E-Track Office Automation System

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Abstract

Computer technology has been applied to the automation of office tasks and procedures. Much of the technology is aimed not at improving the efficiency of current procedures, but at altering the nature of office works altogether. The development of automated office systems raises a number of issues for the organization. How will this technology be received by organization members? How will it affect the definition of traditional office work? What impact on individual, workgroups and the structure of the organization? Automation defines the level of sophistication of an office. E-Track is an attempt to automate various tasks of an organization. Through e-Track the following tasks will be automated. Asset management system which keeps track of company's assets, Leave management system by an SMS alert based product and the leave request should flow from lower level to higher level, Employee's details, Contact Book, Employees Daily Attendance and Send Alert and Warnings to the employees by SMS.

1. Introduction

E-Track is an attempt to automate various tasks of an organization. E-Track means information tracking system where we are tracking different information by application which includes as employees leave information, asset information, attendances and contact information employees.

Today every kind of organization in the world conducts its business, acquire knowledge and find the solutions of the problems through the computers. Computerized systems are now at the heart of our daily activities. These are very helpful in major considerations in decision-making process. Automation defines the level of sophistication of an office. An automation system is a precisely change in a physical or administrative task utilizing a new process, or machine that increases productivity, quality, and profit. Office automation refers to the computer machinery and software used to digitally create, collect, store, manipulate, and office information for accomplishing basic tasks and goals.

Through e-Track office automation system software the following tasks will be automated, Asset management system, leave management

system with GSM modem, contact book management system and Attendance management system with RFID.

The main objective of our paper is to automate various tasks of an organization. To reduce a lot of manual work done at the company office, by maintaining records in soft form. Understanding office automation and knowing the changing office concept. The objectives of system are to provide the facilities to all the people concerned with office. From the management point of view works can be done fast and more accurately as compared to existing manual system. The system also provides the efficient handling of any kind of query related to existing records of office. System automation is in its ability to improve efficiency; reduce wasted resources associated with rejects or errors; increase consistency, quality, and customer satisfaction; and maximize profit.

The propose paper Office Automation System can be placed under the RDBMS (Relational Database Management System) category as it is to provide each and every detail regarding the Office and office staff such as employee personal and academic information, company Assets, employee's daily attendance and leave details. This paper is mainly based on database handling. Asset management system allows us to manage company assets like Hardware and Software devices given to the employees.

The reporting is also helpful and gives us information like daily/monthly attendance of a employees, leaves details of employees, displays the employee contact details based on the particular search key field like EID, Ename, and Edesignation from the database and assets information displays based on the particular device which are given to the employees.

A. Introduction to RFID device

Radio-frequency identification (RFID) is a technology [1] to electronically record the presence of an object using radio signals. This technology is used for automatically identifying a person, a package or an item. It is an automatic identification method, relying on storing and remotely retrieving data whenever required using devices called RFID tags.

No one can deny the importance of identification of persons, animals and objects.

Airports, railway stations, cinemas etc are some places where identification is necessary. Identification can be made automatic using Auto identification. There are various methods for auto identification; some of them are barcode systems, optical character recognition, biometrics, smart cards and RFIDs. RFID device is very low cost and reliable.[1] RFID module not only reduces cost as compared to the design of RFID module using discrete components, but it also increases the reliability of the system.

   In this paper, we propose a general RFID based authentication system which can be used anywhere where authentication of persons or objects is required. The proposed RFID system is also accompanied with PC interfacing and database logging software which is used to display the output of the system and it also logs the authentication detail that is RFID tag number along with date and time when the tag was authenticated in a database.

   As In figure 1 RFID system, there are two main components; RFID reader and RFID tag. The tag is responsible for transmitting and modulating the original signal from the reader in a way in which the data is retrievable.
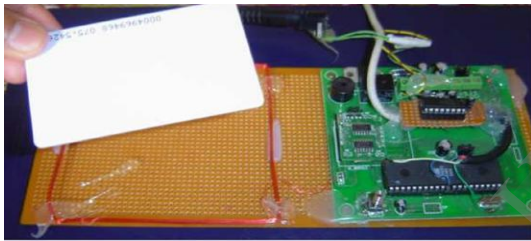

Figure1. RFID Reader and Tag

   The reader's job is to receive and interpret the data. RFID system is a passive type, which means that the tag itself does not have its own power source. In modern RFID devices the tag is simply a small integrated circuit with its data encoded on it in some way and a simple LC antenna to receive and retransmit the data. The tag contains electronically stored information which can be read from up to several meters (yards) away. Unlike a bar code, the tag does not need to be within line of sight of the reader and may be embedded in the tracked object. PC interfacing and Database logging software was designed to show the authentication data and also logs it to database.

   Problem with RFID attendance system is anybody could carry proxy cards and mark attendance on behalf of somebody else. This drawback we overcome by using the RFID along with any digital camera.
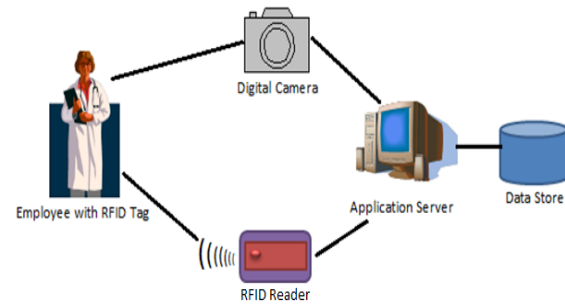

Figure2. RFID Architecture

   In Figure2, Working Principal is the system reads the RFID tags of the employee and instantly takes a picture of the person and stores it in the database. Hence anybody tagging proxy tags will be taken photo of and stored for future reference and verification.

B. Introduction to GSM modem

   A GSM modem [2] is a specialized type of modem which accepts a SIM card and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer or laptop, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection as shown in Figure 3.

Figure3. GSM modem

   Currently, the modes of disseminating the warning are Television, Radio, Cellular Phones, PSTN and Satellite-based systems. If the warning arrives late at night when people are asleep, media such as television and radio will be ineffective. Alternatively the warning message can be delivered by GSM modem. This is not practical as a mass-alert system due to the large number of calls that would have to be generated, and the ineffectiveness of this method in network congestion. This system is fastest method of sending warning messages.

   Using GSM modem sends multiple messages which will operate globally. As cost of SMS is less, so such system is much cheap. One more advantage is that as it is store and forward service, so even if

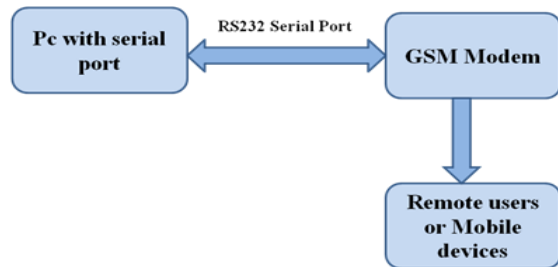the network is temporarily overloaded, it is sent as soon as network is free.

Figure4. Proposed Structure for the System Model

GSM modem is communication medium.GSM modem is an external device that is connected via serial port RS232 to PC. GSM modem sends and receives messages by using radio waves, AT commands is set of commands which are used for communicate with GSM modem. These commands can be used for sending, receiving and deleting messages. Any processing unit can make an interface with GSM modem using these command sets.

PC (Personal Computer) is a Programmable machine that receives input, stores and manipulates data and provides data in useful manner. PC unit contains software components. GSM modem is plug and play device. GSM modem connected via serial port RS232 to PC. GSM modem receives and sends messages from mobile device by using radio waves. PC and GSM modem interference is used AT commands for sending messages.

Data transfer between PC and GSM modem. The following AT commands are used for transferring data.

1) AT: testing connection.
2) AT+CSQ: for signal quality.
3) AT+CMGS: sending SMS message.
4) AT+CMGW: writing SMS message.
5) AT+CMGD: deleting SMS message.

2. Related work

A. *Introduction to office automation system*

An automation system [3] is a precisely planned change in a physical or administrative task utilizing a new process, Method or machine that increases productivity, quality, and profit while providing methodological control and analysis. The value of system automation is in its ability to improve efficiency; reduce wasted resources associated with rejects or errors; increase consistency, quality and customer satisfaction; and maximize profit.

Office automation [5] [8] helps in optimizing or automating existing office procedures. The backbone of office automation is LAN, which allows users to transmit data, mail and even voice across the network. All office functions, including dictation, typing, filing, copying, fax, Telex, microfilm, records management, telephone and telephone switchboard operations, fall into this category. IT as the technological innovations that have transformed work in the late twentieth century Integrated into a smoothly working business system, office automation tools can vastly improve office productivity

B. *Office automation System Focus*

Office automation [4] refers to the type of computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system.

There are three basic activities of office automation system: Storage of information, data exchange, and data management. Within each broad application area, hardware and software combine to fulfil basic functions that are needed to successfully accomplish the goals for a specific business.

i. Storage of information would be the computer or a computer like system.
ii. Data Exchange would be a fax, phone, or some type of communication hardware.
iii. Data management would be using specific software tools to organize and maintain data.

3. System module

The "Office automation system" application is mainly divided in 5 modules as shown in Figure 5.

a. Module1:Contact book management system Module.
b. Module2:Asset management system Module.
c. Module3:Attendance Management System Module.
d. Module4:Leave management system Module.
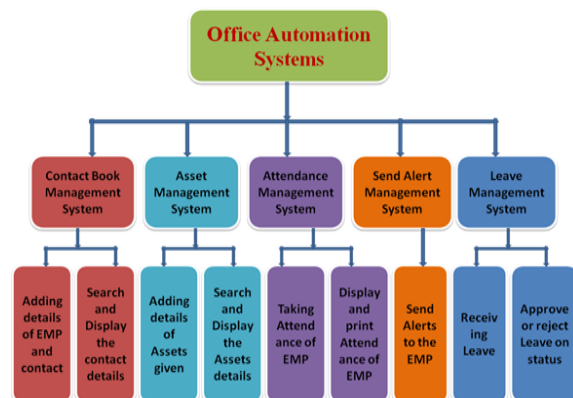e. Module5:Send alert management system Module.

Figure5. Office automation system module allocation

A. Contact book management system

The contact book management system contains list of all employee details. In this module, only admin have the access to enter the employee's details. Employees not have the access to edit the details. The details fields are like EMP id, EMP name, EMP designation, EMP phone, EMP emails, EMP address. All the employee contact details are successfully saved and stored in database. This employee contact report contains search function which is based on keyword. If we enter any character it should display all employees' details starting from that character.

B. Assets management system

The Assets management system keeps track of company assets like mobile phone, laptop, and pen drive and so on. Admin maintains the company's assets general information which is provided to company employee. The details should be contain fields like assets identification number, employee id, employee name, list of assets given and date of assets given and so on. This information stored successfully to the database. This information with based to one particular search assets key can be generated. The admin search the assets key like laptop it will display the all list of laptop provided by the employee with assets id and EMP name. The admin maintains the keeping assets up to date as well as generate the assets reports.

C. Attendance management system

The attendance management system is used to take attendance of employees using RFID tag, reader and web camera. All employees will come and swipe there RFID tag near RFID reader. Hear RFID tag number is unique for all employees. The System reads RFID tags and takes pictures of person tagging with current date, time and stores it in the database for future reference and verification. If the employee comes for out time before 5 minutes it will display a message like already punched, Please try after 5 mins. It will accept out time after 5 minutes only by using the difference between in time and out time. If employee again comes for attendances it generates the new entry record for the day.

D. Leave management system

The leave management system is allowing the employee to apply leave through mobile phones. Hierarchy for applying leave is
    a. Project Trainee
    b. Group Leader
    c. Project Leader
    d. Project Manager.
The employee will apply for the leave by sending SMS using mobile phone and the leave format is

LMS%Empid%Numberofdays%Startdate%Enddate%Reason%Leavetype%LMS. This leave request is received by GSM modem. The leave request should flow from lower level to higher level. Project Manager has the authority to approve/reject leave at the end. If the employee send invalid leave format then employee will get message as invalid leave format. If the leave format is correct then the employee will get the message as your leave has been successfully registered. If the leave has been approved/ rejected by the project manager then an employee will get a message.

E. Send alert management system

In this module admin has the authority to send the messages, warning, alerts etc to the all employees or to particular employee by using GSM Modem. If admin send the message to particular employee it will be stored in the database.
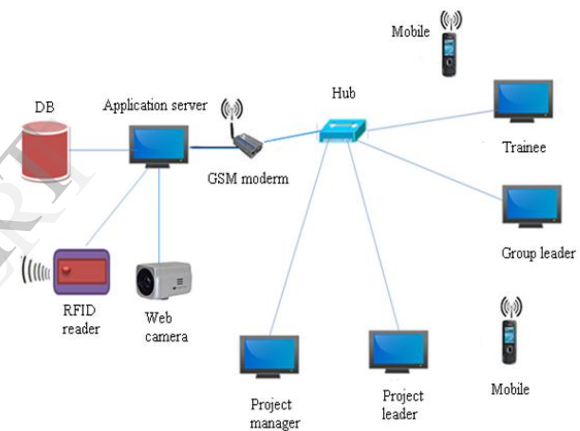
4. Systems architect

Figure6. Architecture diagram

The backbone of office automation is LAN, which allows users to transmit data, sms and images across the network. LAN computers in a limited area such as home, school, lab, or office building using network media. A Hub is device for connecting multiple Ethernet devices together and making them act as a single network segment. It has a multiple input/output ports, in which a signal introduced at the input of any port appears at the output of every port except the original incoming.

In Figure 6 the large systems architecture was developed as a way to handle systems too large for one person. Systems of this size are rapidly becoming the norm, so architectural approaches and architects are increasingly needed to solve the problems of large systems.

A. The basics of system architecture

There are three basic activities of an office automation system: storage of information, data exchange, and data management. In each

application area, hardware and software combine to fulfil basic functions.

Information Storage

The first area within office automation is information storage which is usually considered to include office records, other primary office forms and documents. Data applications involve the capture and editing of files, images, or spreadsheets. Word processing and desktop presentation packages accommodate raw textual and graphical data, while spreadsheet applications provide users with the capacity to engage in the easy manipulation and output of numbers. Image applications allow the capture and editing of visual images.

Data Exchange

While data storage and manipulation is one component of an office automation system, the exchange of that information is another equally important component. Electronic transfer is a general application area that highlights the exchange of information among multiple users. Systems that allow instantaneous or "real time" transfer of information (i.e., online conversations via computer or audio exchange with video capture) are considered electronic sharing systems. Electronic sharing software illustrates the collaborative nature of many office automation systems.

Office automation systems that include the ability to electronically share information between more than one user simultaneously are sometimes referred to as groupware systems. One type of groupware is an electronic meeting system. Electronic meeting systems allow geographically dispersed participants to exchange information in real time.

Data Management

Office automation systems are also often used to track both short-term and long-term data in the realms of financial plans, workforce allocation plans, marketing expenditures, inventory purchases, and other aspects of business. Task management or scheduling systems monitor and control various projects and activities within the office. Electronic management systems monitor and control office activities and tasks through timelines, resource equations, and electronic scheduling.

B. Flow of Office Automation with algorithm

Step 1: Start

Step 2: Main menu form has five forms

Step 3: Click operation will be performed on these forms

Step 4: Click on Asset form
       Else if

Step 5: Click on Contact book form
       Else if

Step 6: Click on Attendance for form
       Else if

Step 7: Click on Leave form
       Else

Step 8: Click on Send SMS form

Step 9: Click operation will be performed on Asset form of Save button
       Else if click on Reset button
        Else click on Close button

Step 10: Generate asset report

Step 11: Click operation will be performed on Contact form of Search button
       Else if on Print button
        Else if on Refresh button
        Else on close button

Step 12: Generate contact book report

Step 13: Click operation will be performed on Attendance form of start attendance system button
       Else click on close button

Step 14: Generate attendance report

Step 15: Click operation will be performed on Leave form of start listening to leave server button
       Else click on close button

Step 16: Generate leave report

Step 17: Click operation will be performed on Send SMS form of send SMS button
       Else if click on send SMS to all button
       Else if click on clear button
       Else click on close button

Step 18: Generate send SMS report
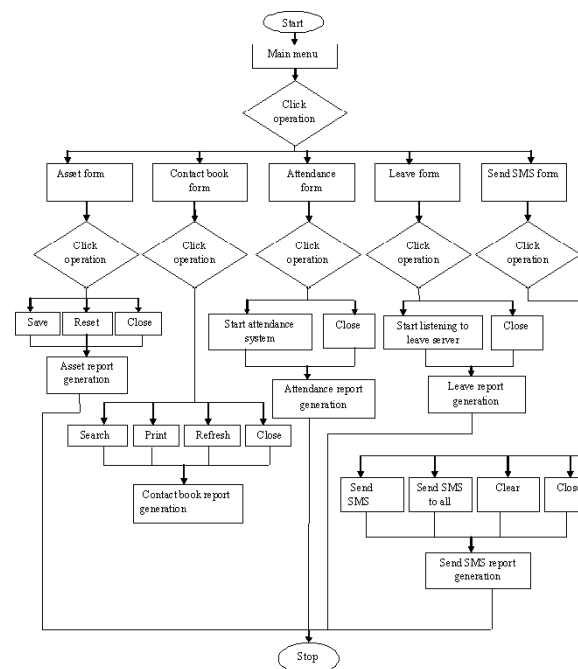
Step 19: Stop.

Figure7. Flowchart of Office Automation

The main menu form has five forms, namely Asset form, Contact book form, Attendance form, Leave form and Send SMS form. The click operation will be performed on these forms. The asset form has save, reset and close options. The click operation will be performed on these options. The asset report is generated. The contact book form has search, print, refresh and close options. The click operation will be performed on these options. Contact book report is generated.

The attendance form has start attendance system and close options. The click operation is performed on these options and attendance report is generated. The leave form has start listening to leave server and close options. The click operation will be performed on these options and leave report is generated. The send SMS form has send sms, send sms to all, clear and close options. The click operation will be performed on these options and send sms report is generated.

5. Results

The e-track office automation System is developed using Visual Basic.NET fully meets the objectives of the system. The system is operated at a high level of efficiency and all employees and user associated with the system understands its advantage. The system solves the problem. It was intended to solve as requirement specification.

A. Add Employee Details Form

Employee details form allows us to add new employee details like Employee id, password, Name, Qualification, Designation, Work experiences, Age, Contact number, Address and RFID code and these details are stored in the database. Employee id is auto generated. While saving to database there should not be empty filed otherwise it will display an error message.

Figure7. Employee details Form.

B. Contact Book Form

Contact book form displays the employee contact details based on the particular search key field like EID, Ename, and Edesignation from the database in the data grid view. Employee ID, Name, Designation, Phone number, Email and

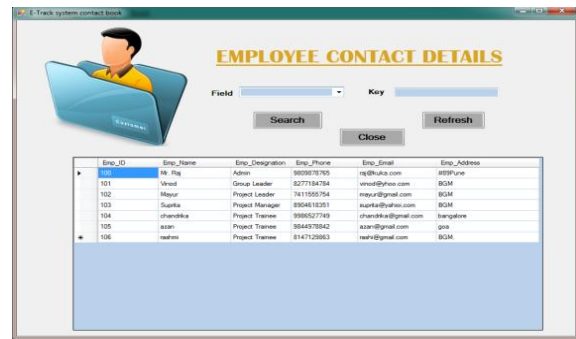Employee Address will be display in the data grid view.

Figure8. Contact Book Form.

C. Assets Form

Assets form allows us to manage company assets like Hardware and Software devices given to the employees. In this form assets details include as assets id, employee id, name of employee, date of assets given, assets given approx value of assets. And these details are stored in database.
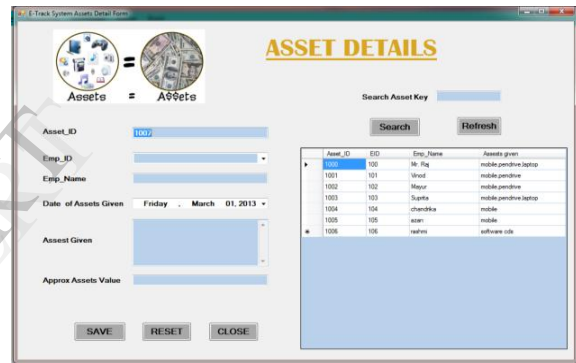

Figure9. Assets Form.

D. Leave Form

Leave form displays the list of leaves that are applied for the leave with the details like who applied leave his leave ID number, employee ID, Number of days, Starting Date, Ending Date, Reason, and Leave Type and so on.
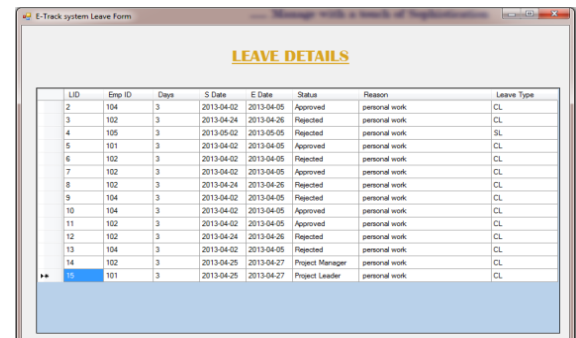

Figure10. Leave Details Form.

E. Leave Status Form

Leave Status form displays the list of leaves to check there leave status. Status of the leave is approve or rejected the leave and the approve

sequence who has approved or rejected the leave. It displays the based on the employee id for a particular employee.

Figure11. Leave Status Form.

F. Leave Approve List Form

Leave Approve List form displays the list of leaves that are pending for the approval based on their designation and for approve or reject the leave. After that higher level of employee will login with his id and password and he approve or reject the leave in this form. After that particular massage will be send to the employee leave approval or rejection.

Figure12. Leave Approve List Form.

G. Send Alert Form

Send alert form allow the admin to send the messages, warning, alerts etc to the all employees or to particular employee by using GSM Modem. If admin send the message to particular employee it will be stored in the database and display in data fill grid.

Figure13. Send alert Form.

The asset report has four options namely, search, print, refresh and close. Using search option we can easily search assets given to the employee. The refresh option will show all asset information. The print option will allow taking printout of the report generated and close option will allow closing the form.

The attendance report has generate option which displays employees RFID no, employee name, date, in time, out time and image. With the help of this report it is easy to calculate the number of hours the employee work in company.

The contact details report has four options namely, search, print, refresh and close. Based on particular field and key it is possible to search the assets given to the employee. The refresh potion is displays the whole asset information, print option will allow to take printout of the generated report and close option will close the form.

6. Conclusion

In most of the organization today lots of manual paper work done at the company offices like employee details, contact, attendance, leaves of employee and so on. The main objective of our paper is to automate various tasks of an organization to reduce a lot of manual work done at the company offices, by maintaining records in soft form. E-track office automation system automates process and saves time and efforts of the employees. It takes the organization to the next level of sophistication.

The future work is to reject the tag by face recognition with help of Mat lab based on 12 characteristics of image compare with the existing image of employee. And we can add some new modules, like "Control of doors", "Payment system" by RFID reader.

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