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Research Article

Key finder based on IoT

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ABSTRACT

We realize we've misplaced our keys and are frustrated by a massive search of the house. This paper develops a simple IoT-based key discovery method that uses a NodeMCU, a buzzer, and a battery. The method involved creating a key management method designed for key installation and developing a website to assist with key location. With her Google Chrome browser on the user's mobile phone, she can pinpoint the location of the lost key. When the website presses the key search button, it will play an IoT key-related beep and save time by streamlining the process. If you misplace your keys, you may search all over the house, but in the end, you may not be able to find them. This paper is extremely important in that it has developed a method for quickly finding keys using the method described above.

1. Introduction

In today's society, if you misplace your keys, you end up scurrying around the house looking for them. The stress of losing your key becomes extremely high when you don't have a spare. Fortunately, society now has solutions for quickly finding misplaced keys. Some devices make loud noises within range. Other devices use GPS and Bluetooth to display location on a smartphone, but integrating GPS and Bluetooth makes the device larger and heavier [1]

This paper is about creating a key finder based on IoT using NodeMCU, buzzer, and battery. The plan is on a key chain that easily attaches to your keys. This includes the development of his web page dedicated to key tracking accessible in Google Chrome on mobile phones. An IoT keychain is a device that uses a web page to make a sound when a lost key is found.

According to a survey conducted by Pebblebee.com, a Bluetooth tracking startup, one in five individuals in the United States misplaces personal items on a weekly basis [2].

Among these items, car keys are at the top of the list of items that are often left behind. 28% of respondents thought it was lost forever and gave up trying to find it within a week. This is because personal items are often misplaced and keys have become a serious concern. This case is also the most important one, as searching for lost keys requires a great deal of time and effort. Furthermore, if a misplaced key falls into the wrong hands, it is unsafe and undesirable in terms of crime prevention. The novelty of this paper is to solve the problem by inventing a key finder based on IoT, so that when a user misplaces a key and a sound is heard, the user can quickly find and retrieve the lost key. We have developed an innovative technology that can do this.

2. Literature Review

Several research studies have explored the application of IoT-based detection and tracking systems, with examples

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including IoT-based fire alarm systems. In a study by Asma Mahgoub, Abdullah al-Ali, and Nourhan Tarrad (2019), an IoT-based wireless fire alarm system was designed. This system was designed for easy installation and utilized an ESP8266 microcontroller connected to various sensors (temperature, smoke, humidity) along with a buzzer for user alerts. Programming for the microcontroller was done using an Arduino. The ESP8266 was programmed to send SMS notifications to both the fire department and the user, make phone calls to the user, and activate an alarm when a fire was detected. The author also developed a mobile app for user communication. The study successfully achieved its primary goal, which was to create an IoT-based fire alarm system capable of detecting fires and notifying the relevant parties [3]. One limitation of this system is that it relies on a power supply instead of a rechargeable battery source.

IoT technology has also been applied to Human Activity Recognition (HAC) for remote monitoring of vital signs. Diego Castro, William Coral, and Camila Rodriguez (2017) designed a wearable-based human activity recognition system using IoT devices. This system employed an ESP8266 microcontroller programmed to collect data from sensors measuring parameters like heart rate, respiration rate, and skin temperature. An application was developed to record and store sensor data, which could be reviewed daily by medical professionals. In cases where the patient was at a distance from medical assistance, the system could automatically send SMS messages or make calls to a hospital if any vital signs indicated a problem. The primary objective of this system was to create an IoT-based device for monitoring and recording vital signs, as well as alerting medical professionals if necessary [4]. One potential improvement for this system could be a more compact design that can be worn on the arm rather than the waist.

IoT technology has also been applied to child safety and tracking devices, offering parents a means to locate and monitor their children. M Nandini Priyanka, S Murugan, K N H Srinivas, T D S Sarveswararao, and E Kusuma Kumari (2019) developed such a system using a LinkIt One board interfaced with sensors (temperature, heartbeat, touch) as well as GPS, GSM, and a digital camera module. This system would automatically send SMS alerts to parents when immediate attention was required for a child during an emergency. Parameters like touch, temperature, and heartbeat were analyzed and recorded using a dedicated application created by the authors. The primary aim of this system was to create an IoT-based device for child safety and tracking [5]. However, it's important to note that there may be associated charges for SMS services.

Furthermore, IoT technology has been employed in automated irrigation through an Android application. The irrigation robot used in this system was equipped with eight wheels to facilitate its movement and two ultrasonic sensors for obstacle detection. When obstacles were detected, the robot would lift up before proceeding. Soil moisture and DHT22 sensors were placed in the soil to measure moisture, humidity, and temperature. These readings were sent to users via SMS every minute, and users could also access the data through an Android app. The robot followed a precise seeding and irrigation process, including automatic seed dispensing at fixed intervals [6], [7].

3. Methodology

The IoT-based key finder system, as presented in this paper, takes the shape of a keychain that can be conveniently attached to keys. Additionally, the project's objective encompasses the creation of a dedicated web page for locating misplaced keys. Users can utilize the Google Chrome web page on their mobile phones to locate their missing keys. For visual representations of the proposed system's structure and operation, please refer to Figs. 1 and 2 which depict the block diagram and flowchart, respectively.

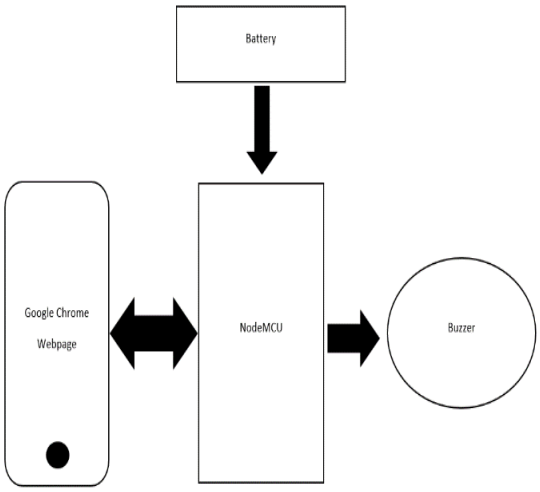

Fig.1. Block Diagram of the system

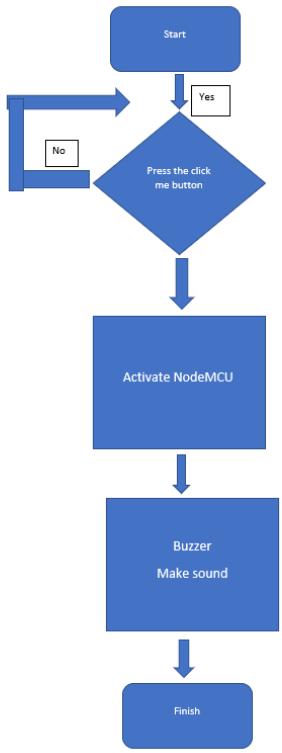

Fig.2. Flowchart of the system

4. Findings

4.1. *Hardware of IoT based Key Finder*

The hardware of the IoT based key finder assembled on PCB is shown in Fig. 3. The key finder has been meticulously crafted to offer a compact and lightweight design. Weighing a mere 20 grams and measuring just 9 cm by 6 cm, it is exceptionally portable and can easily accompany you wherever you go.

Fig. 3. Hardware of IoT based key finder

4.2. *Google Chrome Webpage*

We have created a dedicated web page designed for locating misplaced keys. Users can employ the Google Chrome web page on their mobile phones to track down their missing keys, as illustrated in Fig.4.

Fig. 4. GUI of the Webpage

To initiate the process, the user must establish a connection between their device and the NodeMCU by connecting to the device's hotspot. In the subsequent step, the user should input their Wi-Fi credentials, including the router's username and password, to specify the Wi-Fi network to which the NodeMCU should connect. After establishing the connection, the user can access the device's webpage by entering the IP address (192.168.1.2) into their browser, as depicted in Fig. 4. This webpage has been constructed using HTML code, which has been programmed into the NodeMCU.

In the event of a missing key, the user can activate the buzzer by clicking the 'click me' icon on the webpage. Once the key is located, the user can deactivate the buzzer by clicking the 'click me' icon again. The system's effectiveness has been verified at various detection distances, with the key's detection range from the mobile device spanning from 1 meter to 15 meters. The buzzer emits a sound at a frequency of 6 kHz, which remains audible to the user within a 15-meter range.

5. Conclusion

In this paper, we designed an IoT-based key detector using various parts such as the ESP8266-01, buzzer, and battery. This collection of elements takes the form of a small key chain that can be easily attached to a key. Additionally, a dedicated web page has been created to help find misplaced keys. It can be used from the Google Chrome browser on your mobile phone. When activated via a web page, the IoT-based key chain emits a unique beep, allowing users to search for lost keys.

This plan has several enhancements that can be implemented. Integrating her GPS component into a quick key chain finder allows users to precisely track the location of their keys. Additionally, data and information exchange can be incorporated to notify the user when a lost key is found. This paper also provides a more versatile solution for users to choose an Android app for key tracking, and develops a new technology.

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