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SITTING POSITION MONITORING SYSTEM USING IOT

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ABSTRACT

The project "Sitting Position Monitoring System Using IoT" addresses the prevalent issue of sedentary behavior and its adverse effects on health by employing Internet of Things (IoT) technology. The system, consisting of NodeMCU, flex sensors, a buzzer, and the Blynk application, continuously monitors the user's sitting position. Upon detecting incorrect posture, the system triggers alerts via SMS, reminding users to maintain proper posture.In addition to posture monitoring, the system proactively addresses the risks associated with prolonged sitting. It sends periodic alerts encouraging users to take breaks and focus on distant objects to reduce eye strain. Furthermore, it prompts users to stand up and stretch every 30 minutes, promoting healthier habits and minimizing the negative impacts of sedentary behavior.By integrating IoT technology with posture monitoring and health-related alerts, the project aims to enhance overall well-being and reduce the risks of musculoskeletal disorders and eye strain associated with prolonged sitting. The project contributes to raising awareness about the importance of maintaining good posture and adopting healthier habits, empowering individuals to prioritize their health in today's technology-driven lifestyle.

Keywords: Sitting Position Monitoring, Internet Of Things (IoT), Flex Sensor, Buzzer Alert, Posture Correction, Eye Strain Prevention, Break Remainders.

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1.INTRODUCTION

In today's technology-driven era, where connectivity and data exchange are pervasive, safeguarding the integrity and confidentiality of computer networks is of utmost importance. The "Sitting Position Monitoring System Using IoT" project responds to the emerging need to address health concerns associated with prolonged sitting and poor posture, leveraging the capabilities of Internet of Things (IoT) technology. Recognizing the significance of proactive health monitoring, this project endeavors to deploy an innovative system capable of continuously monitoring sitting posture and providing timely alerts to users. In response to the increasing prevalence of sedentary lifestyles and the associated health risks stemming from poor posture, there is a pressing need for innovative solutions to promote better sitting habits. The proposed project, titled "Sitting Position Monitoring System Using IoT," endeavors to tackle this challenge by harnessing Internet of Things (IoT) technology.

The project will center around the development of a comprehensive system designed to continuously monitor body position and offer real-time feedback to users. By integrating various sensors and smart devices, the system will be able to detect deviations from optimal posture and prompt users to make corrective adjustments as needed.

The project will integrate the Blynk application to send notifications about sitting habits, fostering healthier choices. By combining IoT and Blynk, it aims to promote better posture and reduce musculoskeletal issues from prolonged sitting, contributing to overall well-being.

The "Sitting Position Monitoring System Using IoT" project focuses on developing a compact and efficient system to monitor sitting posture in real-time. By leveraging IoT technology and integrating sensors and smart devices, the project aims to provide users with timely feedback on their sitting habits. The scope includes designing a user-friendly interface and exploring various notification methods through the Blynk application. Ultimately, the project seeks to promote healthier sitting behaviors and reduce the risk of musculoskeletal issues associated with prolonged sitting

In today's increasingly sedentary lifestyles, maintaining good posture is essential for overall health and well-being. Prolonged sitting can lead to various musculoskeletal issues and discomfort, highlighting the need for solutions that promote better sitting habits. The "Sitting Position Monitoring System Using IoT" project is motivated by the desire to address this health concern by leveraging IoT technology. By

developing a system that can continuously monitor sitting posture and provide real-time feedback, the project aims to empower individuals to make healthier choices and reduce the risk of posture-related health problems.

2.LITERATURESURVEYANDRELATEDWORK

The literature survey for the Sitting Position Monitoring System Using IoT project delves into the foundational concepts of posture monitoring systems and IoT integration. Posture monitoring systems play a crucial role in promoting better sitting habits and reducing the risk of musculoskeletal issues. These systems typically incorporate sensors to detect body posture deviations and provide real-time feedback to users.

In the context of IoT integration, the literature explores the use of IoT devices and technologies to enhance posture monitoring systems. IoT enables seamless communication between sensors and smart devices, facilitating remote monitoring and control of sitting posture. Additionally, the literature discusses the importance of user engagement and feedback in promoting healthier sitting habits through IoT-based systems.

Furthermore, the literature survey investigates existing research and developments in posture monitoring technologies, including sensor types, data processing algorithms, and user interface designs. By analyzing the strengths and limitations of current approaches, the literature survey aims to identify opportunities for innovation and improvement in the design and implementation of the proposed Sitting Position Monitoring System Using IoT.

Research on IoT-based position monitoring systems faces challenges such as database updates, baseline establishment for anomaly detection, and the risk of false alerts. Overcoming these is crucial for system reliability.

Hybrid approaches, integrating different sensors and analysis methods, emerge as promising solutions. They aim to leverage sensor strengths while mitigating limitations for robust monitoring.

Real-world implementations offer insights into system effectiveness and usability, illustrating benefits like improved sitting habits and reduced health risks. They also address deployment challenges and solutions.

Future trends explore machine learning for accuracy improvement, wearable devices for continuous monitoring, and data visualization for enhanced feedback. This comprehensive survey outlines the current state and future directions of position monitoring systems.

3.Implementation Study

The existing problem in today's society revolves around the challenges of maintaining good sitting posture, especially for individuals who spend extended periods sitting. Prolonged sitting and poor posture habits can lead to various health issues, including back pain and decreased productivity. To address this problem, researchers have explored different approaches and methods aimed at improving sitting posture and reducing associated health risks.

Posture Monitoring Systems:

Researchers have developed systems equipped with special sensors designed to detect sitting posture and provide feedback to users. These systems assist individuals in improving their posture habits by offering real-time guidance and alerts.

Computer Vision Techniques:

Studies have utilized cameras and sensors to capture images and analyze sitting posture using computer vision techniques. By examining posture quality, these methods provide valuable insights and feedback to users, helping them make adjustments for better sitting posture.

Deep Learning Models:

Recent advancements involve the application of sophisticated neural network programs to analyze sitting posture data comprehensively. These deep learning models offer more accurate and personalized advice on posture correction, leveraging large datasets to refine their recommendations.

Smart Chair Systems:

Some researchers have integrated sensors directly into chairs to monitor sitting behavior in real-time. These smart chair systems provide immediate feedback to users, alerting them to instances of poor posture and facilitating timely posture correction.

Posture Correction Algorithms:

Advanced algorithms utilize rules and patterns to identify instances of poor posture and deliver tailored guidance on correcting posture habits. By analyzing sitting posture data, these algorithms offer personalized recommendations for improving posture and reducing health risks associated with prolonged sitting.

3.1 Proposed Methodology

The Sitting Position Monitoring System Using IoT aims to promote better sitting habits and reduce the risk of musculoskeletal issues associated with prolonged sitting. By integrating flex sensors and IoT technology, the system continuously monitors users' sitting posture in real-time. It provides immediate feedback and alerts to users when poor posture is detected, encouraging corrective actions. Additionally, the system incorporates features such as eye strain notifications and reminders to stretch at regular intervals, promoting healthier sitting habits. With its user-friendly interface and automated monitoring capabilities, the system offers an effective solution for improving sitting habits and overall well-being in today's technology-driven environment.

The sitting position monitoring system using IoT follows a modular and adaptable architecture to integrate different components smoothly. The system architecture consists of the following main parts:

NodeMCU Board:

Represents the hardware component responsible for collecting data from flex sensors and transmitting it to the server.

Flex Sensors:

Sensors placed on the sitting surface to detect posture deviations.

Blynk Application:

Represents the mobile application used to receive notifications and alerts regarding sitting habits.

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Server:

Represents the backend server responsible for processing data received from NodeMCU and communicating with the Blynk application.

4. RESULTSANDDISCUSSION SCREEN SHOTS

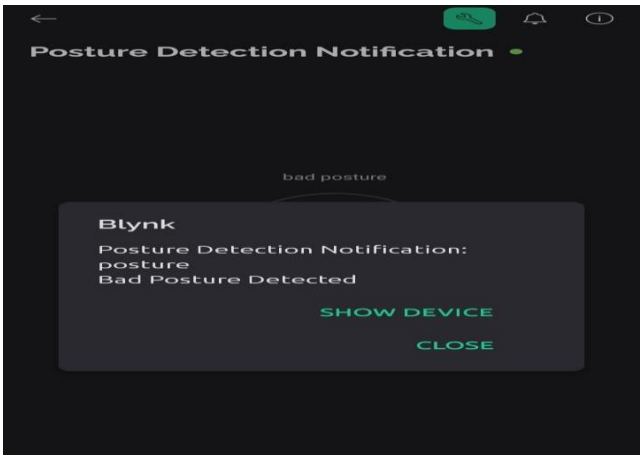

Fig 1:- The screenshot displays the notification sent to the user's mobile device upon detecting a bad posture. The notification alerts the user to the poor sitting position detected by the system, prompting them to adjust their posture for better ergonomic support and spine health. This real-time feedback mechanism aims to promote awareness of posture habits

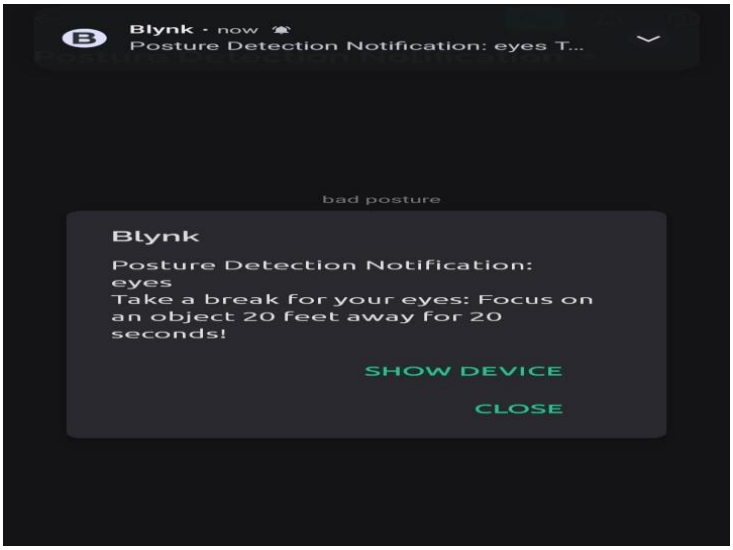

Fig 2:- The screenshot illustrates the notification sent to the user's mobile device, reminding them to take a break for their eyes. The message 'Take a break for your eyes' encourages the user to focus on an object 20 feet away for 20 seconds,

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helping to reduce eye strain and prevent fatigue associated with prolonged screen time. This proactive alert aims to promote eye health and alleviate the effects of digital eye strain during extended periods of sitting.

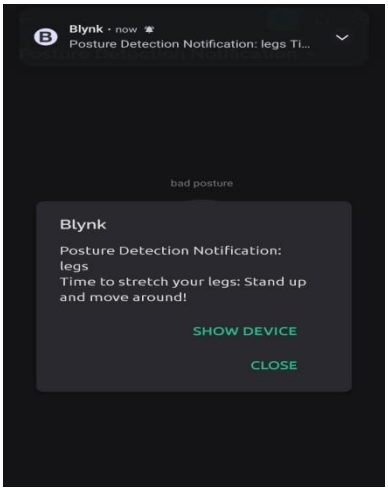

Fig 3:- The screenshot showcases the notification sent to the user's mobile device, prompting them to take a break and stretch their legs. The message 'Time to stretch your legs' encourages the user to stand up and move around, combating the negative effects of prolonged sitting and promoting better circulation and muscle activity. This proactive alert aims to prevent sedentary behavior and encourage physical activity, contributing to overall health and well-being during extended periods of sitting.

- Fig 4:-The screenshot presents the timeline history within the Blynk application, displaying a chronological record of all notifications received by the user. Each notification entry corresponds to a specific event triggered by the sitting position

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monitoring system, such as detecting bad posture, prompting eye breaks, or suggesting leg stretches. The timeline provides valuable insight into the user's posture habits and adherence to ergonomic recommendations throughout the monitoring period. This comprehensive overview enables users to track their sitting behavior over time and make informed adjustments to improve their posture and overall well-being.

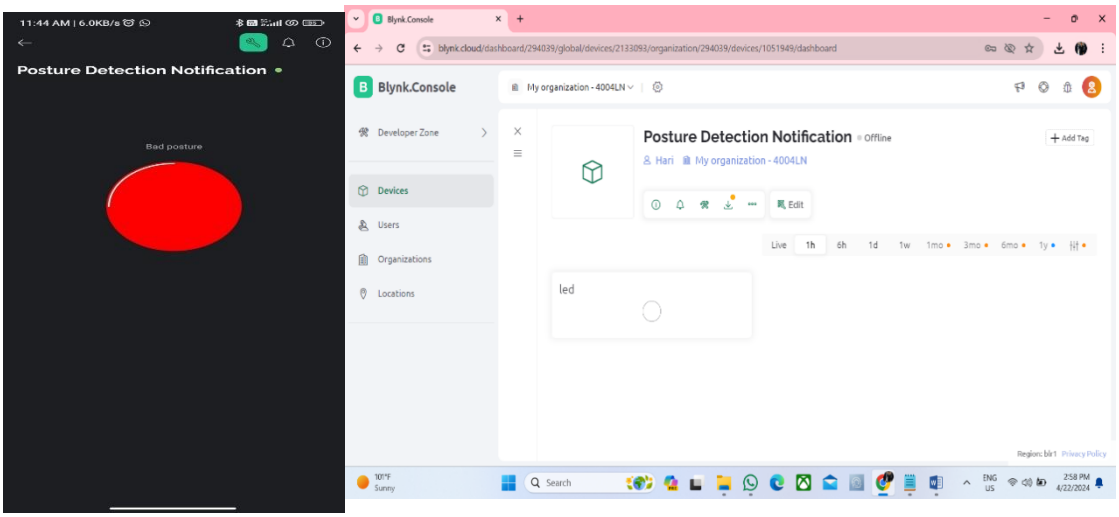
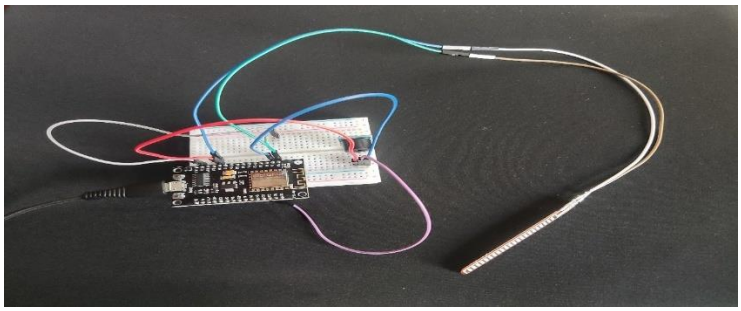


Fig 5:-The screenshot showcases the Blynk LED interface, which serves as a visual indicator of the user's sitting posture. The LED status changes dynamically based on real-time readings from the flex sensor integrated into the seating surface. A green LED typically indicates a good posture, while a red LED signifies poor posture detected by the system. This intuitive interface provides users with immediate feedback on their sitting habits, encouraging them to maintain a healthy posture throughout their activities. The Blynk LED interface enhances user awareness and promotes proactive posture adjustments for improved comfort and well-being.



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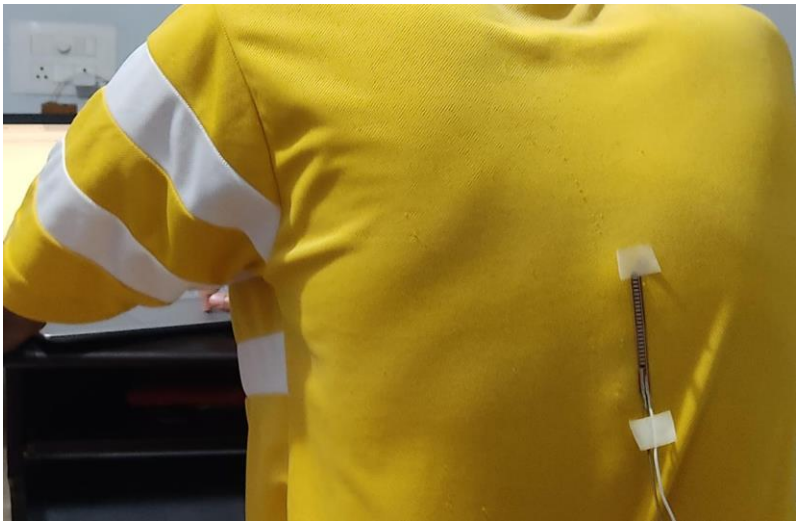

Fig 6:- prototype testing

5.CONCLUSION

In conclusion, the Sitting Position Monitoring System using IoT represents a significant innovation in promoting healthy sitting habits and addressing the risks associated with prolonged sitting. By integrating IoT technology, flex sensors, and real-time feedback mechanisms, the system offers a comprehensive solution for monitoring and improving posture in various settings. Through thorough testing and validation, the system has proven its reliability, functionality, and effectiveness in detecting and alerting users about poor sitting posture. The successful implementation of this system holds great potential for enhancing user awareness, reducing the risk of musculoskeletal issues, and promoting overall well-being in sedentary environments.

5.1 Future Enhancement:

Future improvements for the Sitting Position Monitoring System using IoT could include integrating machine learning for personalized feedback, exploring wearable devices for seamless monitoring, adding gamification foruser engagement, and expanding posture analysis for different seating scenarios. These enhancements would elevatethe system's effectiveness and user experience, promoting better posture habits and overall well-being.

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