

# SURVEY ON SMART OBJECT DETECTION USING ESP8266

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**Abstract** - These days Human Beings are facing a problem of forgetting their belongings very often. In order to overcome this, we are implementing object detection using ESP8266 device. ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability. Electronic Stability Program (ESP) is a computerized technology which acts as a Hotspot. Here we make use of set of ESPs' in which one acts as a transmitter (hotspot) and rest acts as receiver. In this model, the ESP transmitter (Hotspot) send signals to the set of ESP receivers. Whenever, any of the receiver device exceeds the specified range of the Hotspot, then it produces an alert sound.

**Key Words:** ESP8266, Microcontoller, switch, buzzer Arduino.

## 1. INTRODUCTION

People forget their belongings very often, by making use of this model (longer range) it assures people not to forget their belongings. People lose their belongings very often, by making use of this model (shorter range) it helps people search the lost belongings. If any one of the ESP receivers get disconnected, it is possible to connect another device by dumping a new code. Making use of a set of ESP8266 devices ensure the user that all of his/her belongings are present within the range. As ESP transmitter acts as a Hotspot, it is connected to all the ESP receivers. Whenever any ESP receiver exceeds specified range of Hotspot, then the transmitter produces an alert sound indicating that the receiver has exceeded the range of the Hotspot.

This model can be used in Longer Range or Shorter Range mode. Longer range is a method which detects the ESP receiver when it exceeds the specified range of the Hotspot whereas shorter range is a method which detects the ESP receiver when it enters the specified range of the Hotspot. We make use of a toggle switch which will help us to select the appropriate mode as per our convenience.

## 2. LITERATURE SURVEY

This section discusses the existing literature and the shortcomings and problems in existing work.

Radio Frequency Identification (RFID) as being used in a number of practical applications, such as in improving supply chain management, tracking household pets, accessing office buildings and speeding up toll collection on roadways. RFID is used to automatically identify people, objects and animals using short range radio technology to communicate digital

information between a stationary location (reader) and movable object (tag).

RFID technology can be used to track products in a manner similar to using bar codes for product identification, but RFID also carries additional benefits. RFID does not require line of sight to read the tag, has a longer read range than a bar code reader and tags can store more data than bar codes. Readers can simultaneously communicate with multiple tags. This feature could allow customers to breeze through grocery store checkout counters while a reader identifies all items in a shopping cart at the same time, instead of scanning each bar code individually.

RFID tags fall into two categories, Active tags, which contain an internal power source and Passive tags which obtain power from the signal of an external reader. Because of their lower price and smaller size, Passive tags are more commonly used than Active tags for retail purposes. A passive tag consists of a microchip surrounded by a printed antenna and some form of encapsulation, plastic laminates with adhesive that can be attached to a product or a small glass for implantation. The tag reader powers and communicates with Passive tags. The tag's antenna conducts the process of the energy capture and ID transfer. A tag's chip typically holds data to identify an individual product, the product model and manufacturer.

An emerging mobile technology, Beacons enable smart phone applications to pinpoint their exact location, indoor or outdoor, with a level of accuracy down to a few centimeters. The signal from a Beacon can be used to trigger a specific application notification relevant to that location and time. Beacons are inexpensive, small and often battery powered devices that can be discretely placed in retail, entertainment, hospitality, transport, health care, outdoor media and private locations to enable a wide variety of use cases. Beacons help app developers to engage consumers at the right place and time, pushing out the relevant information and content, rather than requiring the consumer search for offers, payment details, tickets or loyalty cards. Note, in some cases an app may need to use a cellular or Wi-Fi connection to display the appropriate content, while in other cases the relevant content may already be cached within the app. Beacons can also give app developers greater insight into consumers behavior, for example by enabling them to track the typical path through a store or dwell time at a particular product.

### 3. PROPOSED MODEL

In this Paper we are proposing a model which will be helpful for detecting the misplaced or lost (within the specified range) object. It is a normal function that every Human Brain tends to forget so many things which is because of the frustration undergone by Brain. In such a case the Human Brain enters into a sort of Google search wherein the subconscious mind tries to remember where the object was being placed. The subconscious mind tries to get an answer after a random amount of time. What if the subconscious mind fails to get an answer? In order to overcome this, we can make use of this model.

Basically, it is implemented using active device such as ESP8266. In this model, we make use of multiple ESP8266 devices in which one of the devices act as a transmitter whereas rest of the ESP8266 devices will behave as receivers.

Normally, an ESP8266 has a maximum range of 150 meters.

Fig.1 shows the proposed design and model. In the proposed model ESP8266 transmitter's range will be predefined in the code. The rest of ESP8266 receivers will be present within the specified range of the ESP8266 transmitter. The ESP8266 transmitter when turned ON will ping each and every receiver. If the receiver fails to send an Acknowledgement packet it means that the receiver has exceeded the specified range of the transmitter. This will result in an alert sound in the transmitter indicating that the receiver has exceeded the specified range of the transmitter.

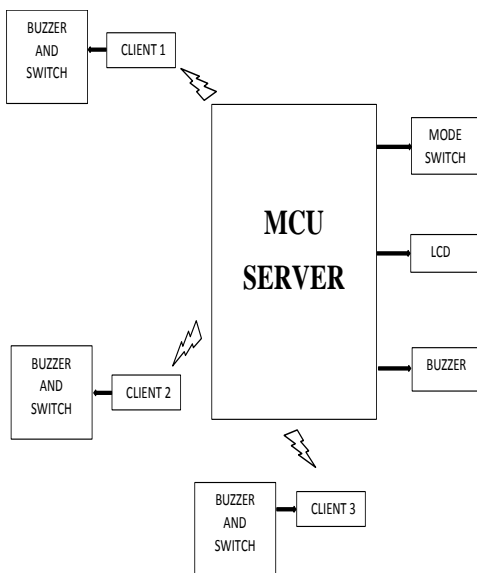


Fig -1: Proposed model

The above explained scenario is known as Longer range mode. It is also possible to make the model work in the other way around, that is to make the transmitter produce an alert sound when the receiver enters the specified range of the transmitter. As transmitter pings each and every receiver, it

gets an Acknowledgement only if the receiver enters the specified range which will be helpful to detect the nearby misplaced objects. The above explained scenario is known as Short range mode.

The components used are discussed as below:

#### 3.1 ESP8266

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Express if Systems.

The chip first came to the attention of western makers in August 2014 with the ESP module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.

#### 3.2 ARDUINO

Arduino is an open source computer hardware and software company and user community that designs and manufactures single-microcontroller and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

The Arduino project started in 2003 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.

The name Arduino comes from a bar in Ivrea, Italy, where some of the founders of the project used to meet. The bar was named after Arduino of Ivrea, who was the margrave of the March of Ivrea and King of Italy from 1002 to 1014.

Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available. The source code for the IDE is released under the GNU General Public License, version 2. Nevertheless, an official Bill of Materials of Arduino boards has never been released by Arduino staff.

Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name Arduino to be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several Arduino-compatible products commercially released have avoided the project name by using various names ending in -duino

A program written with the IDE for Arduino is called a sketch. Sketches are saved on the development computer as text files with the file extension. ino. Arduino Software (IDE) pre-1.0 saved sketches with the extension. pde.

The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main () into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program argued to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

### 3.3 LITHIUM BATTERIES

A lithium-ion battery or Li-ion battery (abbreviated as LIB) is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging.

Li-ion batteries use an intercalated lithium compound as one electrode material, compared to the metallic lithium used in a non-rechargeable lithium battery. The electrolyte, which allows for ionic movement, and the two electrodes are the constituent components of a lithium-ion battery cell.

Lithium-ion batteries are common in-home electronics. They are one of the most popular types of rechargeable batteries for portable electronics, with a high energy density, tiny memory effect and low self-discharge. LIBs are also growing in popularity for military, battery electric vehicle and aerospace applications.

### 4. CONCLUSIONS

People forget and lose their belongings very often, by making use of this model it assures people not to forget their belongings and also helps people to search the lost belongings in the prescribed range. So, this model can be used in two different ways they are Longer range and Shorter range. If any one of the ESP receivers get disconnected, it is possible to connect another device by dumping a new code. In this proposed system, instead of using Beacon Battery we are making use of Lithium ion Battery as it has wide range of advantages such as High energy density and it has the ability to self-discharge. Beacon Batteries last for a longer time but they do not last forever, once the battery is drained out it has to be replaced.

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