Cloud Based Statue Theft Detection using RFID

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Abstract –

***A**utomatic identifying approach using cloud storage, or both storing and retrieving data, is radio-frequency identification (RFID). The cloud-storage RFID position detection technology works by identifying the user-provided tag ID. This technique is based on wireless sensor networks and radio-frequency identification. This project's primary goal is to reduce theft at museums. This study focuses on five distinct strategies, including a location monitoring system, an RFID system for detecting cloning attacks, trauma resuscitation, chipless RFID tag detection, and an RFID-based smart phone absence alert system. However, there are several issues with these approaches. The paper offers a new way to create cloud storage RFID position detection system as a means of resolving these issues and enabling easy access for end users by detecting the tag ID.*

***Key Words: C**loud-Storage, RFID, Cultural relics.*

1. INTRODUCTION

A museum is a facility that looks after a collection of artifacts and other items with scientific, artistic, cultural, or historical significance. These items are made accessible to the public for viewing through exhibits in many public museums, which may be permanent or transient. Our project depends on IOT technology to function. The project's methodology entails employing an RFID-based tracking system to locate museum artefacts. The main goal of this project is to employ an RFID reader to track or keep an eye on each individual museum piece. The network of physical items is referred to as the web of things, which includes sensors, software, and other technologies integrated with the intention of connecting and exchanging data with other devices and systems over the internet. The moment the museum doors closed, they were locked. Now we will observe that many unopened display spaces are secured by a sizable lock inside the prohibited city. The most common locking system, however, has several drawbacks due to the ongoing growth of society, making it simple for thieves to pick the lock. Later, sound waves make up the high-tech museum anti-theft system. Due to the industry's ongoing growth, consumers may now use electronic equipment to identify different sound wave kinds and frequencies, which is how sound-proof anti-theft gadgets came into existence.

These technologies, such as radio-frequency identification (RFID) tags, are employed for security purposes and to provide customers with convenient access to cloud services through browsers, web applications, and mobile phone applications. This technique is based on wireless sensor networks and radio-frequency identification. The frequency signals are created by the location detection system, which then decodes the tag ID. This essay focused on five distinct strategies, including Location tracking system, [1] a significant quantity of RFID and WSN hardware is needed for this system to perform quickly and completely. Additionally, it is utilized for a wide range of services, including network services, social networking, and commodities tracing services, highway toll inquiries, health care, and others [1]. Radio-frequency identification (RFID) applications' security is substantially hampered by deterministic detection of cloning attack schemes. Secure radio-frequency identification (RFID) applications are impeded by Tag Cloning attacks [2]. During trauma resuscitation, an RFID-based system is utilised to track the use of objects and other actions. This strategy provides feedback in order to boost efficacy and efficiency [3]. A detection method is the foundation of the adaptive wavelet-based chipless RFID tag detection system. The vector network analyzer was used to measure this system. Decoding and detection procedures are employed while the chipless RFID tag is moving [4]. The absence warning system for smartphones powered by RFID These methods aim to minimize some issues and identify them as early as possible. However, there are certain issues with this approach.

2. LITERATURE SURVEY

Meriam Anushani Bibile et al. (2018) [4] proposed a moving average technique, which denoises by functioning as a low-pass filter, is a straightforward denoising technique that was used to assess this system using a vector network analyzer. For automatic identification and authentication, this approach is quite beneficial.

The technique described by Muhammad Jawad Hussain et al. (2017) [5] is based on RFID and uses a smart phone absence warning system. This approach is predicated on putting security measures in place as soon as a phone is missing. The cost of the RFID-based solution is lower.

RFID and mobile devices are used in a location-aware system for an art museum.

In cultural contexts, new location-aware mobile technologies are deployed successfully. Mobile devices may connect with their environment thanks to a variety of technologies, including RFID, WiFi, and others. Lower level, Medium level, and Higher level are the three levels of attention that we have established. This idea eliminates the requirement for users to manually select the information they wish to read by offering location-aware information. This method has been successfully used to locate and position PDAs.

Construction of an RFID-based Anti-Theft System.

The technology known as Radio Frequency Identification, or RFID, assigns identity tags to the device being tracked and enables remote data storing and retrieval. It is made up of an RFID reader and an RFID tag. The thing being watched has an RFID tag attached to it. The identity codes, which are essentially one-of-a-kind identification numbers and contain all the information about the object being monitored, are stored on the RFID tag.

RFID-based Immobilizer-based Anti-Theft Vehicle Security System

This research provides a unique RFID-based vehicle immobiliser system that has a low hacking chance while maintaining the security of the kidnapped vehicle's occupants. The immobiliser makes use of active RFID technology, in which rather big character sets are used to create the tag.

E. Theft Alert System and Auto Arresting System for Museums or Jeweler Shop

The thesis title itself implies that anytime someone tries to steal a jewel from a shopping mall, the robbery will be immediately stopped thanks to some person detecting sensors, vibration sensors, and mechanisms that cause the doors to close on their own. Thus, the thief has been apprehended. There are two aspects to this project. Three components make up the transmitter section: a PIR sensor, a motor, a microcontroller, and a GSM module. It is a museum security tool that provides your museums with outstanding protection. The user can lock and unlock doors in a museum using an electronic control unit security system by simply pressing a button.

A Control and IOT Platform for the Preservation of Museum Content

Museums are crucial teaching resources for art and history as well as storage facilities for priceless artifacts from the past. Therefore, the most crucial task to extend the museum's lifespan is to monitor and control the environmental conditions. In this work, we construct a three-layered IOT architecture that organises the needs and capabilities of the system. In this work, we create an integrated IOT system for monitoring and managing museum ambiance that includes anti-theft capabilities. The implementation of the three functional levels across the various system components of the proposed IOT system. Following a brief description of each

layer's function in the suggested architecture, we offer each layer's implementation information.

Smart museums powered by IOT and Bluetooth Low Energy

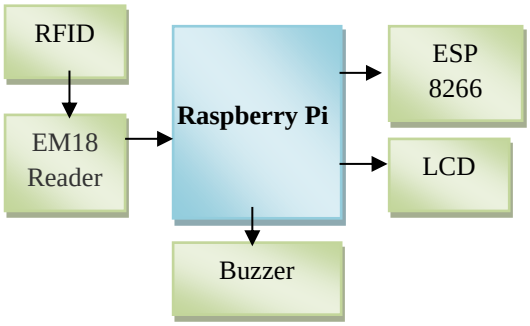
In this study specifically involves a wearable device and an IOT. The museum administrator has login credentials and can upload the artwork from each room in accordance with the Bluetooth low energy type. We are able to set a new BLE ID to a certain artwork. Each piece of art will have video, audio, and text content that will be uploaded to the cloud. There is no predetermined size limit for uploading video, sound, or other documents. Every room has a Bluetooth 4.0 infrastructure and an identifying number. The wearable device will identify the user's location in a museum hall based on this number.

3. Proposed System

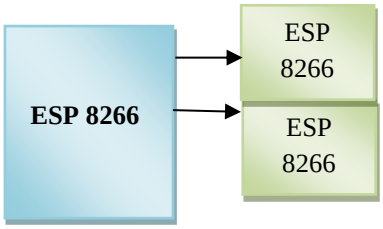
The proposed RFID-based anti-theft system for statue theft in temple is capable to detect movement of the asset that is attached to the RFID tag.The design of the motion-sensitive RFID tag with interrupt function is capable to send the motion alert signal to the reader in real-time. The thing speak graph moves to 0 when the statue is moved. This feature is reliable to be used in anti-theft system for efficient high-value asset monitoring.

3.1 Block Diagram

3.1.1 Transmitter Side



3.1.2 Receiver Side



3.2 Raspberry Pi

A GPU, Ethernet interface, multicore processor, I/O peripherals, USB host, ROM, DDR RAM, and micro HDMI are all features of the Raspberry Pi. This work used Raspberry Pi board in our waste separation system because it can help with many forms of process

automation and smart agriculture. A Raspberry Pi 4 board will supply power to the smart trash can.

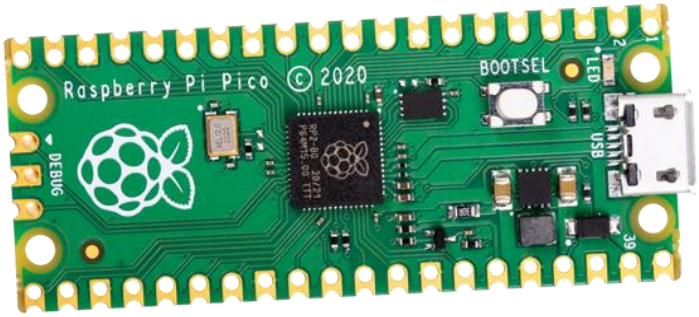


Figure 1 Raspberry Pi Pico

3.3 RFID

RFID, or radio frequency identification, is utilized in a location tracking system to track the object, and cloud computing is employed to increase calculation speed while keeping hardware costs low. A transponder or tag is attached to the luggage in order to track it inside the museum. When the tag is close to the reader or integrator, it activates. An RFID passive tag is made comprised of an integrated electronic chip, an antenna coil, non-volatile memory, and basic modulation circuitry. To trace the luggage in the museum, a transponder or tag is fixed to it. The tag is activated when it is in close proximity to the reader or integrator. An integrated electronic chip and an antenna coil with basic modulation circuitry and non-volatile memory make up an RFID passive tag.

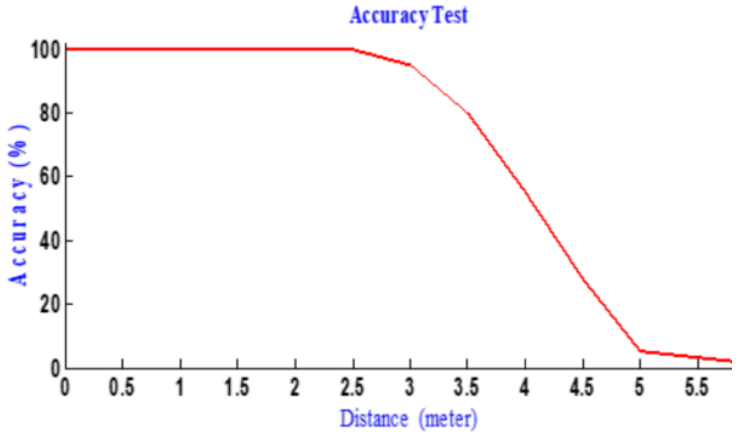


Figure 2 Distance and accuracy relationship

Additionally, the impact of various offset angles on tag read rates was investigated. The findings indicate that as the offset angle is increased, the reading rate falls. About 60 degrees is the effective recognition angle, and the effect is better around 45 cents. The reading rate significantly decreases beyond 75 cents. As a result, there are specific guidelines for the placement of cultural artifacts and reading angles in order to guarantee their veracity.

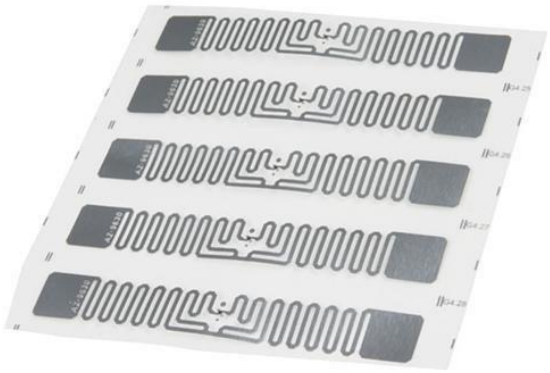


Figure 3 RFID Tag

3.4 EM18 RFID Reader

It is an RFID reader that operates at a 125 kHz frequency to read tags. After reading tags, it connects to the appropriate pins on the PC or microcontroller using Wiegand format or UART to send a serial unique ID. The EM18 RFID reader can read data from RFID tags with stored IDs that are 12 bytes long. The EM18 RFID reader does not require line-of-sight to operate. Additionally, it only has a few centimeters of identification range.

Figure 4 EM18 RFID Reader

3.5 ESP 32

The ESP32 module, created by a third-party business called Ai-Thinker, originally caught the eye of Western OEMs in August 2014. With the help of Hayes-style commands, this little device enables microcontrollers to join a Wi-Fi network and establish straightforward TCP/IP connections.

Figure 5 ESP 8266

However, there wasn't much information regarding the chip and the orders it would take at first that was available in English. Some ESP-xx modules come in metal cases that are stamped with the FCC seal of approval. The FCC's approval and protected Wi-Fi equipment will likely be needed for the first and second world markets.

3.6 LCD

LCD module at a temperature and relative humidity of 40% and 40%, respectively. Lower temperatures can slow the display's blinking pace, while higher temperatures can cause the display's overall colour to change. The display will return to normal when the temperature falls within the established range. Heat and humidity can cause polarisation degradation, bubble production, or polarizer peel-off.

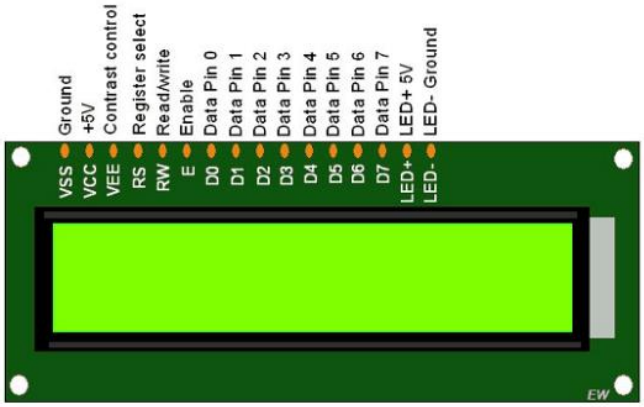


Figure 6 LCD

3.7 Buzzer

A mechanical, electromechanical, or piezoelectric audio signaling device is a buzzer or beeper (piezo for short). Buzzers and beepers are widely utilized as railway horns, alarm clocks, timers, and to confirm human input from the keyboard or mouse. It is utilized to discover unauthorised movement inside the museum by an unidentified person, an odd angle that has been detected, as well as whatever objects have been determined to be anomalous or have been damaged by the unidentified party. When a sensor behaves abnormally, the emergency bell sounds, and the police respond appropriately.

Figure 8 Buzzer

4.STIMULATION RESIULTS

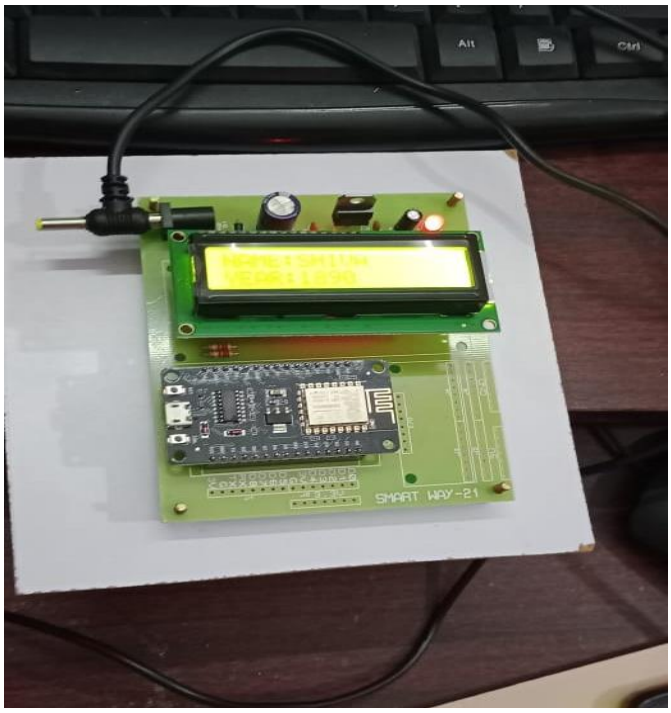


Figure 1 Setup Of Receiver Side

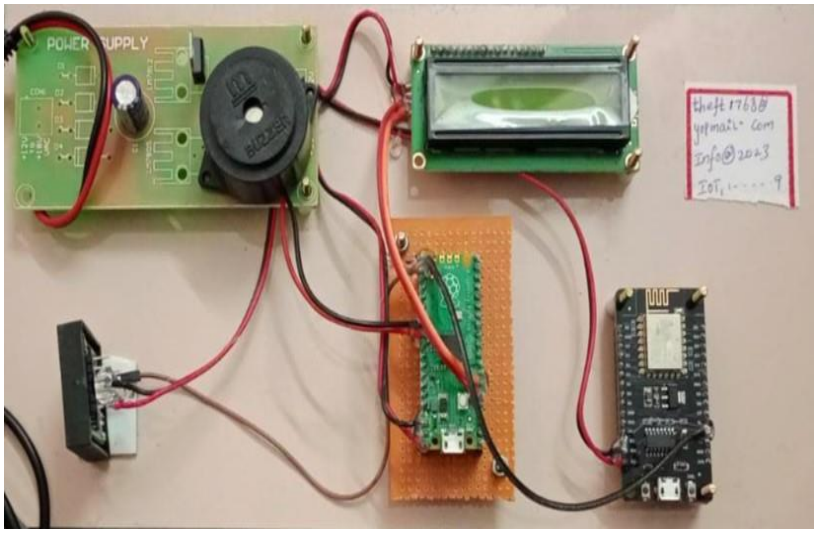


Figure 2 Setup Of Transmitter Side

Figure 3 Receiver Side Display

Figure 4 Transmitter Side Display

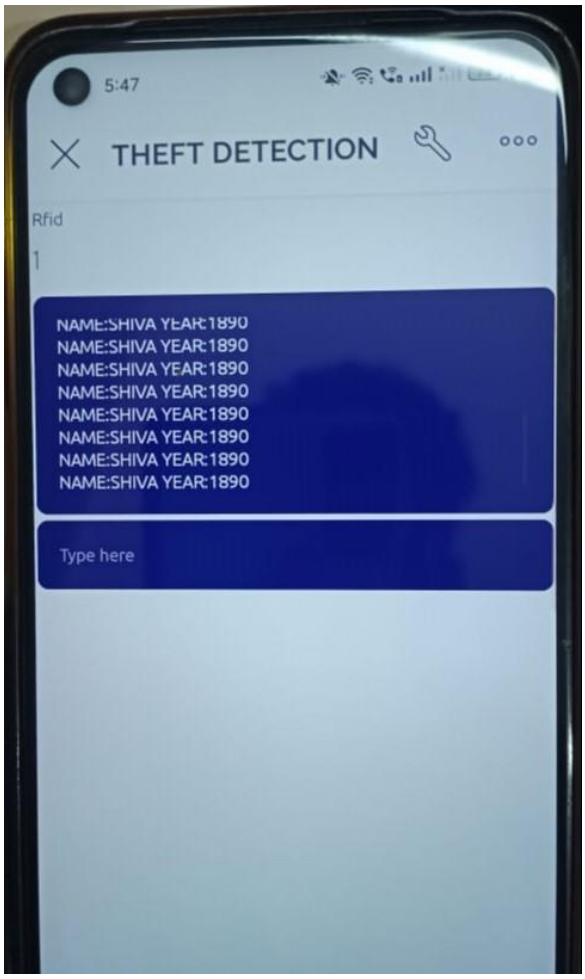


Figure 4 Stimulation Result From Blynk Cloud

4. CONCLUSION

An automatic identification technique called radio-frequency identification leverages cloud storage for both storing and retrieving data (RFID). The position of the cloud-storage RFID technology is determined using the user-provided tag ID. This technique is based on wireless sensor networks and radio-frequency identification. This project's primary goal is to reduce theft at museums. The five diverse strategies that are the subject of this study are a location monitoring system. The study and discussion include a summary of these difficulties. In order to address these problems and provide simple access for end users, the study proposes a new method for developing a cloud storage RFID position detection system. It resolving these issues and enabling easy access for end users by detecting the tag ID.

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