Smart Tickets and Passenger Validation System using IOT

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Abstract: *— As mobility through bus travel becoming easier, people are preferring bus for traveling. For long distance travel Bus booking system is adopted. Most of the seats will be booked and few will be left vacant. Without the knowledge of the bus owner, the conductor and the driver allocates non booked seat to some illegal passengers for low ticket rates. It is not been taken to the account of the bus. Here we propose a system through which the owner can monitor the passengers travelling in the bus. This can be done by making the passengers to check-in into to the bus by using a QR-CODE and their presence in the seat is found with the help of PIR-SENSOR. The passenger occupied in non-booked seats is also detected and the visualization is changed. Thus this comes into the notice to the owner.*

Keywords —Non-booked, PIR sensor, QR Code.

I. INTRODUCTION

An embedded system is a computer system designed for specific control functions within a large system, often with real time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts.

A. NODEMCU ESP8266-12E

ESP 12E Wi-Fi module is developed by Ai-thinker Team. core processor ESP8266 in smaller sizes of the module encapsulates Ten silica L106 integrates industry-leading ultra-low power 32-bit MCU micro, with the 16-bit short mode, Clock speed support 80 MHz, 160 MHz, supports the RTOS, integrated Wi-Fi MAC/BB/RF/PA/LNA, on-board antenna. The module supports standard IEEE802.11 b/g/n agreement, complete TCP/IP protocol stack. Users can use the add modules to an existing device networking, or building a separate network controller.ESP8266 is high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

ESP8266EX offers a complete and self-contained Wi-Fi networking solution; it can be used to host the application or to offload Wi-Fi networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any micro controller based design with simple connectivity (SPI/SDIO or I2C/UART interface). ESP8266EX is among the most integrated Wi-Fi chip in the industry; it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.
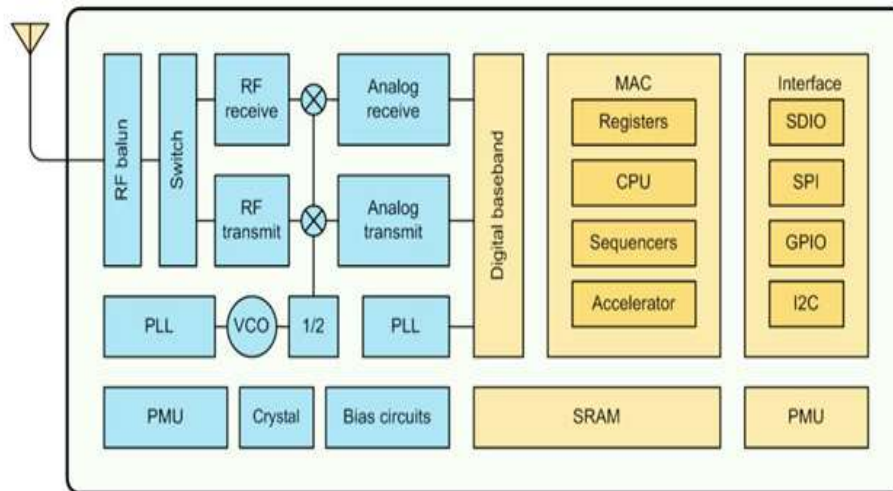
Figure. Block Diagram of Node MCU ESP-12E

The figure shows the block diagram of the wi-fi modem ESP 8266-12E.It has memory element SRAM. It has a MAC consisting of registers, CPU, sequencers and a accelerator .It can be interfaced using I2C.

B. INTERNET OF THINGS (IOT)

One of the buzzwords in the Information Technology is Internet of Things (IOT). The future is Internet of Things, which will transform the real world objects into intelligent virtual objects. The IOT aims to unify everything in our world under a common infrastructure, giving us not only control of things around us, but also keeping us informed of the state of the things. In Light of this, present study addresses IOT concepts through systematic review of scholarly research papers, corporate white papers, professional discussions with experts and online databases. Moreover this research article focuses on definitions, geneses, basic requirements, characteristics and aliases of Internet of Things. The main objective of this paper is to provide an overview of Internet of Things, architectures, and vital technologies and their usages in our daily life. However, this manuscript will give good comprehension for the new researchers, who want to do research in this field of Internet of Things (Technological GOD) and facilitate knowledge accumulation in efficiently.

 "An open and comprehensive network of intelligent objects that have the capacity to auto -organize, share information, data and resources, reacting and acting in face of situations and changes in the environment"

II. SYSTEM DESIGN AND CONSTRUCTION

A. ESP8266

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 WiFi SoC from Espressif systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the dev kits. The firmware uses the Lua scripting language. It is based on the Lua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua, json, and spiffs. ESP8266 ARDUINO CORE: As Arduino.cc began developing new MCU boards based on non-AVR processors like the ARM/SAM MCU and used in the Arduino Due, they needed to modify the Arduino IDE so that it would be relatively easy to change the IDE to support alternate tool chains to allow Arduino C/C++ to be compiled down to these new processors. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file down to the target MCU's machine language. Some creative ESP8266 enthusiasts have developed an Arduino core for the ESP8266 WiFi SoC that is available at the GitHub ESP8266 Core webpage. This is what is popularly called the "ESP8266 Core for the Arduino IDE" and it has become one of the leading software development platforms for the various ESP8266 based modules and development boards, including NodeMCU.

Table 2.1: Pins of NodeMCU

IO INDEX	NODE MCU	IO INDEX	NODE MCU
0	GPIO16	7	GPIO 13
1	GPIO 5	8	GPIO 15
2	GPIO 4	9	GPIO 3
3	GPIO 0	10	GPIO 1

4	GPIO 2	11	GPIO 9
5	GPIO 14	12	GPIO 10
6	GPIO 12		

B. PIR sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) radiation being emitted from objects in its field of view. They are most often used in PIR-based motion detectors. The term PIR is the short form the Passive Infra-Red. The term "passive" indicates that the sensor does not actively take part in the process, which means, it does not emit the referred IR signals itself, rather passively detects the infrared radiations coming from the human body in the surrounding area.

The detected radiations are converted into an electrical charge, which is proportional to the detected level of the radiation. Then this charge is further improved by a built in FET and fed to the output pin of the device which becomes applicable to an external circuit for further triggering and amplification of the alarm stages. The PIR sensor range is up to 10 meters at an angle of +15o or -15o.

C. FIREBASE

Formerly known as Google Cloud Messaging (GCM), Firebase Cloud Messaging (FCM) is a cross-platform solution for messages and notifications for Android, iOS, and web applications, which currently can be used at no cost. Firebase Analytics is a cost-free app measurement solution that provides insight into app usage and user engagement. Firebase Auth is a service that can authenticate users using only client-side code. It supports social login providers Facebook, GitHub, Twitter and Google. Additionally, it includes a user management system whereby developers can enable user authentication with email and password login stored with Firebase.

Firebase Storage

Firebase Storage provides secure file uploads and downloads for Firebase apps, regardless of network quality. The developer can use it to store images, audio, video, or other user-generated content. Firebase Storage is backed by Google Cloud Storage.

Firebase Hosting

Firebase Hosting is a static and dynamic web hosting service. It supports hosting static files such as CSS, HTML, JavaScript and other files, as well as dynamic Node.js support through Cloud Functions. The service delivers files over a content delivery network (CDN) through HTTP Secure (HTTPS) and Secure Sockets Layer encryption (SSL). Firebase partners with fast a CDN, to provide the CDN backing Firebase Hosting. The company states that Firebase Hosting grew out of customer requests; developers were using Firebase for its real-time database but needed a place to host their content.

III. SYSTEM ASSEMBLY

The proposed system deals with the monitoring the vibration, air pressure, voltage and temperature of a machine with the help of nodemcu-esp8266 12e microcontroller and displaying the values in an LCD and sending to the user using GSM module. Using IOT the measured parameters are uploaded to the could directly from the microcontroller through the wifi modem.

The main component used is the PIR SNSOR can be used IOT is used to upload the sensed parameters to the cloud. Since the microcontroller itself can be connected to the wifi modem directly it is very easy to send the parameters through internet and the data's can also be sent to the PC and stored for any future references
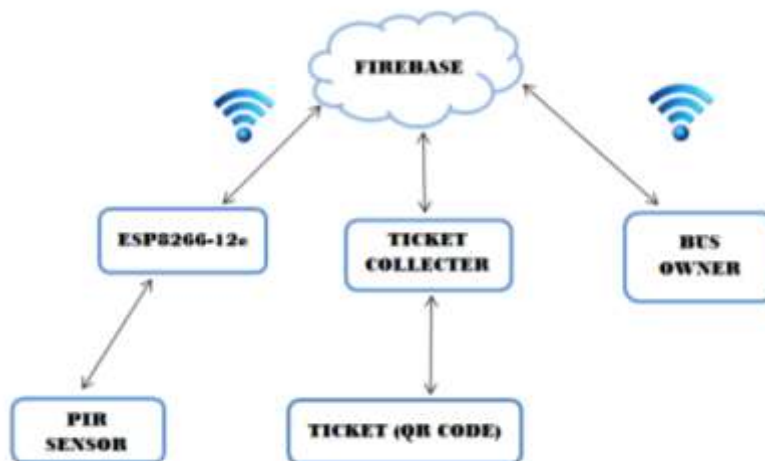

Figure.General Block Diagram

The above Figure depicts the general block diagram of our proposed system. The overall operation is controlled by FIREBASE platform. The output is also uploaded to the cloud using the wifi modem and also displayed in the PC.

IV. CONCLUSION

The system deals with the validation system of proper checking of tickets by generating QR code and the passenger validation can be done with the help of PIR sensor and the generated values will be sent to Firebase with the help of nodemcu-ESP8266 12E microcontroller and the indication to the owner's portal is done with the help of web page. Hence it creates a good relationship between the owner and workers and also it provides better profit for the owner's.

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