Development of IoT based Key Finder

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Abstract

Typically, we misplace our keys and hunt for them throughout the home, eventually locating them with much difficulty after a long search. Therefore, we propose to develop a basic IoT-based Key finder utilizing NodeMCU, Buzzer, and Battery in this paper. In this paper, the development of key chain which can be attached to the keys will be explained. The paper also includes the creation of a website dedicated to the search for the missing keys. The missing keys can be located using a mobile phone's Google Chrome browser. When the webpage is enabled to find the missing keys, the designed IoT-based keychain is equipped with a buzzer that will make a beep sound. The developed IoT based key finder is important in terms of keeping track of the keys and could also save time.

Keywords: Key Finder, Internet of Things (IoT), NodeMCU, Google Chrome

1. Introduction

Generally, people misplace their keys and search the entire home for them, only to discover them after a long search. It is very easy to misplace keys, and it can be a stressful situation if they do not have any spares. This is the twenty-first century, and there are tools that can assist anyone in quickly locating missing keys. When they are within a certain distance, some of them make loud noises, while others utilize GPS and Bluetooth to show information on your smartphone. However, adding modules like GPS and Bluetooth to the gadget can make it overly big and heavy[1]. Hence, this study aims to build a simple IoT-based Key finder by using NodeMCU, Buzzer, and Battery. This project will be built in a form of a key chain which can be attached to your keys. The project also aimed to develop a webpage dedicated to find the missing keys. The missing keys can be found using google chrome webpage from the mobile phone. The developed IoT based keychain is equipped with a buzzer which will produce beep sound when the webpage is activated to find the missing keys.

According to a survey of 1,000 U.S. adults conducted by Bluetooth tracking startup Pebblebee.com, one in every five people loses or misplaces personal items every week [2]. Car keys are the most frequently misplaced items. Twenty-eight percent said they look for an item for less than a week before accepting it as lost forever. This

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shows that everyone misplaces personal items, particularly keys. This is a big issue because no one has time to seek for a missing key in today's world. These misplaced keys might sometimes end up in the hands of the wrong individuals, causing everyone to suffer as a result of their oversight. Therefore, this paper has proposed an IoT-based Key to tackle this challenge. With this idea, the misplaced key will make a buzzer sound to get our attention and find our lost key.

2. Prior Study

Several studies have been conducted on IoT based detection and tracking system. One of the examples is the IoT based fire alarm system. Asma Mahgoub, Abdullah al-Ali, Nourhan Tarrad, (2019) has designed an IoT based fire alarm system. The author has proposed an IoT based wireless fire alarm system that is easy to install. The proposed system used an ESP8266 microcontroller. Each microcontroller is connected to different kind of sensors (temperature, smoke, humidity). The system also consists of a buzzer to alert the user. An Arduino was used to program the microcontroller. The ESP8266 has been programmed to send a SMS to the fire department and the user, also call the user and alert the house by producing an alarm sound. An app was created by author to send message to the user. The proposed system was able to achieve its goals which were mainly building an IoT based fire alarm system that was capable of detecting the presence of fire and call or sent SMS to the necessary parties when a fire is detected[3]. The drawback of this system of the study is that it could have used a rechargeable battery source instead of a power supply.

IoT was also incorporated widely to Human Activity Recognition (HAC) by monitoring the vital signs remotely. Diego Castro, William coral, Camila Rodriguez (2017) has designed a wearable-based human activity recognition using IoT based devices. The proposed system used an ESP8266 microcontroller. Each microcontroller program to detect the data from the sensors (heart rate, respiration rate, skin temperature). An application has been created to record the data that were taken from the sensors. These data can be checked by a medical professional daily. If the patient lives far away from a medical assistance a call or a SMS will be sent to a hospital to monitor the patient any vital sign are showing any problem. The proposed system was able to achieve its objective which was to build a human activity recognition IoT based device to monitor and record their vital signs. Also, to send a SMS or call the hospital if any sign doesn't see normal[4]. The drawback for this system is that it can be more lightweight and instead of putting

the device in waist it can be build smaller so it can fit in the arm.

IoT technology was also used in the child safety and tracking device where it is developed to help the parents to locate and monitor their children. M Nandini Priyanka, S Murugan, K N H Srinivas, T D S Sarveswararao, E Kusuma Kumari (2019). The proposed system is developed using a linkit One board and the system is interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The system will automatically alert the parents by sending SMS, when immediate attention is required for the child during emergency. The parameters such as touch, temperature &heartbeat of the child are used for parametric analysis and results are plotted for the same. An application was created by the author to record these results obtained. The proposed system was able to achieve its objective which was to build an IoT based device for child safety and tacking[5]. The drawback for this system is that there will be charges for SMS services.

Moreover, IoT was also used to perform automated irrigation by using Android Application. The irrigation robot was equipped with eight wheels to facilitate the movement of the robot[6]. The robot was also equipped with two ultrasonic sensors of any obstacle at the front and base of the robot to detect obstacles in the front and under the robot. The robot lifts up before moving forward when it detected obstacles in the front and comes back down with the assistance of the base ultrasonic sensor when the obstacle has been passed. This also enabled the system to water the tall plants. Soil moisture and DHT22 sensors are fixed on the land to sense the soil moisture, humidity and temperature. The readings of these parameters are sent to the user vis SMS every one minute. In addition, the user can view the readings of the parameters via Android App. The robot moves forward once and perform the seeding at one point, irrigate the seed and moves to the next point for the seeding process. The robot dispenses seeds automatically at a fixed distance (7 cm)[7].

3. Methods

The IoT based key finder system proposed in this paper is built in a form of a key chain which can be attached to the keys. The proposed system also aimed to develop a webpage dedicated to find the missing keys. The missing keys can be found using google chrome webpage from the mobile phone. The developed IoT based keychain is The block diagram and the flowchart of the proposed system is shown in Figs. 1 and 2, respectively.
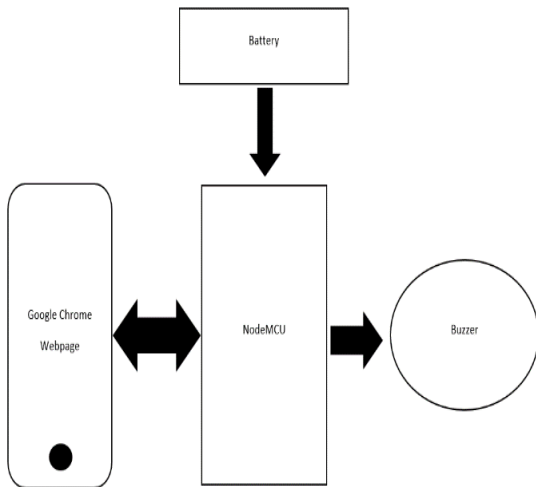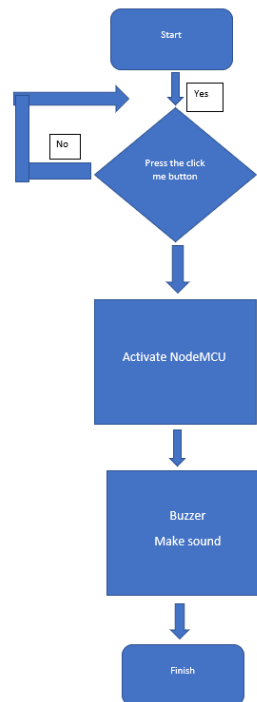
Fig.1. Block Diagram of the system

Fig.2. Flowchart of the system

4. Results and Discussion

4.1. *Hardware of IoT based Key Finder*

The circuit of the IoT based key finder assembled on PCB is shown in Fig. 3. The circuit is covered with a plastic cover as shown in Fig. 3. The key finder has been designed to be small and light. The weight of the key finder is only 20g and the size of the key finder is only 9 cm by 6cm. Hence, it is feasible to bring it everywhere.

4.2. *Google Chrome Webpage*

A webpage dedicated to find the missing keys is developed. The missing keys can be found using google chrome webpage from the mobile phone as shown in Fig.4.

Fig. 3. Hardware of IoT based key finder

Fig. 4. GUI of the Webpage

First, the user has to connect the NodeMCU to user device using device hotspot. In the next stage, enter Wi-Fi credentials like the username and password for the Wi-Fi router to which your NodeMCU should connect with. Once connected the user can type in the IP address (192.168.1.2) of the device to open the webpage shown

in Fig. 4. This webpage is created using HTML code. This code is then programmed into the NodeMCU. When the 'click me' icon is clicked in case where the key is missing, the buzzer will be turned on. Once the user has found the key, the user can disable the buzzer by clicking the 'click me' icon again. The system has been tested in various detection distances. The detection range of the key from the mobile is 1m to 15m. The frequency of the sound produced by the buzzer is 6kHz and the user will be able to hear the buzzer sound in 15m range.

5. Conclusion

In this paper, IoT-based Key finder by using ESP8266-01, Buzzer, and Battery has been developed. This system was built in a form of a key chain which can be attached to the keys. The system has developed a webpage dedicated to find the missing keys. The missing keys can be found using google chrome webpage from the mobile phone. The developed IoT based keychain is equipped with a buzzer which will produce beep sound when the webpage is activated to find the missing keys. A number of improvements can be made to the project. A GPS module could have been used in the smart keychain finder. With the help of this keychain finder the user could have easily tracked the missing keys. A message system could have been programmed to alert the user about finding there missing keys. Instead of a webpage the user can use an android app to track the missing keys.

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