iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** III **Month of publication:** March 2017

DOI: http://doi.org/10.22214/ijraset.2017.3150

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

RFID Technology for IOT Based Meal Management System

Ms. Snehal Borole[1], Prof. P. B. Borole[2]
[1,2]*Electrical Department, Veermata Jijabai Technological Institute, Mumbai*

Abstract: ***The current systems of Meal Management in the canteens can be upgraded using Internet of Things (IoT) paradigm involving RFID technology with the purpose to make the existing system faster and efficient. RF identification (RFID) technology provides application to gather information about large number of the customers, perhaps, making it easier to process the gathered data and also encourages the exchange of electronic cash. IoT enables the transparency in the system to administrator as well as customer ends. This manuscript will give idea how the system to manage canteen bills is constructed by introduction of Internet of Things (IoT) in existing system of meal management system.***
Keywords: IoT, RFID technology, RFID reader, Active tag and Passive tag.

I. INTRODUCTION

IoT based Meal management system is a planning system for a canteen that used to track food items, orders made and bill paid. IoT based Meal management needs a good coordination of information of the entire food menu above in addition to billing management. IoT based Meal Management system proves useful to keep record of the balance available on the name of a particular person in the database. As well it proves beneficial so as to keep track of consumption on the meal card.

RFID, Radio Frequency Identification, is normally called an electronic tag. RFID is a non-touching automatic skill and can be used in any conditions through radio frequency signal to obtain data of objects without human's instructions. RFID can identify objects in high speed for many tag tasks and is easy to handle. RFID is a simple wireless system with two basic devices. The system is to control, detect and follow the targeted object, which consists of a reader and many other transponders. According to frequency, RFID owns LF, HF, UHF and MW, the corresponding frequency number is: 135 kHz, 13.56 MHz, 860M~960MHz, 2.4GHz and 5.8GHz.

IoT (Internet of Things) is a novel paradigm shift in Telecommunication field. The phrase "Internet of Things" which is also shortly well-known as IoT is coined from the two words i.e. "Internet" and "Things". Internet of Things technology is based on the Internet technology, development and extension, due to its extremely wide range of applications, involving almost all the fields of sciences. The Internet is a worldwide system of interconnected smart device networks that use the standard Internet protocol suite (TCP/IP) to serve a large number of users globally. It is a network of networks that consists of number of private, public, of local to global scope, that are linked by a broad side array of electronic, wireless and optical networking technologies.

II. BACKGROUND

Most of the previously proposed RFID based Meal Management systems are dedicated machines i.e. they can be used for maintaining database of people, keeping records of balance available on the card, taking the orders for food item. The proposed framework for Meal Management systems leverage an architecture consisting of RFID reader, microcontroller and PC interface. These systems where proposed so that they can be useful for the canteen owners so that they can maintain database and their functioning should be faster, also evaluation of profit/loss could become easier. Also it would be easier for end users who visit canteen on regular basis since they would not be obligated to take cash to the canteen. Also the end user can recharge their respective accounts according to their convenience according to their level of usage. These systems only have gained attention in recent times.

While the advent of electronic RFID based Meal Management systems has promised to revolutionize the conventional management methods, integrating the IoT paradigm into these systems can further increase intelligence, flexibility and interoperability. The system utilizing IoT scheme becomes smart system i.e. the account activities can be visible to end users on android apps, this adds to security of system. The exchange of information can be done over the internet which adds transparency, significantly simplifying the administration process.

Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

III. SYSTEM ARCHITECTURE

The system architecture for a RFID technology for IoT based Meal Management System, whose major components are described next:

CES-IOT210 IOT system box is an integrated internet of things experiment set up, which focuses on the networking perception layer, the network transport layer, the application layer, three layer technology. The system's perception

layer consists of various sensors (such as temperature sensors, photoconductive sensors and vibration sensors), RFID radio frequency modules to realize the different physical characteristics of information collection, the network layer by the Internet of Things one of part being ZigBee which is a short-range data communication tasks of information, as well as Wi-Fi, Bluetooth, 3G, GSM and other technologies to achieve a variety of different network transmission function. The application layer of Internet of things technology is uppermost layer, constituted by senior Internet of Things gateways, data the processing of information and the upper application development. The table I describes the specifications for this IoT system box.

Figure I: CES-IOT210 system

No.	Feature	Description
1	CPU	ARM Cortex-A8
2	FLASH	1GByte
3	SDRAM	1GByte
4	HCI	Touch Screen Interface, Keyboard

Table I: Specifications of IoT system box

RFID consists of the basic parts- Tag, reader and Antenna. Tag consists of coupling elements and chips. There is unique electronic code for every tag which is on the object to indentify it. RFID reader is a device that can be a fixed one or adjustable one so as to read the information present in the tag. Antenna is used for transferring radio frequency between tag and reader. The table II describes the specifications of RFID.

Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Figure II: RFID part of system.

.	Feature	Description
1	RFID master MCU	Enhanced 8051 MCU
2	RF reader chip	CLRC632
3	Highest clock frequency	80MHz
4	Transfer rate	424kbps
5	Maximum non-contact distance	100mm

Table II: Specifications of RFID part.

IV. SYSTEM WORKING

The basic working principle of RFID system is that when the tag goes into magnetic field it can sense the electromagnetic waves sent by the reader and then send the information stored in the chip by gaining from induced current, this is operation of passive tag. Else the tag can send a particular frequency, this operation takes place when it works like active tag; reader receives the information, matches with the database, decodes them and sends it to the central system for further process. The figure III shows the flowchart of how the system works.

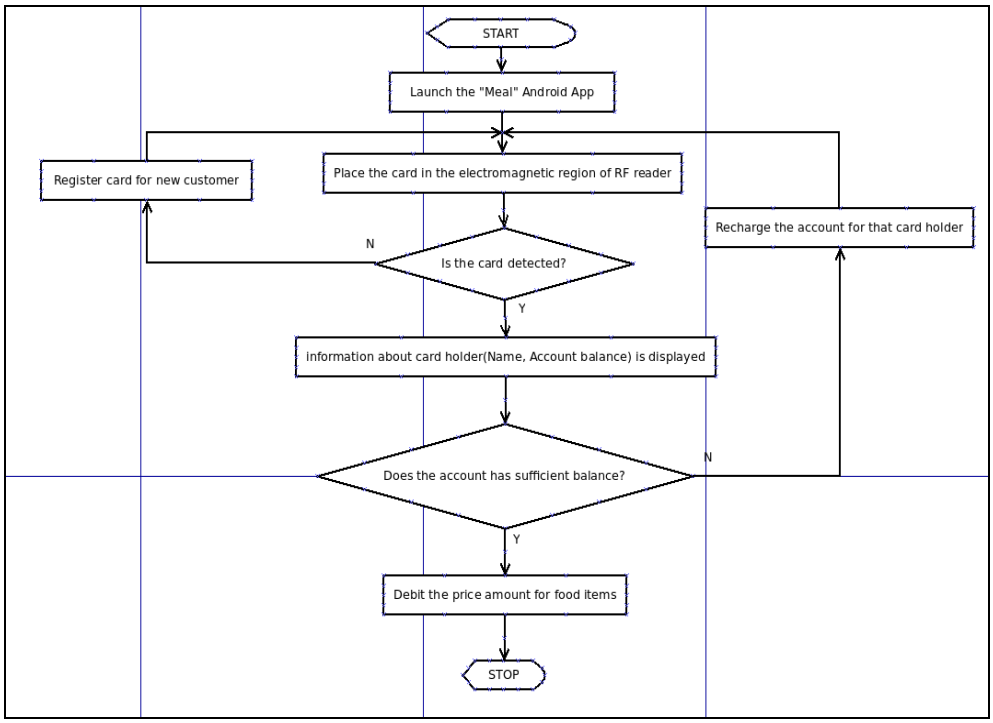


Figure III: Flow chart of the RFID technology for IoT based Meal Management System

This is system can be divided into 3 parts

A. *Responder:* The tag acts as responder in this system. The responder has antenna, coupling element and chip. The tag has unique electronic code attached on object for identification. In Meal Management system the card is used to identify the customer so that the information about the customer can be read.

B. *Reader:* The basic parts of reader are antenna, coupling element and chip. This device has the ability to read the information on the tag. In Meal Management system the reader recognises all the cards issued to the regular customers, so that they can be identified in the database and to obtain the information about the account balance.

Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

C. *Software Application:* The software application is the part which is used to register the information about the end user and assigning the particular card in which this information is burnt. An Android application is setup using which the administrator can monitor the balance and make the deduction every time any food item is purchased by the card holder.

The figures IV and V depict the GUI of Android App built for the system. When the card is detected on the electromagnetic region of RF reader, the information stored in card ids read and displayed on the app. Refer figure IV for this.

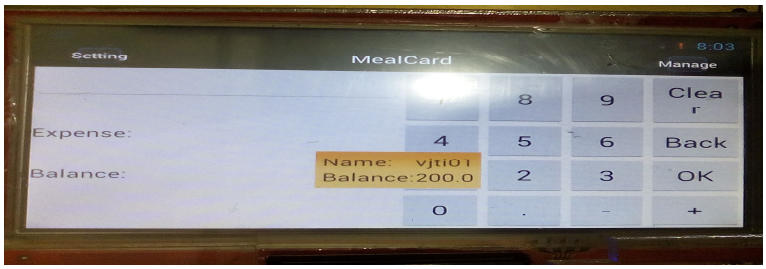


Figure IV: The information in card displayed as card is kept on RF reader.

When the amount for food item is deducted from the balance the details displayed on the Android App are as shown in Figure V.

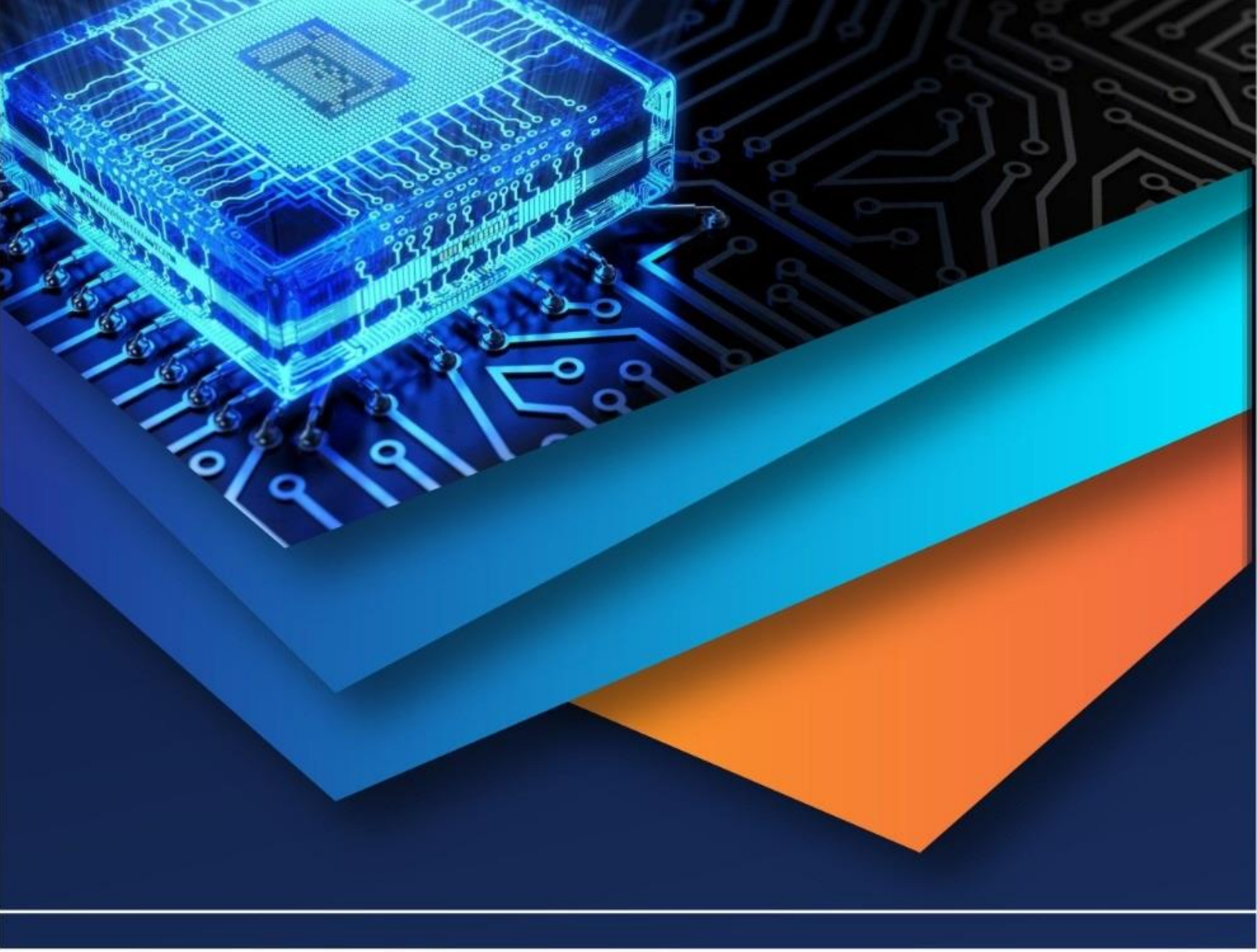
Figure V: The information displayed when amount for food item is deducted from the balance.

V. CONCLUSION

The RFID technology for IoT based Meal Management System can be used in cafeterias, food court so that the operation for administrator become easy since the management of customers becomes easy. The interface on the android instrument makes it user friendly. The main purpose of keeping record of customers and use hassle free electronic cash thereby increases the efficiency of management single-handedly. Also this system reduces the efforts for customer as they can recharge their accounts at any time as he too can have an android application installed in his mobile phone so that he can keep a check on the activities happening on his meal card. The introduction of IoT can enhance the profit in this type of service industry.

REFERENCES

[1] RFID Handbook (Fundamentals and Applications in Contactless Smart Cards, Radio Frequency Identification and Near Field Communication) by Klaus Finkenzeller.
[2] A.Ankit Kumar Jain, T. Rama Krishna,"Dynamic Book Search Using RFID Technology" International Journal of Engineering Research and General Science Volume 2, Issue 6,October-November, 2014,ISSN 2091-2730
[3] Sara Amendola, Rossella Lodato, Sabina Manzari, Cecilia Occhiuzzi, and Gaetano Marrocco "RFID Technology for IoT-Based Personal Healthcare in Smart Spaces", IEEE INTERNET OF THINGS JOURNAL, VOL. 1, NO. 2, APRIL 2014 Ovidiu Vermesan , "Internet of Things- From Research and Development to Market Deployment ", River Publishers Series in Communication.
[4] Somayya Madakam,R.Ramaswamy, Siddharth Tripathi, "Internet of Things (IoT): A Literature Review", Journal of Computer and Communications, 2015, 3, 164-173.
[5] "RFID based prepaid card for canteen management", Micro Technologies, Experts in Embedded and Electronics systems.
[6] Zhang D., Liu Y., Han K., Liu A., Liu L. (2012) The Application of RFID-Based on IOT in Logistics Management. In: Zhang W. (eds) Software Engineering and Knowledge Engineering: Theory and Practice. Advances in Intelligent and Soft Computing, vol 162. Springer, Berlin, Heidelberg.
[7] Arulogun O. T., Olatunbosun, A., Fakolujo O. A., and Olaniyi, O. M., "RFID-based Students Attendance Management System", International Journal of Scientific & Engineering Research Volume 4, Issue 2, February 2013. ISSN 2229-5518.
[8] Yao Xiaochun, Jiang Yuhong, "Canteen consuming management system design based on CAN bus and Radio Frequency Identification ", Transportation, Mechanical, and Electrical Engineering (TMEE), 2011 IEEE Conference.
[9] "Internet of Things technology integrated experiment system type I" user manual by SHENZHEN HAITIANXIONG ELECTRONIC CO.,LTD.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY