ESP8266 AND EMG SENSOR DEVICE

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ABSTRACT- An EMG is a device for counting and recording very small electrical impulses that occur when muscles perform movements. In the EMG system, a wireless link will be used to facilitate the transmission of real-time medical information. To record EMG sensor readings, various network protocols are used to communicate. However, the previous technology could not help to see the condition of the muscles directly. Therefore, Players cannot avoid their muscle cramps because they lack effective equipment to monitor muscle health that can control their daily muscle rate. Players need to go to the hospital for muscle testing and take a long time for testing and recovery. Therefore, with the existence of IoT technology able to overcome the problem easily and effectively by only using the EMG sensor device and through the help of the ESP8622 WiFi Module. In the future of virtual consultation for remote medical care, IoT will be able to provide efficient data connection from multiple locations (Philip, N.Y.; Rodrigues, J.J.P.C.; Wang, H.; Fong, S.J.; Chen J, 2021).

Keywords: EMG Sensor, Esp8266, Arduino IDE, MySQL

1. INTRODUCTION

The aim of this research is to build a real-time EMG data collection and monitoring system using esp8266 and EMG sensor device and then compare the results of muscle performance under various different scenarios that indicate the player's muscle condition. The scope of this research focuses on sports players as it involves the arm on the radial and ulnar muscles. The scope of this study is focused on sports players because it involves the arm muscles. Athletes can view their muscle health rates via their mobile phones which will be uploaded to MySQL. This project also discusses the extent to which these IoT network technology issues can help in this research.

2. METHODOLOGY

The method used to conduct this study is to use the EMG Sensor device. The sensor's EMG readings are displayed in the form of a cloud-based table that is read through the NodeMcu. Arduino IDE is used to upload the source code to the NodeMCU to get the EMG sensor reading and there are two 9V battery supplies connected to the EMG sensor device for power supply. The system is run under several different scenarios such as reading EMG sensor readings before and after performing sports activities. The results obtained are then analyzed to understand the performance of the player's muscles when there is pressure on the muscles.

3. RESULT AND DISCUSSION

The EMG sensor test shows the detection of the pulse of the player's arm muscles. The notification test successfully triggers notifications according to the specified conditions, indicating that the system is working properly. The usability test, carried out with 3 sportsmen, yielded positive results, demonstrating the functionality of the system. The network performance test was considered successful as a well-performing system, with minimal impact on transfer rates and latency due to data transfer. Overall, this test confirms the effectiveness, reliability and user satisfaction of the real-time EMG data collection and monitoring system using esp8266 and EMG sensor device.

4. NOVELTY OF RESEARCH / PRODUCT

The novelty of this research project is the development of real-time EMG data collection and monitoring system using esp8266 and EMG sensor device that overcomes the weaknesses of the muscle monitoring system. The system offers effective real-time monitoring by integrating IoT Technologies including EMG sensor devices, ESP8266 Wifi Module and NodeMCU microcontrollers. Muscle monitoring system obtain advanced capabilities with the implementation of EMG sensors to measure muscle pressure on sports players. With the help of this project, the vending machine business will be better to monitor and control the occurrence of muscle stress while playing sports that can cause muscle defects and can increase player productivity.

5. CONCLUSION

By using IoT technology, the Muscle Monitoring system project has successfully addressed the issues faced by sports players to monitor the state of their muscle health. This system has been produced with the use of EMG sensor and ESP8266 WiFi Module as well as MySQL data collection which serves as a hub for data collection and analysis. The project met its goals, resolved issues and opened up opportunities for further progress in the future.

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