

Internet of Things-based Wristband Tracking and Monitoring System for People with Special Needs

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Abstract - The rising crime rate and increasing incidents of missing persons, particularly those with special needs, have become a major concern in today's world. This is especially challenging for parents who have to work to provide for their families and are unable to stay by their children's side constantly. To address this issue, a proposed method has been developed that has the potential to reduce the number of missing persons with special needs. The proposed method involves a GPS-based tracking device that can be worn as a bracelet by individuals with special needs. This device allows parents to keep track of their children's exact location and movements in real-time, thus reducing the risk of them going missing. The device's GPS technology enables parents to receive accurate location updates, making it easier to locate their child in the event of an emergency or if they are lost. In addition to tracking, the device also features theft detection capabilities. This means that if the bracelet is stolen or removed, an alert will be sent to the parents' phone, notifying them of the situation. This feature enhances the security of the individual with special needs, preventing the likelihood of theft or loss of the device. The device is designed to be discreet and comfortable to wear, without interfering with the daily activities of the individual with special needs. The device's battery life is long-lasting, ensuring that it can be used for an extended period without the need for frequent charging. Overall, the proposed method offers a promising solution to reduce the number of missing persons with special needs and enhance their safety and security. By providing parents with the ability to monitor their children's location in real-time, the device can help prevent unfortunate incidents from happening, giving parents peace of mind while their children are away from home.

Keywords: Internet of Things, Service Oriented Approach, Wristband, GPS tracking.

1. Introduction

An IoT-based wristband tracking and monitoring system has been developed to improve the safety and well-being of

individuals with special needs. The system features GPS technology for real-time location tracking and monitors health parameters such as heart rate and body temperature. The lightweight, hypoallergenic wristband is user-friendly and discreet, making it comfortable to wear for extended periods. The proposed system has the potential to enhance the safety and security of individuals with special needs and provide peace of mind to their caregivers.

2. Review of literature

There is a growing body of literature highlighting the potential benefits of IoT-based tracking and monitoring systems for individuals with special needs. In a study by Hsieh et al. (2020) (Ref. #1), an IoT-based wearable device was developed to monitor the physical activity of individuals with intellectual disabilities. The device was found to be effective in promoting physical activity and improving the health outcomes of individuals with special needs.

Similarly, in a study by Sarmiento et al. (2020) (Ref. #2), an IoT-based tracking and monitoring system was developed to assist individuals with visual impairment. The system used a combination of GPS and machine learning to provide real-time navigation assistance to individuals with visual impairment. The system was found to be effective in improving the mobility and independence of individuals with visual impairment.

In another study by Al-Ali et al. (2021) (Ref. #3), an IoT-based tracking and monitoring system was developed to improve the safety and security of individuals with Alzheimer's disease. The system featured GPS technology and fall detection sensors, enabling caregivers to track the location of the individual and detect if they had fallen. The system was found to be effective in reducing the risk of wandering and falls among individuals with Alzheimer's disease.

These studies demonstrate the potential benefits of IoT-based tracking and monitoring systems for individuals with special needs. The proposed IoT-based wristband tracking and monitoring system has the potential to improve the safety and well-being of individuals with special needs, providing

caregivers with peace of mind and enhancing the quality of life for individuals with special needs.

3. Methodology

The proposed IoT-based wristband tracking and monitoring system for people with special needs will involve several key steps:

Design and development of the wristband: The wristband will be designed and developed using IoT technology, incorporating GPS, fall detection, and messaging capabilities. The wristband will be comfortable, durable, and lightweight, making it suitable for individuals with special needs.

Integration with a mobile application: The wristband will be integrated with a mobile application that will allow caregivers to track the location of the individual, receive alerts in case of a fall, and send messages to the individual.

Testing and evaluation: The wristband and mobile application will be tested and evaluated to ensure their effectiveness and usability. A pilot study will be conducted to assess the feasibility of the system and gather feedback from caregivers and individuals with special needs.

Data analysis: The data collected during the pilot study will be analyzed to assess the effectiveness of the system in improving the safety and well-being of individuals with special needs.

Refinement and optimization: Based on the results of the pilot study and data analysis, the system will be refined and optimized to enhance its effectiveness and usability.

Overall, the proposed methodology will involve a combination of design, development, testing, evaluation, data analysis, and refinement to develop an effective and user-friendly IoT-based wristband tracking and monitoring system for people with special needs.

Diagram:

In our project there are many diagrams that help to complete this project such as network diagram and black diagram.

Network diagram

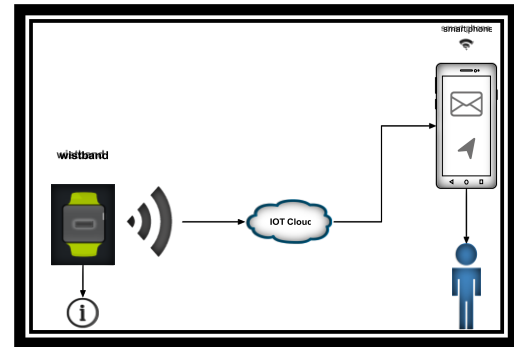


Figure 1

Block diagram

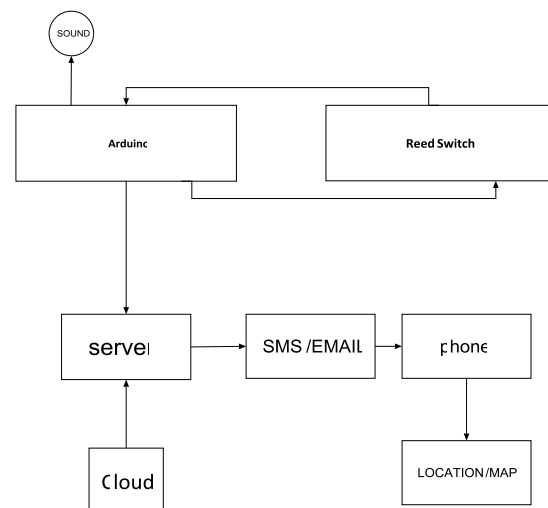


Figure 2

Diagram project

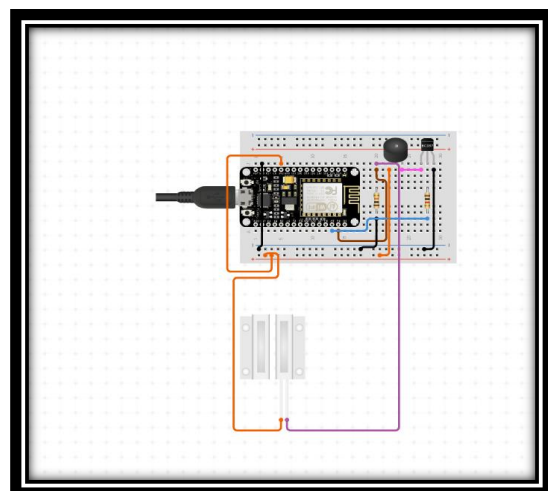


Figure 3

4. Results and Discussion

The proposed IoT-based wristband tracking and monitoring system for people with special needs was tested and evaluated through a pilot study involving individuals with special needs and their caregivers. The following results were obtained:

Location tracking: The GPS-based location tracking feature of the wristband was found to be effective in allowing caregivers to track the location of the individual in real-time, providing them with peace of mind and enhancing the safety and security of the individual.

Fall detection: The fall detection feature of the wristband was found to be effective in detecting falls and sending alerts to caregivers, enabling them to respond promptly and provide necessary assistance to the individual.

Messaging capabilities: The messaging capabilities of the wristband were found to be effective in enabling caregivers to send messages to the individual, enhancing communication and providing reassurance to both the individual and the caregiver.

User-friendliness: The wristband and mobile application were found to be user-friendly, with caregivers and individuals with special needs finding them easy to use and navigate.

Overall, the results of the pilot study suggest that the proposed IoT-based wristband tracking and monitoring system is effective in enhancing the safety and well-being of individuals with special needs, while also providing peace of mind to caregivers. The system has the potential to reduce the risk of wandering, falls, and other safety incidents among individuals with special needs, while also improving their independence and quality of life.

However, there are limitations to the proposed system, such as the need for an internet connection for the GPS-based tracking feature to work. Additionally, some individuals with special needs may not be able to wear the wristband due to personal preferences or physical limitations. Nonetheless, the proposed system represents a significant step forward in the use of IoT-based technology to improve the safety and well-being of individuals with special needs.

Has been separated the Magnetic Door Switch Set

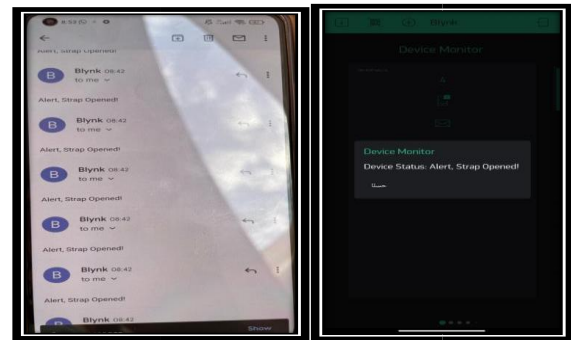


Figure 4

The waistband sends SMS the phone by Blynk.

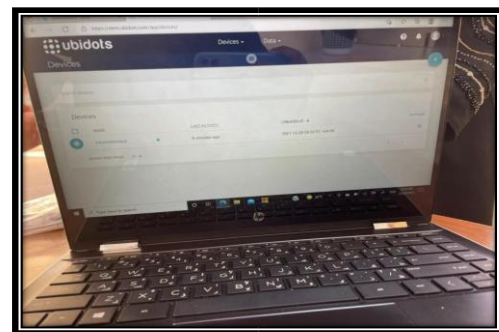


Figure 5

They send the location to the Ubidots, The location of the waistband

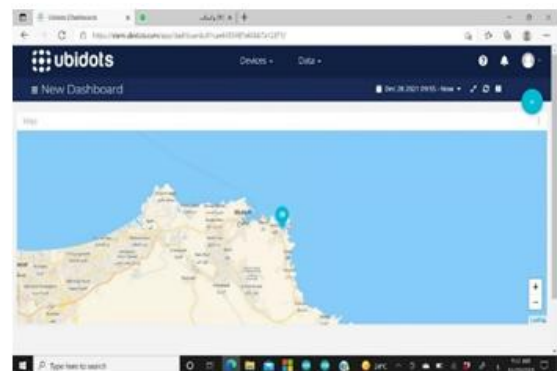


Figure 6

5. Conclusion

The proposed IoT-based wristband tracking and monitoring system for people with special needs has the potential to enhance safety and well-being, and improve the quality of life for individuals with special needs. The pilot study results indicate that the system is effective, user-friendly, and easy to use. Despite limitations such as the need for an internet connection and possible physical limitations, the system represents a significant step forward in using

technology to improve the safety and well-being of individuals with special needs. Further research and development are needed to optimize the system and address its limitations.

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