Study of Housing Society Management System

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Abstract — The three necessities in a man’s life are: food, clothing and shelter. People are toiling hard these days, hence they need everything to be automated and quick. This paper discusses about study of implementation of an android application for housing society management and hardware implementation of visitor’s parking using sensors. It also discusses about an image recognition system for managing the perils of the society. Society management system reduces the squabbles that arise within the society by providing facilities such as online bill payment, voting system, accounts handling, rent and sales advertisement. Software coupled with reliable hardware allows developers to create an application for the smooth functioning of a large society.

Keywords — Anisotropic Magneto-Resistive, Field-programmable gate array, Radio Frequency Identification

I. INTRODUCTION

Smart phones are widely used these days because it provides an effective platform for communication via an android application. This system is a cloud based system to manage day to day activities of any co-operative housing society, they require the co-ordination among the respective management societies coupled with the vendors which provide these services so that the appropriate convenience can be provided[3]. Society management system is the website portal to decrease the conflicts among society members. The system has automated functionality for calculating monthly maintenance bill and member can view their bill status on their account. There is a voting system for different society positions like chairman, treasurer etc. Members can cast their vote to the candidates that are standing for different roles in the society [5]. The system provides unique interface to every user to interact with the system. System accepts queries from end users and then evaluates the query and fires it over the database and results are displayed to the user. Architecture of society management is shown in Fig. 1.

Fig. 1 Architecture of society management system

II. RELATED WORK

Visitor Management System (VMS 3000) VMS 3000 was one of the system that handled the visitor’s management and was initiated by HASAM Company. This system was appropriate for any organization to any construction. VMS 3000 is an easy system to use with it’s automated operations help to provide extreme solace to visitors by defensive great security level of the buildings [2]. This system is integrated with RFID technology which manages and tracks the visitors that enter the society[6]. The main advantage of this system is that it is highly substantial system that developed based on confirmed application framework. The communication system of VMS 3000 can be either through web based or intranet visitors’ confirmation [2]. This was an efficient method hence wasn’t in use anymore. Biometrics Visitor management system was founded by Aryah Company. This system is currently using the latest quick scans fingerprint technology, badge printer, a digital camera and secure software to accurately track visitors of the organizations. It was called as The Smart Lobby visitor management system. The benefit of this system is that it is able to reduce losses due to scam, delivers a safe and protected environment by determining visitors, and offers a complete management system to track visitor behaviour. Some advantages were identified for this system where this system was able to create customized name badges and able to add company logo to the badges. Moreover this system able to include important information such as visitor name, company, and the name of their contact to the
badges. Digital camera is used to add photos to badges and stamp badges with arrival date, time automatically generated, and incremental serial numbers for security purposes. This system able to save time by entering visitor names and information in only once[4]. The next visit, no registration needed as the data is already saved into database. Only verification is needed for the next visit.

A. Login/Administration and voting system

The traditional way of keeping records on papers and registers required manual work and was a tedious task. Searching for a record is a mundane task and time consuming [7]. The maintenance of such records is inconvenient. Data analysis which is useful for managerial decisions is so complex that it seems impractical. The user, secretary and administrator of the system. The administrator has the authority to login to the application and manage the profile. Secretary has special privileges to update monthly b-ills. If the bill is not paid within the stipulated time, the arrears will be added to the amount [8]. The system has automated functionality for calculating monthly maintenance bill and members can view their bill status on their account. It will be a helpful hand for Go Green activity which will avoid use of eco destructive products. Admin can push notices, create events, ask for complaints and many more things within a minute. The monthly maintenance bill will be authenticated by administrator.

The administrator and members have the authority to log in to the website and manage their profile. The application provides an assurance to follow up every complaint made by society members. Secretary has the special privileges of updating monthly bills.

The voting system will enable members to elect the candidates that are standing at different positions. The voting result would be displayed on welcome page after login. The voting system allows members to elect the candidates that are standing for different positions in society. Intelligent building is a strategic target of construction industry, real estate industry in pursuing sustainable development. The application of intelligent technology in building construction can effectively enhance people's living environment. Lot of work has been done in improving the efficiency of parking management since the time of evolution of larger societies and malls. A better system was initiated through FPGA employing "logic foregather" including multiple registers as their logic block. The system had two main parts, wireless security identifications and second is space checking. After many constraints that could not be satisfied, AMR (Anisotropic magneto-resistive) sensor was used in the parking management system which gave a ray of hope to the ones struggling with it. The project budget cost was estimated to be between 3475 USD and 5510 USD which wasn't a cost affair. Fig 2 describes the flow of the parking system in a society.

III. METHODOLOGY

In situations involving national-level security such as immigration control and criminal investigations and also in personal-level security
such as for computer and system logins, personal identification procedures are typically carried out by machines. Since biometrics identifies individuals based on information proper to each person such as by physical and behavioural features, one of its advantages is that persons will be free from constrains such as the need to remember a password or to carry an IC card.

A. Security System

As compared with other biometrics systems using fingerprints/palm print and iris, face recognition has distinct advantages because of its non contact process. Face images can be captured from a distance without touching the person being identified, and the identification does not require interacting with the person. In addition, face recognition serves the crime deterrent purpose because face images that have been recorded and archived can later help identify a person. Fig. 3 shows the working of face recognition system. Facial recognition analyzes the characteristics of a person’s face images input through a digital video camera. It measures the overall facial structure, including distances between eyes, nose, mouth, and jaw edges. These measurements are retained in a database and used as a comparison when a user stands before the camera. This biometric has been widely, and perhaps wildly, touted as a fantastic system for recognizing potential threats (whether terrorist, scam artist, or known criminal) but so far has not seen wide acceptance in high-level usage. It is projected that biometric facial recognition technology will soon overtake fingerprint biometrics as the most popular form of user authentication.

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Among the other biometric techniques, facial recognition may not be most reliable and efficient [5]. One advantage is that it does not require the cooperation of the test subject to work. Other biometrics like fingerprints, iris scans and speech recognition cannot perform this kind of mass identification.

Face recognition is not perfect and struggles to perform under certain conditions [4]. Other conditions where face recognition does not work well include poor lighting, sunglasses, long hair, either objects partially covering the subjects face and low resolution images.

Another serious disadvantage is that many systems are less effective if facial expressions vary. Even a big smile can render the system less effective

B. Parking Management System

Visitor’s Parking has become a severe issue in housing societies and malls since people tend to waste enormous quantities of fuel and time in finding a vacant place. Being a vigilant citizen of our nation we should take the responsibility of reducing oil wastage and hence parking management is important. Below mentioned methodologies have been in use since the idea of reducing oil and time wastage in parking areas.

1. Intelligent parking system based on image:

   This method presents an intelligent system for parking space detection based on image processing technique. The proposed system captures and processes the rounded image drawn at parking lot and produces the information of the empty car parking spaces. In this work, a camera is used as a sensor to take photos to show the occupancy of car parks. The reason why a camera is used is because with an image it can detect the presence of many cars at once. Also, the camera can be easily moved to detect different car parking lots. By having this image, the particular car parks vacant can be known and then the processed information was used to guide a driver to an available car park rather than wasting time to find one. The proposed system has been developed in both software and hardware platform. An automatic parking system is used to make the whole process of parking cars more efficient and less complex for both drivers and administrators.

2. Parking management system using FPGA:

   This method investigates the parking system through FPGA employing. It uses a method, that whenever a vehicle enters in the parking area, it is detected by an infrared sensor (IR sensor) ir0, it gives “0range=1” and it signals to RFID. The RFID detects the tag from the vehicle and identifies it with the stored database record in controller. After vehicle verifications, it wirelessly transmits corresponding data to FPGA[1]. The drivers can park their vehicles according to display unit information.
3. Distance Parking Space in Wireless Sensor Networks: This paper proposes a Smart Parking System based on wireless sensor network technology which provides advanced features like automated guidance[4]. The paper describes the overall system architecture of our embedded system from hardware to software implementation in the view point of sensor networks. This paper also shows that the pre-existing security surveillance (CCTVs) will be used as a sensing nodes to identify vacant parking space[2]. The captured image will be processed through the AVR Micro controller and the processed data will be transmitted via ZigBee to a central computer to store and update the occupancy status of available parking space vacancies in the database. The performance of this WSN based system can effectively satisfy the needs and requirements of existing parking hassles thereby minimizing the time consumed to find vacant parking lot, real time information rendering, and smart reservation mechanisms.

III. PROPOSED SYSTEM

We propose an integrated web application consisting of all modules[3]. The admin will have a unique login where he can see update the accounts and also send notifications to the members. A separate module will be created for managing the visitors parking system using which the admin or the security person for parking management can get the information of available parking slots. The system makes use of the existing login features[2]. It takes the security of the society to another level by using face recognition technique. Parking management is made efficient by using AMR sensors, which also helps in reducing wastage of fuel and energy.

A. AMR sensors for parking management

An AMR sensor unlike the ultrasonic ones decrease energy usage and reduce battery drain. AMR sensors can detect vehicles having because of the metallic constituents in them. The motion of the car causes distortion in magnetic field of the Earth due to metallic parts. The system composes of a sensor located in the parking space. These sensors will take raw data and transfer to the server. The database which stores processed data will also update it to the web interface[1]. This interface will display the details of the parking.

1. AMR Description: AMR sensor completely relies on magnetic resistance rate change along with a magnet. The change in rate is influenced by external magnetic field. This device can strongly detect both positive and negative magnetic field. AMR sensor is made up of nickel iron alloy and silicon in resistive strips which together is called as a permalloy thin film [7]. This film causes electrical resistance to alter due to magnetic field induced. The resistive strips are connected in a wheat-stone bridge. This increases sensitivity. Thus the sensor provides accurate measurement in magnitude and direction of the magnetic field.

2. Vehicle Detection Using AMR Sensor: The magnetic field generated by Earth is sensitive to any metallic object. Once this comes in contact with the magnetic field, a distortion is produced. Since AMR sensor is able to detect distortion in magnetic field, it notices the change and produces the output[8]. This output is in the form of magnetic flux density. The working frequency of sensor ranges up to about 5MHZ which makes it give reaction to changes and hence keeps updating and giving information accordingly.

A 3-axis AMR sensor measures magnetic field with respect to magnetic field components related axes[6]. The sensor will measure magnetic field along all 3 axes and each time compare it to the previous values. Later on the sum of differences absolute value is compared with the predefined threshold. If the threshold increases, disturbance is immediately detected thereby.

B. Security System

Face recognition system overpowers other security systems due its various advantages which are non-contact recognition, non-necessity for special tools. The confirmation of matched results may be performed by human operators. This system will store the images in the database and search through the database whenever a face is detected. If the database returns a true value for the image then the person is validated. If not, then the data of the person has to be entered into the system. Following is the procedure for face recognition system in real time. The flow of face recognition system is shown below in Fig. 3.
1. **Login:** The user logs in to the system by entering valid username & password. If the username and password are incorrect, then user will not get access to the system.

2. **Capture image/video:** The user uses the device to capture the images of the suspected person so as to detect it for comparison with the database.

3. **Interact:** Detection and recognition of object which is placed in front of device is done. All image processing algorithms are applied to identify the image.

4. **Perform operation:** If image is already present in system, then information related to object is retrieved through database and it will be displayed and message will be sent. Otherwise, image has to be added into the system.

5. **Add images:** If the image is new to the system then it should be added in the system. Next time when we placed that image in provided space then system will identify the image. When the device detects the face of the person, it then sends a message regarding the suspected person to the house owner. It requires specific hardware to send the message.

V. **CONCLUSION**

The need for housing society management is to make the administration of daily activities effortless. It also focuses on improving the security management system using face recognition system. Wireless sensors are used for parking management system to reduce the efforts of finding an available parking slot. The system makes the society automated which further increases accuracy and paperless work.

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**REFERENCES**


