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A NOVEL RFID BASED SMART INTIMATION SYSTEM TO INFORM HIGHER AUTHORITY

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ABSTRACT: The faculty attending to the class in time is very much required for the smooth running of an institute. It is the responsibility of higher authorities like HOD (Head of the Department) at monitoring the faculty attending in time to the class. It is very difficult to observe all the sections and classes of their department which is going on at present situation. So it is very difficult for every faculty to go and give authentication or give signature whether they have attended to the college or school. In the delay time of faculty the students may create disturbances which lead to the indiscipline for the institution. So by implementing this type of systems in the institutions, creates discipline in the faculty and students can be maintained for the success of institution. In today's world the use of RFID (Radio Frequency Identification) technology is increased in the fields like health-care, transportation, agriculture, and hospitality- industry because of most popularity of RFID technology. Hence in this work, a novel RFID based smart intimation system to inform Higher Authority is presented. In this project a method is described to solve the above mentioned problems by using RFID and ZIGBEE. The main objective of this work is to design a smart Intimation system which is mainly based on the faculty attending system. Thus, it will active the faculty members to attend the class in time.

KEYWORDS: Faculty, Head of the Department, classes, RFID and Zigbee.

I. INTRODUCTION

Recently, due to the rapid development of information and communication technology, network infrastructure has been widely distributed, and as various advanced digital equipments are becoming more common in everyday life, the ubiquitous era based on this is coming.

Various attempts are made to incorporate the new paradigm into education, and there are factors that can evolve educational methods or efficiently support all activities related to education. Already, many advanced countries are trying to build a smart campus that applies ubiquitous computing technology to university campuses with this in mind. The aforementioned smart campus refers to a campus that supports convenient and safe activities of campus members with ubiquitous computing technology using

small computer technology and wired/wireless network technology. Currently, smart campus-related research is actively underway, and technology is being developed accordingly [1].

Due to the advancement of technology and cut throat competition in the markets, it has become inevitable for almost all organizations to come up with solution strategies that could help them to be in par with the state of the art technology and exhibit productivity in all aspects of organizational progress. One of the key areas that is in need to be addressed by almost organizations is to come up with a strategy to keep in view the attendance of the employees in an organization. This aspect is one of the key indicators that contribute a lot to the organizational progress.

Nowadays, multiple information and communication technologies (ICT) have the potential to develop society and directed towards several domains such as health, industry, and social life. In recent time, their use progresses considerably to cover education field, and have a holistic impact on the learning outcomes. In the context of the development of traditional practices towards modern education, ICT have become tools which characterize a whole generation henceforth defined as 'digital natives', who have gone far from textbooks and similar traditional tools. A number of digital tools, mobile devices and platforms are now available to education fields. It can therefore rethink education and assessment practices, methods and educational environments. Therefore, technology should be fully integrated not only in learning but in class management as well [2].

RFID is a non-contact automatic identification technology that can provide object level automatic identification. With the rapid development of RFID technology, the application of the systems based on RFID technology is widely used in different fields, such as logistics, civil affairs, transportation, civil aviation, security and identification. RFID is generally composed of three basic components: tags, readers and a PC reader. The tags, active or passive, communicate with readers wirelessly, while the readers communicate with PC reader with cable [3].

ZigBee technology is a kind of wireless technology with short distance, low complexity, low power consumption, low data rate, low cost and wireless network technology, mainly suitable for carrying less data traffic service, can be embedded in a variety of devices, and supports for the geographical location. Compared with the

various existing wireless communications technology, ZigBee technology is the lowest power consumption and cost is also a big hot spot in the embedded application at present.

Over the years different approaches like students attendance monitoring, campus tracking systems, student-teacher interaction systems are presented using RFID, IoT and Wireless Sensor Networks (WSN)s, however there is no particular system to inform the higher authorities about the timings of the teacher entering in to the class or absence or presence of teacher to that particular class. Since to maintain the reputation of any collage or institute it is important to give the best results, so completion of syllabus is must. For this it is necessary to conduct all the lectures and practical's on time. And authorized person should know whether all lectures or practical's are going on time or not. If teachers are not punctual about time it affects the discipline of students and indirectly the growth of institute.

Hence in order to solve these issues, A novel RFID based smart Intimation system to inform higher authority is presented in his work. The section II describes the literature survey. The section III presents A novel RFID based smart Intimation system to inform higher authority. The section IV demonstrates the result analysis of presented system. Finally the work is concluded in section V.

II. LITERATURE SURVEY

Dr. Jayant Shekhar, Mr.Desta Zerihun, Dr. Mesfin Abebe Haile, Dr. Bahiru Shifaw et. al., [4] describes Automated Classroom Monitoring with IoT And Virtuino App. This system consists of two features; the autonomous attendance system as well as an energy saving technology implementation. As for the

autonomous attendance system, the attendances that were taken from student card will be digitalized and send to the server to be processed, and then the attendance records are able to be viewed via web or Virtuino app. Meanwhile, through the energy saving technology, students or lecturer does not purposely need to switch off the air conditioning, fans and lights each time they leave the class anymore.

Ping Tan, Han Wu, Peng Li, ID and He Xu et. al., [5] describes Teaching Management System with Applications of RFID and IoT Technology. A kind of WiFi supported RFID reader (WiRF) is implemented using open source hardware platforms, such as Node MCU and RFID-RC522. Then the described WiRF system is used to assist teacher to perform automatic attendance record and students' behavior record. In addition, Quick Response (QR) code is another technology to enable IoT. In this approach, QR code is designed to quickly access course video and perform real-time interactive response in the classroom, which will provide multidimensional learning and strengthen the motivation of students' learning.

Farhana Ahmad Poad and Widad Ismail et. al., [6] describes An Active Integrated Zigbee RFID System with GPS Functionalities for Location Monitoring Utilizing Wireless Sensor Network and GSM Communication Platform. An active integrated Radio Frequency Identification (RFID) system that operates in 2.45 GHz ISM band frequency is developed to support indoor and outdoor real-time location monitoring by utilizing Global Positioning System (GPS) in Wireless Sensor Network (WSN) and Global System for Mobile (GSM) communication platform. The proposed active RFID system is based on an automated switching mechanism between indoor and outdoor

location and the capabilities of the system is extended by providing a contactless communication between the tagged items or persons and the monitoring station.

Dalibor Dobrilovic, Zeljko Stojanov, Borislav Odadzic et. al., [7] describes Teaching Application Development for RFID/ZigBee Networks using Open Source Hardware. This work presents an approach in creating platform based on open source hardware designed to provide an infrastructure for teaching development of software applications for WSN, in this case applications for RFID/ZigBee networks, to be used in Computing education and profession.

Khalid Hasnan, Aftab Ahmed and Qadir Bakhsh et. al., [8] describes Study of RFID application with Zigbee Network in Supply Chain Management. This analysis explains radio frequency identification technique which can be connected to the internet enabling identify, locate, track or monitor supply chain flow. The issues can be resolved by development of smart interface of system and control variables such as coordinates of the readers, the number of the readers and the antenna parameters. The benefit of application of RFID with zigbee network and internet of things in (SCM) increases the traceability of items in real time and update the information exchange. It also increases the quality of care and services, increases the productivity and reduces the cost, power consumption and human error.

M. Sathish Kumar and S. Nagaraj et. al., [9] describes The Campus Security Tracking System Based on RFID And Zigbee Network. This paper contains the campus security tracking system (CST) has been designed and implemented using the RFID and ZigBee network. The CST reads the RFID tags data through FRID & ZigBee node, and then sends it to PC node

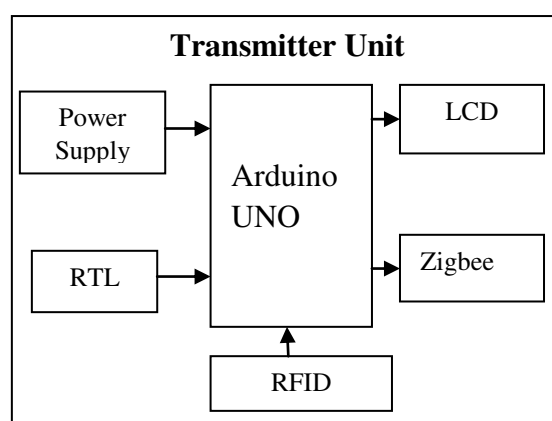
by a custom wireless protocol on the ZigBee. PC node gives related warning (or) hints by the result of matching master slave RFID tag information. When the warning occurs, its user can logon the web system to get the real-time tracking for valuables with embedded slave RFID where the thief arrives at any one access control node, it would be blocked. User can also manage his own valuables such as lending and recovery operation through the Web manager center. The system can achieve large-scale logistics management and tracking, and has good market prospects and value in use.

Wu Ling, Luo Xiangze, Wu Wendi et. al., [10] describes The Design and Implementation of a teacher-student interaction system based on ZigBee and RFID. A teacher-student interaction system based on ZigBee and RFID technology was designed and implemented for the application of actual teaching. the combination of RFID and ZigBee way to achieve the interaction between students and teachers. RFID technology used for data acquisition and transmission, ZigBee wireless transmission module using a star network topology, to achieve the data from students end to teachers end node for wireless transmission. Results show that the system achieved the basic functions of a teacher-student interaction system.

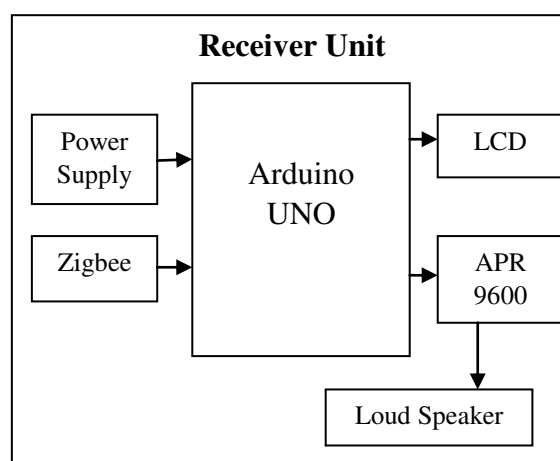
III. NOVEL RFID BASED SMART INTIMATION SYSTEM

In this section, A novel RFID based smart Intimation system to inform higher authority is presented. This system mainly contains two modules Transmitter (TX) Unit and Receiver (RX) unit where transmitter unit is placed at the class room and receiver unit is placed at the office room where higher authorities are presented. The block diagram of presented system is shown in Fig. 1.

The main components included in this system are Arduino Uno, RFID module, Zigbee, LCD, APR9600 and loud speaker. A Regulated Power Supply (RPS) is a power supply which rectifies, filters and regulates the AC main supply in order to deliver a stabled power supply to microcontroller and other connected devices. The transmitter side consists of a RFID reader module to read RFID passive cards, a ZigBee transceiver to transmit data, a 16x2 LCD display and Arduino Uno micro-controller.



(a)



(b)

Fig. 1 (a) & (b): The Block diagram of Novel RFID based Smart Intimation system

Radio Frequency Identification (RFID) is a generic term that refers to the non-contacting technologies that makes use of radio waves to spontaneously identify

people or objects. Several methods of identification are available, but the most common technique is to store an identical serial number that recognizes a person or object on a microchip that is committed to an antenna. The combination of antenna and microchip are combinedly referred to as "RFID transponder" or "RFID tag" and it work in combination with the "RFID reader".

An RFID system comprises of a reader and one or multiple tags. The radio frequency gets transmitted by the reader when powered ON. When the tag is positioned close to the reader, the RFID tag will collect the radio frequency via the antenna placed inside the tag exclusively. The radio frequency (RF) energy is transmitted with the aid of Reader's Antenna. The tag will then modulate the electromagnetic waves generated by the reader will be then modulated by the tag in order to revert back to compiled data to the reader. The modulated waves that have got converted into a digital data will be received by the reader.

In this system, RFID tags are attached with the ID of the teacher. Each teacher has its own unique ID number. Whenever the teacher shows the ID in front of reader then reader reads that particular number and transmits it through ZigBee module which will be sent to receiver which is mounted in the cabin of authorized person. This received number is send to server through USB connection which is already saved in Database. Now, the work of server is it will match the RFID code to other already stored codes and as per these stored codes faculty is recognized and it's starting time of the session, classroom, day and date.

RFID Tag stores the information related to object. It has 12 digit unique ID number. It consist of mainly three parts i.e. antenna,

semiconductor chip and encapsulation. The tag antenna captures the energy from reader and transfer the tag's ID. The chip co-ordinate this process and encapsulation protects the antenna and chip from environmental conditions.

Zigbee is a wireless networking technology designed for reliable, power-efficient, and low-latency communications between low-cost nodes. Other protocols such as 802.11b and Bluetooth either wastes a significant amount of power or is overly complicated for simple automation tasks. Zigbee provides a low bandwidth alternative that can transmit simple instructions while conserving power to further the time the unit can operate off battery power before needing to be recharged. This technique allows small devices like sensors to operate efficiently while providing all necessary functionality for the specific application in which it is deployed. ZigBee and IEEE 802.15.4 are standards-based protocols that provide the network infrastructure required for wireless sensor network applications.

ZigBee is selected because of its low power consumption, low cost and moderate range 30 m to 1.6 Km. This range is suitable for our application where we want to wirelessly transmit data from RFID reader to the Database Server, where attendance is being managed. Another most important reason for using ZigBee module is that these modules come with serial interface therefore it will be easier for us to use these modules. These low-Rate WPAN (Wireless Personal Area Network) standards have exceedingly secured wireless transmission over a very distant range.

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM

outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI (Future Technology Devices International Limited) USB (Universal Serial Bus) -to-serial driver chip. Arduino controller is used for controlling whole the process of the system.

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. The LCD displays the message that is sent by the controller. RFID Reader will read the RFID tag and Check if it relates to teacher. The information about that particular showing tag will be also displayed on 16x2 displays.

APR9600 is a low-cost high performance sound record/replay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. The replayed sound exhibits high quality with a low noise level. A loudspeaker (commonly referred to as a speaker or speaker driver) is an electroacoustic transducer that converts an electrical audio signal into a corresponding sound.

This system provides the admirable remedy which assists the authorized person to monitor and manage the daily schedule of the institute. Whenever the lecturer shows the RFID tag in front of RFID reader then it will directly inform the starting timing of session to the authorized person. This system also keeps the record of attendance. In case of teacher absence the HoD will control the class through the loud speaker.

IV. RESULT ANALYSIS

A novel RFID based smart Intimation system to inform higher authority is implemented in this section. The result analysis of presented system is evaluated here. This system contains two major units namely: Transmitter unit and Receiver unit. The transmitter unit is placed in classroom where lectures show their tags in front of RFID reader to prove their presence to higher authorities. The receiver unit is placed at the office to monitor and control the organization. The Fig. 2 shows the transmitter unit where the main modules include Zigbee, Arduino Uno, power supply and RFID.

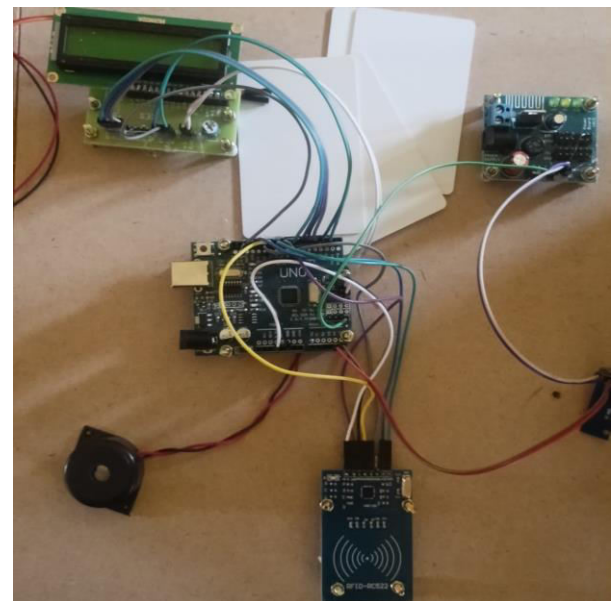


Fig. 2: Implementation of Transmitter Unit

The Fig. 3 shows the Receiver unit where the main modules include Arduino Uno, Zigbee, Loud speaker, LCD display and APR9600.

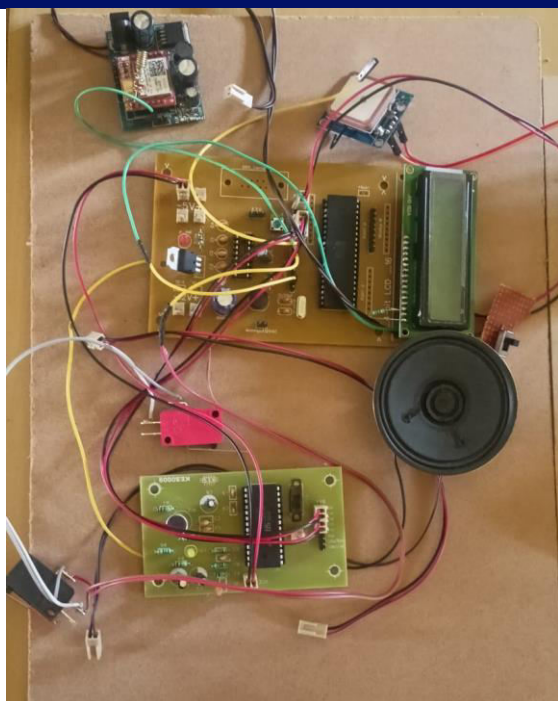


Fig. 3: Implementation of Receiver Unit

The Fig. 4 shows the implemented novel RFID based smart Intimation system to inform higher authority.

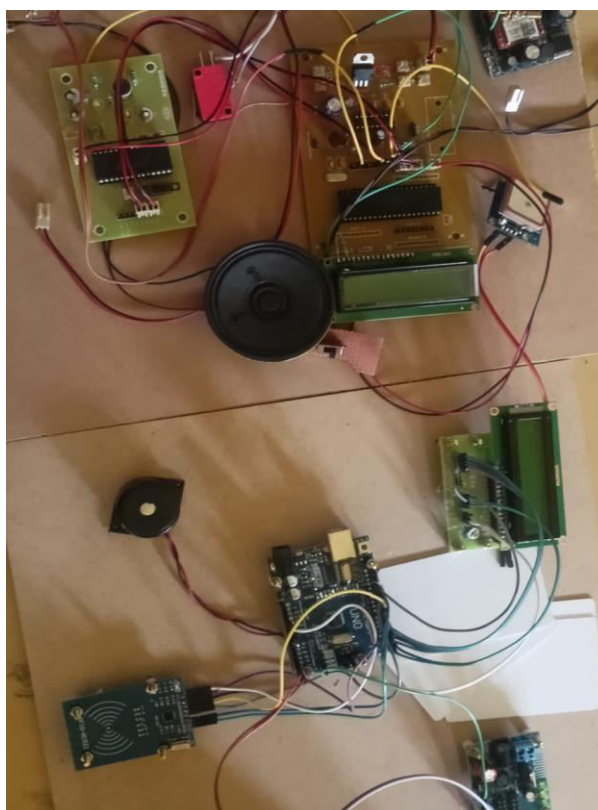


Fig. 4: Implemented novel RFID based smart Intimation system

Whenever the lecturer shows the RFID tag in front of RFID reader then it directly informs the starting timing of session to the authorized person. This system also keeps the record of attendance. In case of lecturer absence the authorized person will control and monitor the class through the loud speaker.

V. CONCLSUION

In this work, A novel RFID based smart Intimation system to inform higher authority is presented. This system is designed to inform the higher authorities about teacher presence or absence to that particular class. The main modules employed in this system are Arduino Uno, RFID module, Zigbee Module, LCD, ARP9600. The Arduino controller is used for controlling whole process. In this system the teacher ID card is replaced by specific RFID tag, so this system is very helpful to save valuable time taken for teacher presence. The main aim of this system is to provide lecture wise attendance for teachers which are successfully achieved. This system helps the authority to upgrade the reputation of the institute. The main advantages of this system are that the records are maintained in the Database.

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