Impelentataion of Smart College Using Embedded System

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Abstract: *This paper gives a brief scenario regarding "Implementation Of Smart College Using Embedded System ". As we know that the demand of current era is "DIGITISATION" so we focused on technical basis in a innovative way of making campus digitized. The major aim of project is to ease the hectic schedule of student, faculty and administration department by using iot system. The basic idea is to have three systems namely account section, library section & attendance section. A Digital Campus system will allow student to automate all work student want to do on regular basis using one card.with the help of IoT, we develop Smartphone application on android phone to monitor and record all the data.*

I.   Introduction

Digital Campus is a central system that can control and create communication between nearly all aspects of student access in campus. This includes: 1) Payment System at account section, canteen, store, exam department, 2) Library Management for book borrow system, 3) Attendance record at classroom, lab, exam hall etc. A Digital Campus system will allow student to automate all work student want to do on regular basis using one card. One of the beautiful thing about digital campus system is it can be tailored to student lifestyle regarding with campus. Here are four of the **strongest benefits** digital campus will provide for student:Decrease students extra work and also waste of time. It improvesstudents campus security. It is very convenient to use. It will improve the comfort of students presence in campus.

Thus, for doing so we are using a ARM7 LPC 2148 processor, WiFiModule , RFID system .The process includes assigning of RFID card to each student having unique identification number(UIN) which can be accessed at the above mentioned three sections. The WiFimodule is used in order to have effective communication between Smartphone application and user. Digital Campus Design is a modern technology that modifies the student campus structure to perform different works using one card instead of using various cards or papers or documents. While smart digital campus system is the brain child that makes smart campus design possible. Digital campus automation technology is new concept which is hybrid concept of many different systems, whose demand may be increase in a wide range in a future. There are many factors that are responsible for the need of digitalization in campus to make campus "Digital and Smart".

II.   Existing Methods

As a student, we are facing many problems during working in campus like:
1)   We have to carry an identity card at all time whenever we are in campus.
2)   We need to stand in row during payment of exam fee, college fee, fine etc.
3)   We need to carry cash for store or canteen purchase at all time.
4)   We need to carry all receipts regarding with exam fee, college fee etc.
5)   We need borrow card for issuing of book from library.
6)   We need to register the issuing of book.
7)   We need to remember the renewal period of book otherwise we pay fine.
8)   We need to give attendance or sign the attendance record daily.

All these works require a long time and may causes waste of time and also causes load on particular management system. So we think about all these problems and decide to solve out those who affect on our lifestyle.Hence we decide to implement a one system which synchronizes all work in campus and can be accessed by only one card.

We understood the preponderance of ARM processors in the field of embedded systems and the features of ARM processors from the book "ARM System Developers Guide Designing & Optimizing System Software – Andrew n, Dominic Sloss&chris Wright". The ARM system is a confluence of many useful features that makes it better than other peer processors. Being small in size & requiring less power, they prove useful in providing an efficient performance in embedded applications[1]. With embedded system fast expanding its reach, subject matter related to this field is available in abundance while working on this project. We have studied matters from various sources such as books, online articles and reference manuals. The knowledge

gained from this activity has been of a great help to us in understanding the basic concepts related to our project and has ignited further interest in this topic. We also referred many research papers which uses this system.

It also highlighted important points in the KFYUPM smart campus experience, in addition to giving glimpses on how KFYUPM is starting to spread the know how of RFID technology in its educational system. KFYUPM plays a very crucial role in presenting a success story in implementing RFID technology as an example for other universities and institutions in the region. Utilizing RFID technology in student projects and research in KFYUPM has a big impact on a university which prepares future engineers to conduct RFID projects like the Saudi national ID projects. Upon completion of the smart campus project, it is hoped that the KFYUPM smart campus will be an ideal case study [3].

The RFID and GSM are connected with PIC microcontroller and varying data is sent to GSM modem which is simultaneously displayed in LCD and also send as message both parents and school admin. Through this experiment and implementation we came to know that the student can be monitored using RFID and sent the status as SMS to the particular mobile successfully. RFID assisted GSM based smart school management system can be extended to monitor the objectives and also can be controlled the hijacking further consequences. The system can be controlled and monitored via short message service (SMS) from anywhere that covered by GSM service [4].

The developed Web-Based Student Attendance System using Radio Frequency Identification technology will significantly improve the current manual process of student attendance recording and tracking system, especially in a university or school environment. The system promotes a semi-automated approach in capturing the student attendance, i.e. by having the students to flash their student cards to the RFID reader. In addition, a number of other advantages are gained by having an online web-based system, acting as a central repository of student attendance record. Firstly all processes of managing the student attendance record are performed online, allowing administrators and lecturers to view or modify the users' data through any computer via the web browser, as long as they are connected to the Internet. This way, no specific software installation is required. The captured student attendance data are also processed and analyze automatically with less risk of data loss, compared to a manual filing approach. Specific to lecturers or teachers, they can easily monitor their students' attendance online and this could improve the quality of teaching since less time is needed to manage the student attendance record. The developed system can be improved and upgraded further, e.g. by extending the system with new features and modules or by improving the web-interface layout with new display style. Better yet the system can be enhanced further to offer another significant enhancement where the system can be extended to monitor staff attendance record [5].

Digital Campus Security System (DCST) has been designed and implemented base on the RFID, GPS and GSM network. DCST reads the RFID tags and sends information to lpc2148.processor gives alerts through GSM network. If any invalid RFID (Thief) information comes into mobile we will get the real-time tracking for valuables. Where the thief arrives anyone access control node, it would be blocked. User can also manage its own valuables such as lending and recovery operation through the web manager center [6].

III. Proposed System

We alluded numerous papers in regards to with our task. All papers concentrated just on a couple of frameworks, yet here we go to make a framework which is half breed model of installment, library the executives and participation record framework. We search for utilization of the arm processor due its few preferences over a microcontroller. Likewise we present a WiFi module in our framework for realizing that what work is performed. Grounds needs straightforward personality cards for all understudies who are conceded access to specific information, gear and offices as indicated by their status. The RFID card performs following multifunction as Photo ID, as library getting benefits, as an electronic satchel and to get to control to college offices

Radio Frequency Identification (RFID) is upsetting the path associations around the globe track the area and development of products and resources. RFID innovation uses modest remote RFID chips or labels that report their area to adjacent scanners. Thing with RFID labels can be followed. Likewise RFID innovation is additionally used to perform secure budgetary exchanges. So we chose to build up a keen advanced grounds for controlling access to its premises utilizing RFID innovation.

Among the different innovative gadgets and frameworks, Iot (Internet Of Things) is accepted as a proficient and quick enough method that can perform productive, ongoing article recognizable proof and quick observing framework. IoT based observing and information recording framework will pass total data about, where the article (understudy) and its exercises. The RFID framework is used as a board module to connect the parts of the article (sack, character card, tag, and so forth) and pursue the item without further ado. The planned model is considered under research facility scale and the outcomes are examined.

Progressed implanted framework helped IoT and RFID based keen school the board framework is utilized to give an entrance for the activity by constant acknowledgment of the individual dependent on the RFID label data. For instance, for passage control of an association, the RFID tag and its peruser are planned with predefined novel code of tag for individual understudy. At whatever point the tag is perused by peruser, it contrasts the code and the predefined codes in the machine. Based on accuracy of the data, it sends an affirmation (as instant message) to the specific understudy and a similar convention is pursued for every one of the students of the grounds.

This can be conceivable by utilizing an implanted framework. Henceforth we chose to utilize an ARM7 processor. The lpc2141/42/44/46/48 microcontrollers depend on a 16-bit/32-bit CPU with ongoing copying and implanted follow support, that join the microcontroller with installed rapid glimmer memory extending from 32 kb to 512 kb. All the programming program in this IC ARM LPC 2148 ,that information at that point transmitted towards the specific segment. As we realize that RF transmitter and collector takes a shot at sequential information we need to send this information codes and task code sequentially. Information code transmitted by RFID card is gotten by RFID peruser. This got information is encouraged to processor. On processor side we have built up a product dependent on visual fundamental. This product is created so that it will take all information entered by information gadget. At that point specific undertaking is performed on entered information in regards to with specific understudy. At that point it will show the yield information on LCD. All tasks should be possible by processor itself and result is convey to the understudies versatile by means of a WiFi module which is interfaced with a processor.
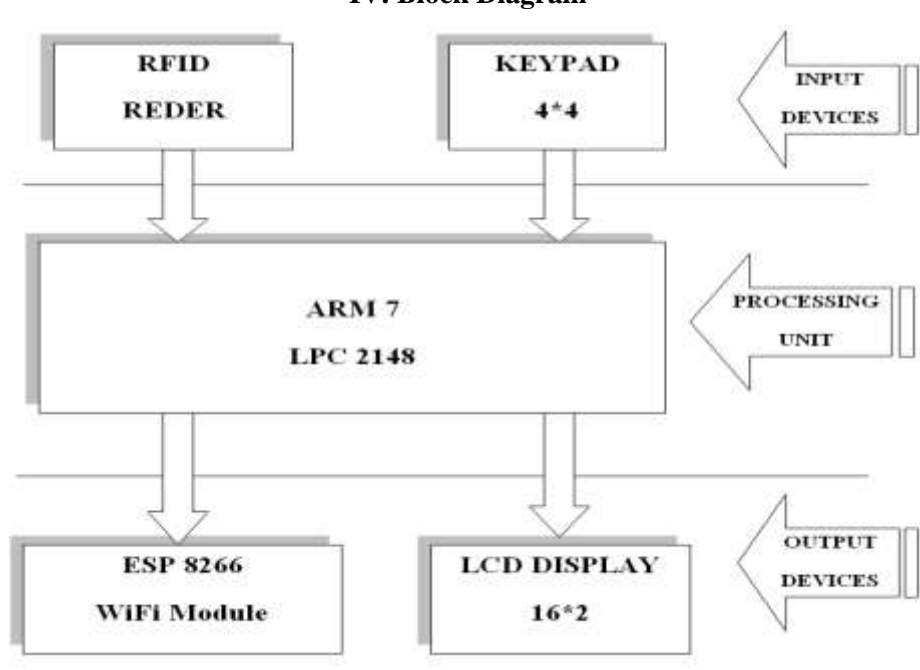
IV. Block Diagram

Fig 1: Block Diagram

V. Hardware description

1] LPC 2148

LPC2148 microcontrollers are based totally on a 32-bit ARM7TDMI-S CPU with real time emulation and embedded trace guide that integrate microcontroller with embedded high-pace flash reminiscence 512 kB. A 128-bit wide memory interface and an specific accelerator architecture permit 32-bit code execution at the maximum clock rate. In-gadget Programming/In-utility Programming (ISP/IAP) thru on-chip boot loader software. 10-bit ADCs offer a complete of 6/14 analog inputs, with conversion instances as low as 2.44 μs in line with channel. single 10-bit DAC offers variable analog output 32-bit timers/external occasion counters (with four seize and four evaluate channels each), PWM unit (six outputs) and watchdog. Low electricity actual-Time Clock (RTC) with independent strength and 32 kHz clock input. multiple serial interfaces along with two UARTs, two speedy I2C-bus (400 kbit/s), SPI and SSP with buffering and variable statistics duration competencies. Vectored Interrupt Controller (VIC) with configurable priorities and vector addresses. as much as 5 V tolerant speedy popular cause I/O pins in a tiny LQFP64 package deal.
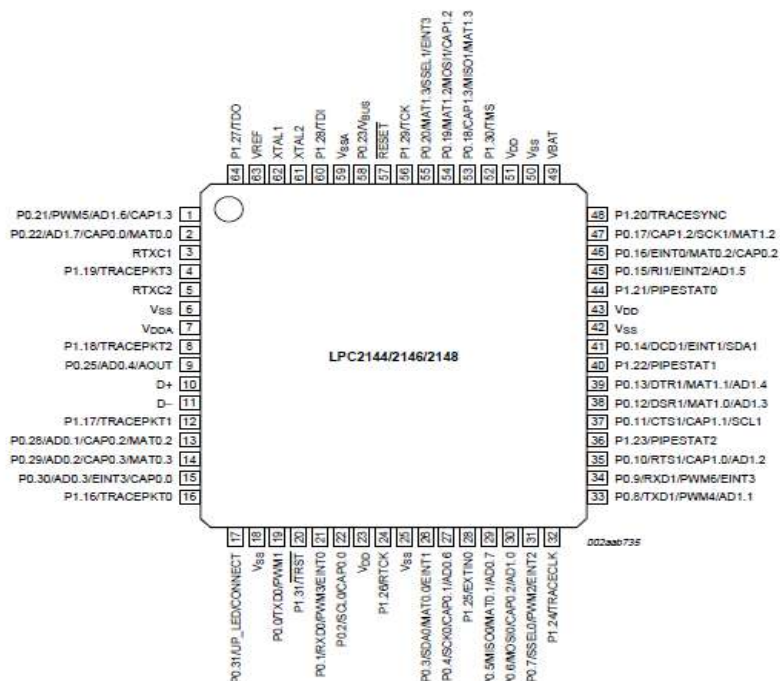
Fig 2 LPC 2148 Pin Diagram

2] ESP 8266 WiFi Module

The ESP 8266 Wi-Fi module is a low cost component among all the modules ESP 8266 WiFi module is a system-on-a-chip with capabilities for 2.4GHz range and employs a 32 bit RISC CPU running at 80 MHz. It is based on the TCP/IP (Transfer control protocol) It is the most important component in the system as it performs the IOT operation. It has 64 kb boot ROM, 64 kb instruction RAM, 96 kb data RAM.

Fig 3 ESP 8266 (Node MCU)

3] RFID Reader

The EM 18 RFID reader module operating at 125khz is an inexpensive solution for RFID based totally software. The reader module comes with an on-chip antenna and can be powered up with a 5V strength deliver. energy-up the module and join the transmit pin of the module to receive pin of our microcontroller. show our card within the studying distance and the cardboard range is thrown on the output. Optionally the module may be configured for additionally a output.

Fig 4 RFID Reader

VI. Software requirements

1] KEIL- It compiles the programs written for controllers and generate hex file for loading into microcontroller.

Fig 5 Keil Software

2] Flash Magic - It burns files from given path into flash memory of microcontroller.

Fig 5 Flash Magic software

VII. Advanatages

A Digital Campus system will allow student to automate all work student want to do on regular basis using one card. One of the beautiful thing about digital campus system is it can be tailored to student lifestyle regarding with campus. Here are four of the **strongest benefits** digital campus will provide for student:

1) Decrease students extra work and also waste of time
2) Improve students campus security
3) It is very convenient to use
4) Will improve the comfort of students campus

VIII.   Applications

Same system can be used for following applications where different works are related with the paperwork: 1] at college, school, 2] at industry, 3] at hospital for hospital staff, 4] for public services.

IX. Future Scope

We can use smart card instead of RFID. Also we can add biometric authentication and password for better security, to login computer or net in campus by card. Further we can include GPS system for finding student position in campus which may leads to be used for transportation

X.   Conclusion

We would like to conclude with the thought that such a DCDES system could be used for the benefit of a students. The components used for making this project are readily available in the market. The main advantage of this system is that, besides carrying the RFID card, no other cards, money etc. is incurred for using it. As the

system used is providing many benefits, the time and cost saving is possible.Hence we concluded that, as it has many good features, it can be use in colleges, schools, etc.

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