



Radio Frequency Identification (RFID) System Attendance Registration System

Zainab Marid AlZamili

Education Directorate of Thi-Qar, Ministry of Education, Iraq

Zainabalzamli91@gmail.com

ABSTRACT

In this project in its practical and theoretical aspects, where after the study, we presented the history and intellectual emergence of this idea at the beginning and we mentioned the details of this system and its components of software and tangible materials Rfid (radio frequency identification) technology is a technique used to track and identify things by sending radio signals between rfid signs and rfid reader. this research aims to explore rfid technology applications in various fields such as supply chain management, security, industry, health care, agriculture, and others. the research also deals with challenges that may face the adoption of rfid technology, such as privacy and safety issues, infrastructure cost, and real-time data. the research depends on reviewing specialized literature and case studies to provide a comprehensive view of rfid uses and challenges, and concludes with directions for future research and suggestions to enhance the adoption of this technology in various sectors.

Key word: Rfid, Reader, Tags, Antennas.

نظام تسجيل الحضور بنظام تحديد الترددات الراديوية (RFID)

زينب مارد الزاملي

مديرية تربية ذي قار، وزارة التربية، العراق

الخلاصة:

وفي هذا المشروع بجوانبه العملية والنظرية حيث قمنا بعد الدراسة بعرض تاريخ هذه الفكرة ونشئها الفكري في البداية وذكرنا تفاصيل هذا النظام ومكوناته من برمجيات ومواد ملموسة. تقنية Rfid (تحديد ترددات الراديو) هي تقنية تستخدم لتتبع الأشياء والتعرف عليها عن طريق إرسال إشارات لاسلكية بين إشارات rfid وقارئ rfid. يهدف هذا البحث إلى استكشاف تطبيقات تقنية rfid في مجالات مختلفة مثل إدارة سلسلة التوريد والأمن والصناعة والرعاية الصحية والزراعة وغيرها. ويتناول البحث أيضاً التحديات التي قد تواجه اعتماد تقنية rfid، مثل مشكلات الخصوصية والسلامة، وتكلفة البنية التحتية، والبيانات في الوقت الفعلي. ويعتمد البحث على مراجعة الأدبيات المتخصصة ودراسات الحالة لتقديم نظرة شاملة لاستخدامات rfid والتحديات، ويختتم البحث بتوجيهات للبحوث المستقبلية والمقترحات لتعزيز اعتماد هذه التكنولوجيا في مختلف القطاعات.

الكلمة المفتاحية: الترددات الراديوية، القارئ، العلامات، الهوائيات

INTRODECTION

To identify people or objects, Radio Frequency Identification (RFID) technology uses radio waves. It uses a device that reads the information contained in a wireless device or "tag" from a distance, without the need for line of sight or physical contact. For some time now, barcodes have revolutionized



automatic identification systems, and barcodes are widely used in various industries, and consumer sectors ensuring automated reading and cost-effective solutions however recently shortcomings in this technology have become evident in certain applications the limitations include the limited information that can be stored the lack of reprogramming capability the necessity for direct exposure of the label to the scanner the inability to read multiple labels simultaneously and the challenge of assigning an independent number to each unit as a single code is assigned to all units of the same type the concept of wireless chips emerged in the early seventies and with significant technological advancements in the field of electronic chips, Microchips, which have been decreasing in cost in recent years, have become the preferred alternative in automated identification systems. Smart cards are today the most widespread and best type of automated identification systems, such as phone cards and bank cards, which rely on contact with the reader to communicate, however, mechanical contact between the card and the reader is impractical in many scenarios, non-contact contact with the reader ensures high flexibility in different applications, in this method the chips emit digital signals that are transmitted via short and long-range radio waves and a scanning device or satellites detect these signals and determine their points of origin, this technology is usually referred to as radio.

OBJECTIVES

1- Enhancing Accuracy in Attendance Recording.

The aim of this segment is to design a system that leverages RFID technology in a manner that significantly enhances the accuracy of attendance and departure recording This will necessitate a meticulous analysis of RFID reading methods and fine-tuning various parameters to ensure precise authentication of each attendance event:

2 -Strengthening Data Security.

Our goal here is to develop a database system that ensures the integrity and security of attendance records. This involves implementing robust security measures, such as encryption and access control, to effectively safeguard data from potential security threats.

3- Increasing the Efficiency of Attendance Management.

This objective aims to improve the administrative processes associated with recording and monitoring attendance using RFID technology. The focus will be on streamlining workflow and reducing the time required for attendance management, thereby enhancing the overall effectiveness of the system.

LITERATURE REVIEW



The origins of radio frequency identification technology are generally believed to date back to World War II. The Germans, British, Japanese and Americans adopted radar, a technique discovered in 1935 by Scottish physicist Sir Robert Alexander Watson-Watt, to use to detect incoming aircraft from miles away. The challenge was that it was impossible to distinguish between enemy aircraft and those belonging to pilots from one country returning from their missions. The Germans discovered that the radio signals reflected by the pilots changed when they turned their planes around while returning to base. This basic approach revealed to ground radar crews that they were not Allied aircraft (this was essentially the first passive radio identification system) but German aircraft. Under the control of Watson-Watt, who was leading a secret project, the first active identification friend or foe (IFF) system was developed by the British. Every British aircraft was equipped with a transponder. When ground radar stations receive signals, it begins sending a signal identifying the aircraft as friendly. RFID technology works on the same basic concept. The signal is sent to a transceiver, which is activated and reflects the signal (passive system) or transmits the signal (active system).

PROBLEM STATEMENT

The problems that led to research and development on this topic is facilitating the availability of student data, speeding his entry to the university campus, helping the movement join as well, providing protection for university information and for the student as well, and easy access to it from the authorized party.

SYSTEM COMPONENTS

Rfid system components

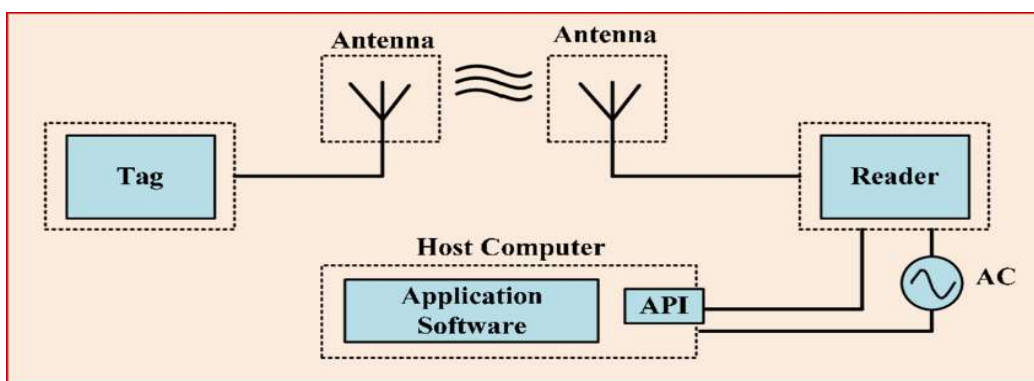


Figure1 [system components]

A Typical Rfid (Radio-Frequency Identification) System Comprises Several Essential Components Working Together To Facilitate The Transfer Of Data Between Rfid Enabled Objects Here Are Some Of The Key Components



1.Tags

- Tags Represent A Fundamental Part Of The Rfid System, Containing Information That Can Be Remotely Read By A Reader Tags Can Be Active (With A Battery) Or Passive (Relying On Power From The Reader)

2.Reader

The Reader Is Used To Read Information Stored On The Tags It Can Be A Part Of A Fixed Device Or A Handheld Device, Identifying And Reading Tags Within A Specific Range

3.Antennas

Antennas Assist In Transmitting Power Between The Reader And The Tag, As Well As Directing Radio Signals To Improve Communication Efficiency

Data management system

The Data Management System Includes A Database That Stores And Manages Information Read From The Tags This System Enables Effective Analysis And Interpretation Of The Data

Software

Software Manages Reader Operations And Interacts With The System This Software Can Be Part Of The Data Management System Or Standalone Applications.

Communication interface

the communication interface provides a means to link the rfid system with other systems, allowing integration with various applications

- these components collaborate to create an efficient rfid system that can be used in a variety of applications, such as inventory management, asset tracking, attendance and access control systems, and many other applications

1. Tag components

An Rfid (Radio-Frequency Identification) Tag Comprises Several Fundamental Components That Work Together To Enable The Identification And Data Transmission Process Here Are The Components Of An Rfid Tag.

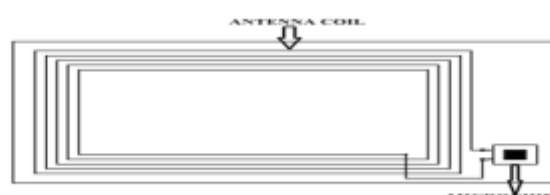




Figure 2[Tag]

2.components of the microchip

The microchip in an rfid tag includes essential components that play a vital role in the identification process and data transmission. Here are the components of the microchip in the tag

Central processing unit (cpu)

The Cpu Performs Computational Tasks And Coordinates Primary Operations Within The Microchip

Memory

This Includes Random Access Memory (Ram) And Read-Only Memory (Rom), Where Data And Programs Are Stored

Communication control unit

Manages Communication Processes With The Antenna And Contributes To Data Transfer Between The Tag And The Reader.

Capacitor

used for storing energy, especially in passive tags where the microchip can be powered by energy harvested from reader signals

Data protection unit

provides features for protecting and encrypting data to ensure the safety and security of stored information on the microchip

Frequency modulation unit

determines the frequency used in the communication process between:
the tag and the reader

I/o interfaces

offers interfaces for interaction with other components or sensors

Power optimization unit

manages and optimizes power consumption to extend battery life in active tags

Understanding these components helps grasp how rfid tags operate, enabling identity determination and data transfer between the tag and the re

3. components of the antenna



In rfid (radio-frequency identification) technology, antennas play a crucial role in the communication and data transmission process here are the components of an rfid antenna

Conductive materials

conductive materials, such as metal wires, are used to construct the antenna structure, these materials help guide the flow of electrical power and radio signals

Transducer

the transducer is a fundamental part of the rfid antenna, converting received power from the antenna into usable power to operate the integrated circuit in the tag

Magnetics

magnetics are used in some antennas to enhance their performance by incorporating them to improve signal reception and transmission

Effective structure

the effective structure includes the engineering design of the antenna influencing its efficiency in interacting with rfid signals

Connectors and plastic connectors

connectors can be used to direct signal flow, while plastic connectors are used for insulation and additional protection of the antenna

Mirrors

some antennas use mirrors to improve signal direction and increase coverage range

Understanding these components helps understand how antennas work to enhance the interaction with rfid tags and readers, contributing to the success of an rfid system

4.Components of the reader An rfid (radio-frequency identification) reader consists of several components that contribute to the process of reading and interpreting data from tags here are the components of the reader

reader module

the reader module is the essential part that receives and interprets signals from rfid tags it contains advanced electronic circuits for data processing

Reader antenna

the reader antenna is used to transmit radio signals between the reader and the rfid tags it helps improve communication efficiency and reading range

control unit

the control unit includes software and control circuits that manage and regulate the reading operations and interaction with data

Communication module

the communication module provides an interface for interaction between the reader and other systems, enabling integration with various applications

User interface

the user interface includes buttons and screens that facilitate interaction between the user and the reader it may consist of a keypad or display screen

Power source: the reader requires a power source for its operation, which can be an external power source or an internal battery.

information processing unit

the information processing unit processes the data read from the tags and converts it into understandable information.

WORKING PRINCIPLE



Figure3 [WORKING PRINCIPLE]

To Get To Know The Working Principle Of Rfid Chips, It's Required That We Get Acquainted With Their Elements To start Three Primary Components Make Up RFID Technology Computer programs and databases are contained on the card that holds the transmitter and information reading and transmitting device. RFID chips are tiny chips that may be glued or attached to objects. They have an



antenna inside of them that receives waves and looks like a thin wire wrapped in a tube.

. The Play After receiving magnetic waves from the reader, this antenna turns on the circuitry inside the card, initiating the wireless transmission process that leads to the reader and ultimately To comprehend the components of RFID chips, we must first comprehend how they operate. There are three primary components of RFID technology: the card, which has databases, computer programs, an information transmitter, a reading and transferring device, and information. RFID chips come in the shape of cards that you may attach or link to various objects. Inside the card, these little chips have a thin twisted wire serving as an antenna to receive signals.

By receiving magnetic radiation from the reader, this antenna triggers the electronic circuit within the card, starting the wireless communication process that ultimately reaches the reader. When information is moved to a computer or network As was previously discussed, barcode number 7 on RFID cards is not the sole memory; it also carries an identification number that is transmitted to the reader.

. This tiny memory, which is often an Eeprom, has an internal storage capacity of up to 256 bytes and can store precise information. It should be mentioned that this chip does not require a power source, such as a battery, making it suitable for placement on products. Instead, this technology, which relies on resonance circuits, harnesses the energy of electromagnetic radiation released by the reading device. A basic coil and a capacitor make up the circuit. When the reader's waves and the circuit's frequency coincide, the circuit enters the resonance stage.

. Therefore, the resulting energy is used to send information to the reader, as the reader converts the wireless signals from the card into digital data that can be processed by the computer. The following figure shows the basic components of the RFID chip.

HARDWARE

We Will Look Here About The Components Of The Used Device

LCD

A liquid crystal screen or l (liquid crystal screen). It is a type of flat panels that can display images. Each plate consists of a certain number of colored or monochromatic units that are placed in front of the light source. Its consumption is low, which is why it is ideal for this type of low-energy electronics project

ESP8266



It is widely used in the electronics industry and is a low-cost Wi-Fi chip. Due to its ease of programming and low power consumption, this chip is very popular. Some of the functions of the esp8266 are:

- Internet connection: It allows the esp8266 to connect to the internet via Wi-Fi, making it ideal for IoT projects.
- Remote control: Devices can be controlled remotely using this chip, making it ideal for home automation projects.
- Easy programming. The esp8266 can be programmed using the lua programming language or the arduino ide.
- Storage capacity: It consists of built-in flash memory inside this chip used to store data.
- Interacting with other components. The esp8266 is compatible with a wide range of electronic components, making it excellent for complex projects.

RFID READER

Rfid-rc522 is an electronic device used in reading and writing data on rfid marks. It features a small size and a simplified design that makes it easy to use in a variety of applications. It works by nfc nearby and works on high frequencies of 13.56 mhz. Rfid-rc522 is used in areas such as wireless payment systems and access and control systems, and is considered a common tool in electronic projects and technical hobbies

BUZZER

An electrician is a small rectangular or cylindrical box often with solid electrical connections in order to directly fix the printed circuit. The resonant ability of such a tin is about 85 db/cm

SERVO MOTOR

Is a type of electric motor used to move the mechanisms accurately and tightly. The serving engine is characterized by its ability to control the angle of its rotation accurately and at certain times. The servo motor is usually consisting of a dc (direct current) engine with a transformation system and a monitoring device such as a potentiometer to determine the position of movement.



Figure 4[SERVO MOTOR]

Here Is An Explanatory Drawing Of Its Way To Link The Ingredients Together

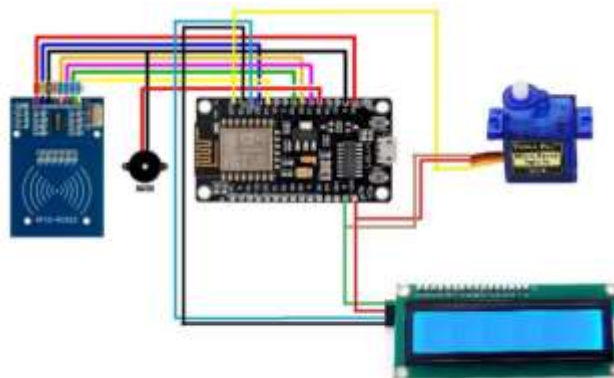


Figure 5 [EXPLANATORY DRAWING]

PRACTICAL STEPS AND RESULTS

the first step when we put our card in the device by withdrawal method will occur a process of acquaintance between the card and the reader of the device through the process of magnetization and waves that are within close limits, which leads to the interference of waves between them and acquaintance is done.

CONCLUSION

The conclusion for an id card swiper could highlight its efficiency in streamlining processes, enhancing security, and improving user experience. It may emphasize its potential to reduce errors, save time, and ensure accurate data collection, making it a valuable tool for various industries and organizations. Additionally, it could mention the importance of choosing a reliable and user-friendly swiper to maximize its benefits and effectiveness.

FUTURE RECOMMENDATIONS

A future view of the development of rfid (radio codes definition) based on current trends and expected technological developments

Performance and efficiency development. the research will continue to improve the performance of rfid technologies, such as increasing the extent of reading, improving accuracy and speed in reading and writing processes integration with other technologies. merging with other technologies such as the internet (iot) and artificial intelligence (ai) to improve the tracker and management of resources and operations. improving safety and privacy. safety and privacy studies will be an important topic in research, as new technologies will strive to provide better data protection and ensure the safety of the system.



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