Guidance for Sleepwalkers and Caretakers using IoT

Roxanna Samuel[1], T. S. Kavin[2], Harshitha Sonthi[3], K. Kavin Kumar[4]

[1]*Assistant Professor, Department of Computer Science, Rajalakshmi Engineering College, Chennai, India*
[2,3,4]*Student, Department of Computer Science, Rajalakshmi Engineering College, Chennai, India*

Abstract: **Somnambulism is a disorder where a person gets involved in activities like walking, driving, etc. without consciousness. We consider an adult who is suffering from somnambulism. Our main idea is to develop an IOT device which will prevent that person from moving out of his/her room. The entrance of the room will be set as a boundary which on crossing the guardian residing in the home will be informed by an alarm. Also, from the time the person wakes up, this IOT device starts recording the surroundings which can be viewed in the guardian's phone. This will help the guardian to find out where the person is. This system is designed to work on the principles of assistive technology.**

Keywords: **Sleepwalker, Somnambulism, IoT, Arduino Uno, GSM, Wearable device.**

1. Introduction

A medical disorder of sleep patterns of a person or an animal is generally referred to as somnipathy or sleep disorder. Some of these sleep disorders have a serious impact on the physical, mental and social functioning of the individual. Sleep disorders include sleepwalking, teeth grinding, night terrors. Somnambulism affects mostly children aged 6-12 years. Patients with this disorder carry out automatic motor activities during sleep. The patients have no memory of the event. The individuals may walk, eat or exit from the house. Any attempt to awake them would lead to agitation or even violence. The motivation for the project arose from an article which stated that the author's grandfather was suffering from somnambulism. Caring for someone who sleepwalks can be worrisome. You never know what they're going to do or where they'll end up. It can be dangerous for themselves as well as others too. In order to overcome this problem, we decided to develop a system which will help out the family members as much as possible.

2. Literature survey

Many research papers which are related to Guidance for Sleepwalkers and Caretakers using IOT have been referred.

In the paper [2], a passive infrared sensor has been used to detect the movement of the sleepwalker and it sends a message upon which the cameras will be activated.

The main objective of the paper [5] is to find out the positional information about the aged wanderers and infants using a GPS module which is fixed in a shoe. The dual-band antenna corresponding to GPS and WI-FI band is installed on the sleepwalker's shoe in order to find out the live location of the sleepwalker.

The GSM900A concept has been used in the paper [6] to send an SMS as CHECK for monitoring body temperature, blood pressure, heart rate and fall detection. The body condition is tested with the help of an ECG signal.

The paper [1] implements live feed of the sleepwalker can be viewed by the help of passive infrared sensor. This detects the movement of the intruder and sends an alert to the owner or the guardian who is at home.

In the paper [3] Passive Infrared sensor is also used to recognize gestures and movements of the people.
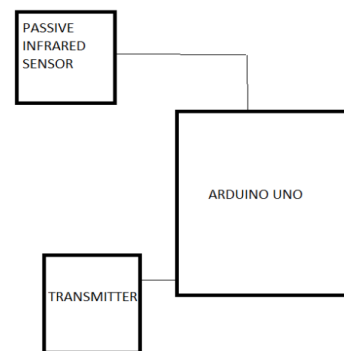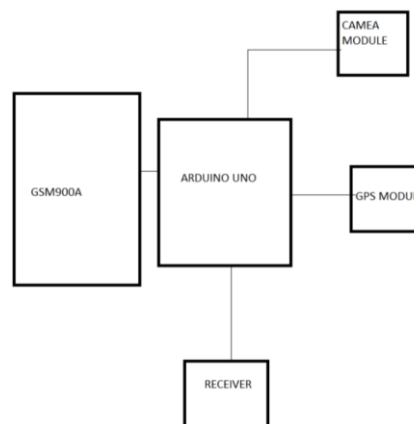
3. Proposed system

Fig. 1. Block diagram (Module-1)

Fig. 1. Block diagram (Module-2)

International Journal of Research in Engineering, Science and Management
Volume-3, Issue-1, January-2020
www.ijresm.com | ISSN (Online): 2581-5792

39

The Arduino Uno R3 is a microcontroller board which consists of 20 digital input or output pins. They are capable of reading inputs like finger on a button, light on a sensor and then these inputs turn out to give relevant outputs like switching on LED, motor, etc.

The PIR sensor is used to detect the presence of humans who are in it is proximity. They are generally used in the security alarm systems to detect motion of an infrared emitting source. These sensors only give information that some object moved. They don't give information about who or what object moved.

The GSM900A module is used to make phone calls and send messages to other phone numbers from the system. This module contains a slot where sim card must be inserted to make calls and send messages.

The Camera module used here is OV7670. This camera has high sensitivity and can work well even when light is low. This camera can automatically reduce the noise from the environment.

Transceiver module contains a transmitter and a receiver. Where transmitter sends a signal to the receiver.

GPS module used is the UBLOX NEO-6M module which is used to track the location of the patient accurately.

In this system there are two modules. First module (fig. 1) is attached to the door of the sleepwalker's room and second module (fig. 2) is attached to the sleepwalker as a wearable device. Whenever the sleepwalker gets into motion the PIR sensor attached to the door senses the motion and the transmitter attached to the sensor sends a signal to the receiver which is fixed in the wearable device worn by the sleepwalker. When the receiver gets a signal it activates the GSM900A module to make a call to the guardian of the sleep walker. The GSM keeps calling the guardian till he/she picks up the call. The Camera module is also activated simultaneously to record the sleepwalker's surroundings and this can be seen live by the guardian. The GPS module tracks the latitudinal and longitudinal locations of the patient and sends them to the guardian via the GSM module.

4. Future scope

This project and system can be developed further by adding more modules such as fall detection system where the wearable device can detect if the sleepwalker fell down. Another Module which can be added is a sleep tracking module like the ones used in fitness bands. This module proves more helpful for the sleepwalkers to analyze their sleep patterns and also for medical treatment purposes.

5. Conclusion

IOT based guidance for sleepwalkers and caretakers can prove to be a helpful system for the guardian who is in house. We can know the movement and location of the patient in the proposed system. If the patient crosses the door, the movement is detected by PIR sensor. Eventually, a phone call will be sent to the guardian and the location of the patient will be sent as an SMS. This system serves a reliable and efficient solution for all the guardians who are worried about the patients with sleepwalking disorder.

References

[1] Amirush Javare, Tushar Ghayal, Jayant Dabhade Ankur Shelar, "Access Control and Intrusion Detection in Door Lock System using Bluetooth Technology", International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS-2017).

[2] Anwar Hossain, Abdulmotaleb El Saddik, "A Multimedia Based System for Monitoring Sleepwalkers," IEEE international conference 2017.

[3] David Binnie, "A passive infrared gesture recognition system," IEEE international conference 2017.

[4] Smriiti Singhal, "Wireless Monitoring of Sleepwalkers" ICECDS-2017.

[5] Tetsuya Nakamura, Yoshinobu Okano, "Development of GPS antenna mounted on shoes for human's position observation," IEEE Trans. Syst., Man, Cybern, vol. 37, pp. 311-324, 2007.

[6] R. Veyilazhaga and V. Bhanumathi, "An Outdoor Intelligent Health Care Patient Monitoring System," IEEE International Conference on Innovations in Green Energy and Healthcare Technologies (ICIGEHT'2017).