

IoT applications on Secure Smart Shopping System

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ABSTRACT

The Internet of Things (IoT) is changing human lives by associate normal protests together. For example, in a marketplace all items can be associated with each different, framing a savvy shopping for framework. In such an IoT framework, an inexpensive RFID tag can be associated to every item which, whilst located right into an excellent buying basket, can be consequently perused with the aid of a truck prepared with a RFID peruse. The Internet of Things (IoT) is changing human lives by associating ordinary protests together. For example, in a marketplace all things may be associated with each other, framing a savvy buying structure. In such an IoT framework, a reasonable RFID tag may be connected to each item which, when placed right into a incredible purchasing basket, may be consequently perused by a truck geared up with a RFID peruse. Another preferred standpoint of this type of framework is that stock control turns into a mess less complex, as all items might be naturally think about by utilizing a RFID peruse set up of physically examined by means of a worker. To approve the attainability of any such machine, on this work we recognize the plan necessities of a brilliant shopping framework, develop a model machine to check ability, and outline a casual verbal trade convention to make the framework sensible. To the fine of our know-how, that is the essential time a cunning buying machine is proposed with security underneath thought.

Keywords: RFID, IoT, UNO, MEGA, IDE

I. INTRODUCTION

In the era of the Internet of Things (IoT), interactions among physical objects have become a reality. Everyday objects can now be equipped with computing power and communication functionalities, allowing objects everywhere to be connected. This has brought a new revolution in industrial, financial, and environmental systems, and triggered great challenges in data management, wireless communications, and real-time decision making. Additionally, many security and privacy issues have emerged and lightweight cryptographic methods are in high demand to fit in with IoT applications. There has been a great deal of IoT research on different applications, such as smart homes, e-health systems, wearable devices, etc.

In this paper, we focus on a smart shopping system based on Radio Frequency Identification (RFID) technology, which has not been well-studied in the past.

In such a system, all items for sale are attached with an RFID tag, so that they can be tracked by any device equipped with an RFID reader in the store. - for example, a smart shelf. Intuitively this brings the following benefits:

- 1). Items put into a smart shopping cart (with RFID reading capability) can be automatically read and the billing information can also be generated on the smart cart. As a result, customers do not need to wait in long queues at checkout.
- 2). Smart shelves that are also equipped with RFID readers are able to monitor Corresponding Author. all stocked items and send item status updates to the server. When items become sold out, the server can notify employees to restock.
- 3) It becomes easy for the store to do inventory management as all items can be automatically read and easily logged. We propose the use of ultra-high frequency (UHF) RFID technology in the smart shopping system, as UHF passive tags have a longer

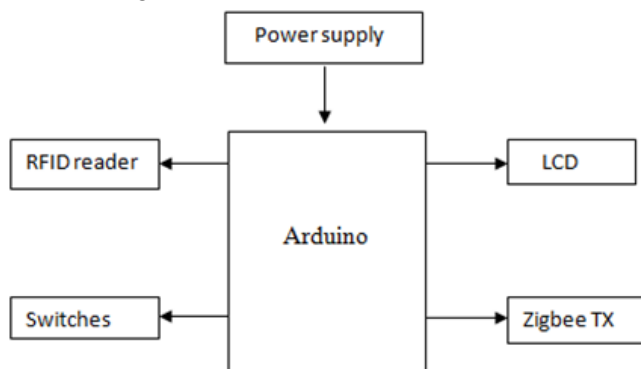
range, from 1 to 12 meters. Previous research on the design of smart shopping systems mainly focused on using low/high frequency RFID, which have inadequate ranges, and leave customers to manually scan items with a RFID scanner.

II. PROPOSED SYSTEM

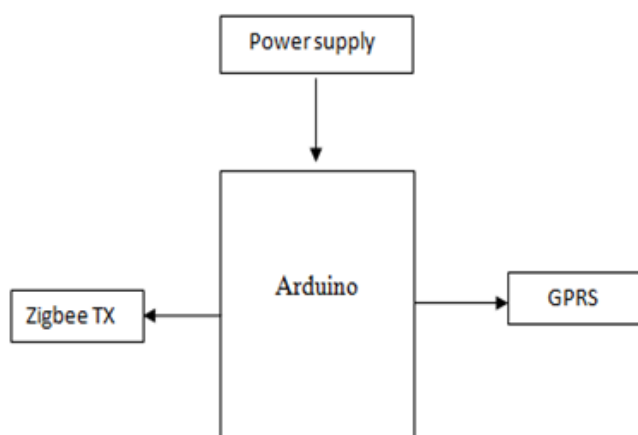
Here we proposed a smart shopping using RFID. For this we can take RFID cards for each and every item in the shop and reader placed in the basket. When we place any object in the basket RFID reader reads the card and the data send to the server by using GPRS. We have one GPRS account to calculate the values of all the things.

BLOCK DIAGRAM:

Transmitting circuit (Item side):



Receiving circuit (Basket side):



HARDWARE REQUIREMENTS:

Arduino:

The Arduino Micro Controller is an extremely easy to utilize and installed on an unmarried chip. It is an In-System-Programmable Device this implies the customer haven't any need to utilize the dispose of the

IC, we can without a moment's delay join the Arduino to the PC and picking the best possible COMM port. The Arduino has many sorts like UNO, MEGA and numerous others; here we utilize Arduino UNO board. The UNO board will appear this way.



The Programming of the Arduino is either in C/C++. In case you're familiar with C, programming of the Arduino is direct to perceive. In the event that you are not acquainted with C no bother picking up information of is to be had in the example codes. The Arduino Board is referred to as ISP transforms into when the code dumped inside the Board can be use at each time, anyplace.

Arduino Board:

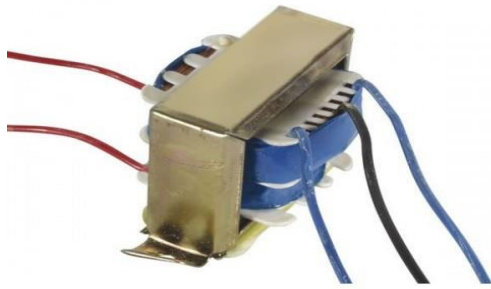
Hence the Arduino Board does not have capacity to execute code by itself, without any external Power Supply. To communicate with the outside world the Arduino board has I/O pins. It contains total 14 pins from 0 to 13 that can be used as input from Switches. Each pin has a 40mA of current passes through it.

The Arduino has inbuilt program to check whether it is working or not. The Arduino board has very easy compatible interface design, for communicating with the Sensors it need only 5v supply.

POWER SUPPLY:

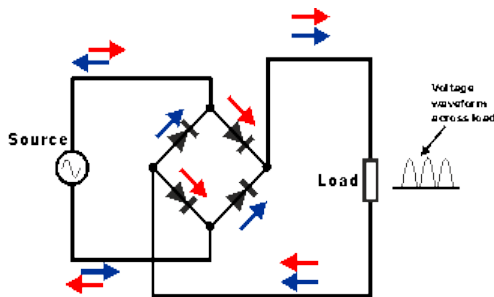
Transformers

Transformers are instruments which wander down a for the most part higher AC statistics Voltage into a lower AC yield voltage. To discover the statistics and yield terminals of a transformer is exceptionally crude. Fundamentally transformers are two sorts. Those are venture down and advance up transformer. Here we utilize venture down transformer.



Rectifier:

Rectifier is a device that's applied to change over AC voltage to DC voltage. It is for the maximum element separated into Full wave and Half wave rectifiers. At the point whilst ahead one-sided there might be voltage drop in diodes of round 0.7v.



Capacitors:

Capacitors are utilized to get the perfect and smoothest DC voltage in which the rectifier is utilized to get throbbing DC voltage which is utilized as a part of the light of the present destiny, from the connector. Capacitors are utilize to get square DC from AC current experience of the present channels so they are used as a touch of parallel to the yield. Furthermore, if there is a swell in the data or yield, a capacitor changes it by discharging the charge set away in it.

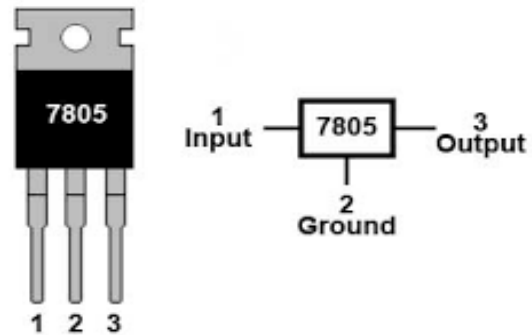


Voltage regulators:

The 78XX voltage controller is mainly overall utilized controller for voltage controllers. The XX speaks to the voltage of which the voltage controller delivers as the give up to the specific gadget. 7805 will deliver and control the give in voltage of 5v and 7812 will create

the give in voltage of 12v. The voltage controllers are that they need no under 2 volts more than their yield voltage as information. For instance, 7805 will require no under 7V, and 7812, no under 14 volts as information sources. This voltage which ought to be given to voltage controllers is called Dropout Voltage.

7805 Pinout



RFID:

RFID is a following innovation used to distinguish and verify labels that are connected to any item, individual or creature. Radio recurrence Identification and Detection is a general term utilized for innovations that make utilization of radio waves with a specific end goal to distinguish questions and individuals.



Zig-Bee:

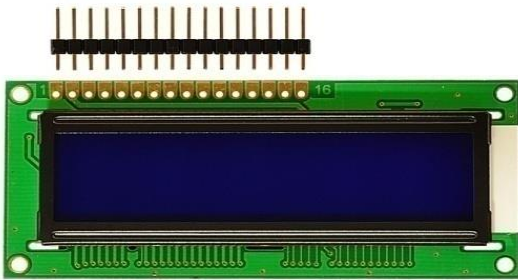
Zig-Bee is a most accepted industrial used mesh network to communicate with different sensors, control systems etc; A Zig-Bee is a Technological standard created for controlling sensor network. It includes personal area networks with high level communication path. It having a frequency range upto2.4GHz.To send the Data in the Zig-Bee a MAX-232 line driver is used.



LCD (Liquid Crystal Display)

LCD (Liquid Crystal Display) screen is a virtual show module and find a major jumble of livelihoods. A 16x2 LCD show is shockingly straightforward module and is regularly utilized as a touch of various gadgets and circuits. These modules are upheld additional than seven components and unique multi area LEDs.

Pin Diagram:



SOFTWARE REQUIREMENTS:

Arduino IDE:

The Arduino IDE software is an open source software, where we can have the example codes for the beginners. In the Present world there are a lot of versions in the Arduino IDE in which present usage is Version 1.0.5. It is very easy to connect the PC with Arduino Board.

WORKING:

We test the robustness of the system with our prototype, and we find that the RFID reading is accurate and precise. According to our tests, the metal of the cart blocks the signal to a large extent and an item outside the cart cannot be read by the reader inside the cart. When a new item is put into the smart cart, it will be automatically read by the reader, which is

continually scanning items within its range. After a product is read, its ID will be checked to see if it is a newly added item. If so, its information will be listed on the user interface. On the other hand, when an item is removed from the smart cart, the reader will no longer be able to scan its information. In this case, the smart cart determines that the item has been removed and will update the display correspondingly. We now evaluate the computational and communication overhead of our proposed protocol. We focus only on the communications between the server and the smart cart, as the communication patterns between the checkout point and the server are the same.

Applications:

- In markets.

Advantages:

- Stock monitoring easily.
- Easy access.

III. CONCLUSION

In this paper, we propose a secure smart shopping system utilizing RFID technology. This is the first time that UHF RFID is employed in enhancing shopping experiences and security issues are discussed in the context of a smart shopping system. We detail the design of a complete system and build a prototype to test its functions. We also design a secure communication protocol and present security analysis and performance evaluations. We believe that future stores will be covered with RFID technology and our research is a pioneering one in the development of a smart shopping system. Our future research will focus on improving the current system, for example, by reducing the computational overhead at the smart cart side for higher efficiency, and how to improve the communication efficiency while preserving security properties.

IV. REFERENCES

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