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# Online JIC Students Attendance Monitoring System in Classroom Using Radio Frequency Identification Technology

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**Abstract—** Mortaring the attendance of JIC student By using RFID technology. It is faster to use RFID rather than old way of attendance. The application of passive RFID is to be accurate, faster and safer to record the attendance in JIC web site. Our paper will tell you the way and technical use of RFID . The main point is to find out best way to development the system which is called Student Monitoring System Using passive RFID

***Keywords***— **RFID, student attendance, passive RFID, technical**

## 1. INTRODUCTION

Radio frequency identification (RFID) use the radio frequency waves to identify and a tag attached to an object. RFID is a wireless type of communication. It uses electromagnetic and electrostatic coupling in radio to communicate between reader and tag. RFID combine radio frequency and microchip technologies to make a smart system that is used to identify and monitor objects. The RFID uses a small chip named "tags" they hold and send identifying information to a reader. In this RFID system for student attendance in JIC, A passive RFID reader is used with maximum detection range of 10cm. The operating frequency of the reader is 125 kHz and uses a power supply of 12V. The system allows us to identify and take the attendance of the students. To take the attendance, the students need only to place their RFID tag on the reader. The system is very time efficient. The attendance will be registered if the tagged ID is scanned and matches the one stored in the memory. The goal of this paper is to register student‘s attendance by using RFID.

## 2. RADIO FREQUENCY IDENTIFICATION (RFID)

Information is collected automatically with the help of RFID technology that uses radio frequency data communication between a tagged object and an RFID reader, to identify them. A reader is used to fetch the data stored in an RFID tag. Readers are devices that emit radio waves and receive signals from tagged objects using antennas. The reader can read/write information on a tag and send that information for storage and processing. The basic RFID system components are shown in the figure 1. RFID-Tag, Antennas, Reader and Host (include with Middle ware and Application software).

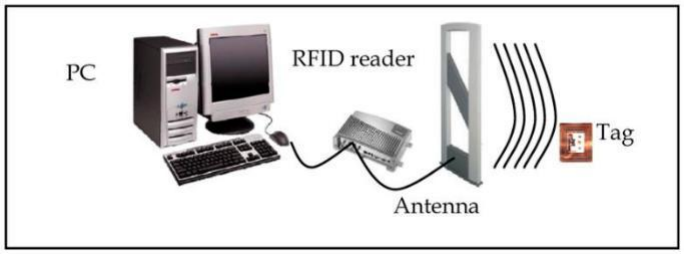



**Fig: 1 RFID System Components**

Some other automatic identification systems that use light as a communicating method (such as bar codes and infrared technology) has limitations that RFID technology overcomes because the tag may be hidden from the eye and can be used in a rough and dirty environment. Readers can automatically and remotely read without manually scanning the object, unlike in the bar code systems, a comparison between all Auto-ID technologies are described in table 1, which highlights the strengths and

weakness of RFID in relation to other old Auto-ID technologies and proves that the RFID is better than other Auto-ID technologies.

### 3. SYSTEM REQUIREMENTS AND INSTALLATION

In order to automate the entire system of JIC student's attendance registration using RFID, an appropriate software application must be built. Attach an RFID tag in the student ID card. Place an RFID reader in every classroom. A cheap reader must be found due to the huge number of classrooms in the college. All readers are connected to the college LAN. The readers are powered by Power over Ethernet (PoE). It's easy to install the system over the existing college LAN and it will hardly cost anything, it required only RFID readers and tags.

TABLE I
COMPARISON OF DIFFERENT TAG-ID TECHNOLOGIES

| System equipment | Barcode | OCR | Voice recognize | Biometry | Smart card | RFID |
|---|---|---|---|---|---|---|
| Data quantity | 1–100 | 1–100 | -- | -- | 16–64 k | 16–64 k |
| Machine readability | Good | Good | Expensive | Expensive | Good | Good |
| Readability by people | Limited | Simple | Simple | Difficult | Impossible | Impossible |
| Effect of dirt/damp | Very high | Very high | -- | -- | Possible | No influence |
| Effect of covering | Total failure | Total failure | -- | Possible | -- | No influence |
| Effect of direction and position | Low | Low | -- | -- | Unidirectional | No influence |
| Purchase cost/reading electronics | Very low | Medium | Very high | Very high | Low | Medium |
| Chance of copying/modification | Slight | Slight | Possible (audio tape) | Impossible | Impossible | Impossible |
| Speed of reading | Low ~4 s | Low ~3s | Very low > 5 s | Very low > 5–10 s | Low ~4 s | Very fast ~0.5 s |
| Max distance between data carrier and reader | 0–50 cm | <1 cm Scanner | 0–50 cm | Direct contact | Direct contact | 0–5-m, microwave |

There are two ways to scan the tags, first is by using Stationary Readers and second is by using Handheld Readers such as mobile device or PDA. Stationary Readers are going to be used in this system. The teacher can turn on the reader with a single tab of a button in a device like PC, laptop, PDA etc. or turn on the reader automatically according to the class schedule. The reader scans all the tags attached to the student ID card. Then, the scanned information goes to central server via college LAN. The information will be processed and uploaded in EduGate. In class, the teacher can see how many students are present and who is absent. However, selection of RFID components as specially tag, and readers play major role in RFID system.

**4. Tag Selection**

Each tag has an identifier that identifies the tags uniquely. Electronic Product Code (EPC) is the tag identifier format that is used. The tag identifier format consists of four data fields as shown in figure 3.

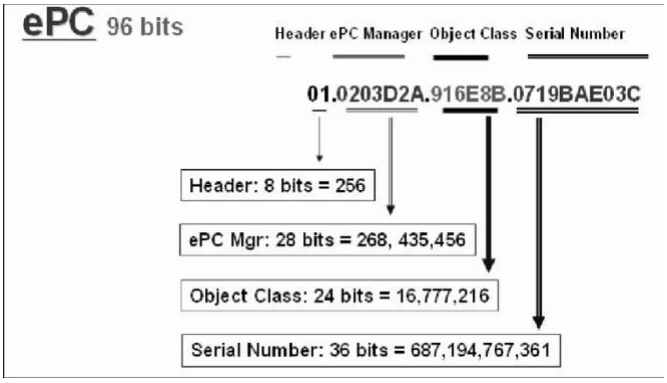



**Fig: 3 96 Bit EPC Format**

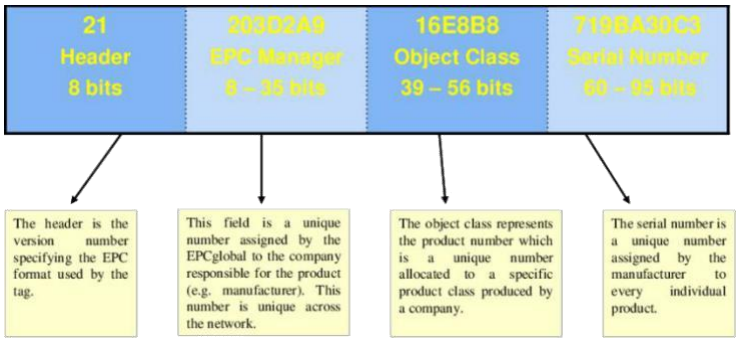
The Header, which specifies the EPC type, The EPC Manager ID, which uniquely identifies the organization that is responsible for assigning the object class and serial number bits (often the manufacturer of the item), the Object Class, which identifies a class of objects, such as a type of home theater set, and the Serial Number, which uniquely describes the class of objects (e.g., a specific home theater set)

Passive tags don't include an internal source of power. They draw the power needed from an RFID interrogator. To power the chips in the tags, electromagnetic waves are emitted from the interrogator that induces a current in the tags. The power in the tag's chip must be higher than the minimum voltage threshold, the circuit will turn on and the tag sends the information back to the reader.

This system uses the passive tag, because they are compact, light, does not require batteries, it can be easily placed inside an ID card, can be carried easily, cheap.

The main advantage of EPC is that it provides fast searching for tag's ID as shown in figure 3.2. Assume our college has two organization and each organization having 500 students. Each organization having two departments and each department having 400 students. The total numbers of students are 900 in an organization. All students will store there tag's ID This RFID system uses Read-only fixed mounted in database server. Now any student's tag ID scanned using RFID reader will send to server to search and mark the presence in appropriate subject's class. Server will search all 900 students tag's in worse case using linear searching method. If we use indexing using EPC coding for tag ID than it takes 2 (search for institute) + 2 (search for departments) + 250 (students id) = 254 search required in worse case.

**Fig:3.2. EPC Coding**



RFID Reader (Interrogator) Selection

The RFID tag and the reader passes the information in digital form communicates using radio waves and to a computer system. This RFID will use system as Read-only fixed mounted interrogators type. Read-only interrogator is a reader that

**Communication with Host Computer**

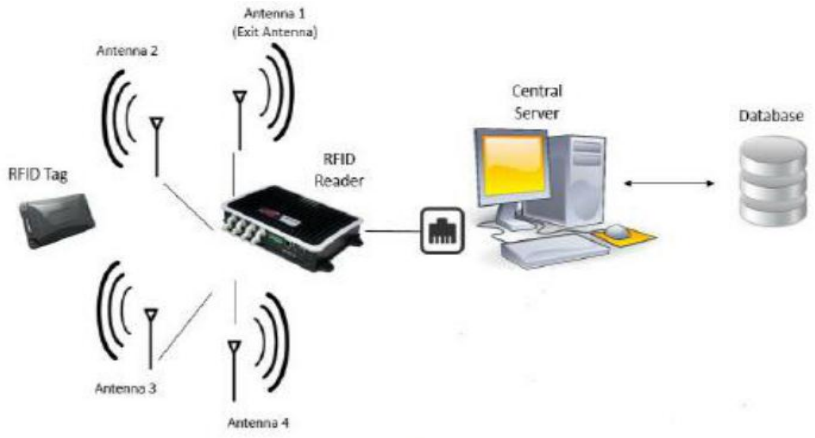
The interrogator sends the information of the scanned tags to a system for processing using TCP/IP interface to the LAN network.

**5. SYSTEM ARCHITECTURE AND ITS WORKING PRINCIPLES**

Figure 4.1 show the used of system architecture, in which it has hardware and software components such as readers, tags, middleware, database server, application server, hosts and local area network infrastructure (LAN).

All RFID interrogators are mounted at the entrances of every classroom and connected with the campus LAN. RFID interrogators are powered using (PoE) Power over Ethernet. All students ID cards implanted with RFID tags. The server receives information about the tag ID, time and date.

The reader turns on automatically during the class based on the class schedule and all the students scan their tags as they enter the classroom. In the server a software runs to search students tag ID stored in the database, if a tag ID matches then mark that student presence, the system operation is described as below:



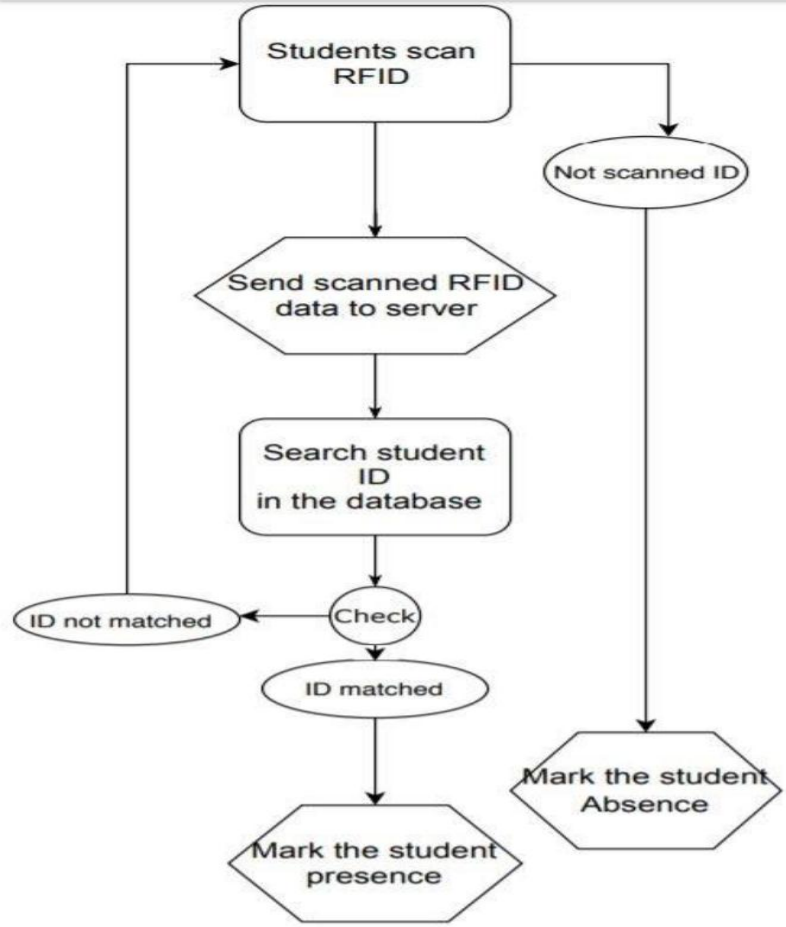




**Figure4.1. A Proposed System Architecture**

## 6. ADVANTAGES OF SYSTEM

The advantage of use RFID in attendance because it is fast, automatic, reliable, highly accurate, no need for physical repair, saving paper for other work, saves the time of attendance call, have memory to save all data, students wouldn't miss classes, basic and don't need for special course to teach how to use. And capable to add new features.

## 7. CONCLUSION

The use of system can provide a new, accurate, faster and secure way to take attendance with less chance of error. A cheap cost RFID Based Attendance System has been successfully developed. The case of the system can provide big number of benefits over the usual way of taking attendance. The system allows us to identify and take the attendance of the students. To take the attendance, the students need only to place their RFID tag on the reader. The system is very time efficient. The attendance will be registered if the tagged ID is scanned and matches the one stored in the memory.

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