



BLE ENHANCED DECENTRALISED WORK TIME SHEET AND REAL TIME MONITORING USING SMART ID CARD

S. Sri Krishna Kumar^{1,2}, G. Chandni^{1,3}, A.L. Meenal^{1,3}, T. S. Kalaimohan^{2,3}, R. Senthil Kumar^{1,3}
K. R. Sugavanam^{1,3}

¹Department of Electrical and Electronics Engineering, Chennai, India

²Department of Electronics and Communication Engineering, Chennai, India

³Vel Tech HighTech Engineering College, Avadi, Chennai, India

E-Mail: rskumar.eee@gmail.com

ABSTRACT

Looking into the technological advancement, we can visualize the smart phones bringing the world within our palm, which has opened a new era of decentralization being the key to speed up the processes. An innovative ideology of monitoring the presence of employees within the work-zone with BLE (Bluetooth Low Energy) makes the centralized attendance entry to be quick and user friendly. The BLE is sensed when it comes within a certain range from the main receiver terminal. The employee can register his presence through smart phones enabled with a customized biometric app. Each employee has a unique QR code and RFID tag embedded within their ID cards, where the former is used to ensure the speed of operation, scrutiny of fake IDs and the latter for real time monitoring of employee location.

Keywords: QR code, smart ID card, BLE, RFID tags.

INTRODUCTION

In recent years, the employee working areas has the greatest and common usage of their biometrics as an input for attendance marking system. The existing centralised system in most of the employee working areas for attendance marking system has delayed the working time of the employee by waiting in large queue and long distances from the vehicle parking areas can make the employee inconvenient to mark the biometric input within the stipulated time. In certain cases, waiting in large queue for their attendance marking can also result in loss of pay. Accessing through biometrics of this kind makes the existing centralised process to slow down. This system primarily suffers from continuous monitoring, tracking and exactly locating the employee within the working zone. Tracking is necessary to locate the employee within working premises and also continuously monitoring his activities in this area. The existing system suffers from these criteria and also lacks from continuous locating of the employee in real time.

problems in fake ID cards in certain areas such as credit card, driver license, valet parking attendant, CBI (Central Bureau of Investigation), security staff at the door etc.

RESEARCH BACKGROUND

An identity document (also called as identification or ID) is any document which is used to verify a person's personal identity. In certain cases, if it is in the form of a small, standard-sized card (IC or ID cards). firstly, these ID cards hold the bearer's full name, ID number, address and citizenship status. In 20th century photographs were attached to these ID cards. The shape and the sizes of these cards were standardized in 1985 by ISO/IEC 7810. In 1988, ISO/IEC 7816 standardized the modern identity documents called the smart cards which also includes an embedded integrated circuit that is difficult to forge. After this era, new technologies were started to get integrated with these ID cards such as photographs, face, iris measurements or fingerprints. Another type of cards is magnetic stripe cards, which is capable of storing data and works on the principle of modifying the magnetism of tiny magnetic particles on a band of magnetic material on the card. These techniques are also used in credit cards, ID cards since they contain a RFID tag, a transponder device. Barcode was invented by Bernard silver in 1948. These codes can only store small amount of information which can be used in school ID cards, Library cards etc. These codes can be integrated with the magnetic stripes. These codes are suitable only for certain application and can be used only for certain circumstances. 2D barcodes are very much efficient which is known as Quick Response (QR codes) which can hold more number of information when compared to that of 1D barcodes. QR codes can also provide high-degree security,

Table 1. Forgery and fraud acts of one year.

	2013	2014	% Difference
Forgery/CNTRFT-ID THEFT	1307	469	12.2%
Forgery/CNTRFT-ALL OTHER*	372	470	26.3%

HINT *: It includes all fake ID Cards

The above statistical report says about forgery and fraudulence acts in the year 2013 and 2014. By analysing prevailing situations, we are facing common



quick and easy to access, by developing a mobile application which is difficult to forge also.

RELATED WORKS

The Real ID act has been incorporated with smart technology [1], the technology includes SIM like structured Smart card (consists of magnetic stripe, printed bar code) have been incorporated into state-issued Real cards (such as driver license or any identification cards) to meet certain security requirements as follows (i) Authenticating the bearer of an identity credential, (ii) Protecting privacy, (iii) For ID management control.

According to finger print verification using smart cards for access control system[2], the authors have worked to improve smart card security placing biometric verification (Finger print) have been incorporated within the ID card for real user authentication. The main problem is lack of initial reference to sort the minutiae found. It required more computer power and storage need.

In research material, it has been proposed that the mobile application based voting [3] using biometric that enforce security and confidentiality of voters. This web based biometric mobile voting application supports only for Android 3.0 (Honey comb).

A research says that attendance marking and calculation system [4] which can be implemented on Android mobile application integrated biometric scanner that communicates database for verification purpose. This process needs an auxiliary device which again makes the above system a centralized one.

PROPOSED SYSTEM

Our system primarily focuses on decentralization process for monitoring the presence of employees. The real time capturing of employees working time sheet are possible by using smart ID cards. Smart ID cards are incorporated with unique QR codes. These QR codes scan using QR code scanner in mobile application. To enhance the security purpose, we also include the biometric verification using smart phone application. Integration of the two mobile applications using BLE creates a decentralized working zone. In addition, RFID tags are used for locating the employee and monitoring the employee activity within the working zone. In remote areas quick scrutiny of ID cards are done by scanning the QR code; employee details are verified in organization web site.

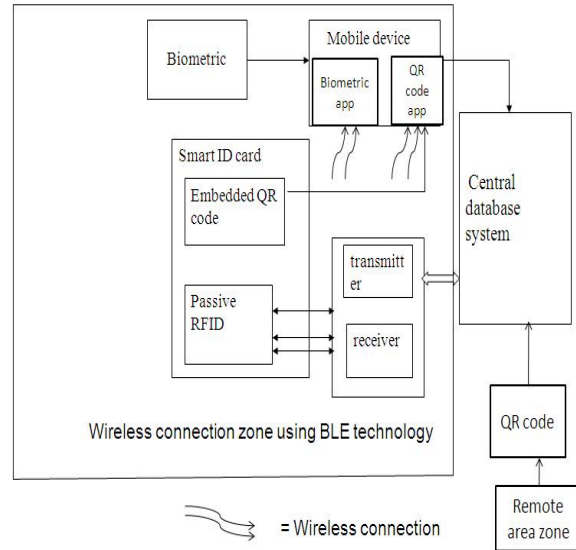


Figure-1. Block diagram of proposed system.

METHODOLOGY

The veracious explanation of this project is given below using flowchart:

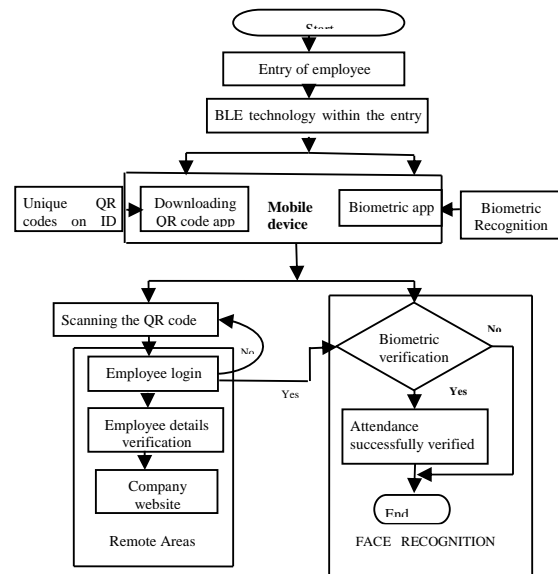


Figure-2. Flow chart of proposed methodology.

ALGORITHM

Step1: To enter employee attendance login using QR codes in which it is present in the employees ID card and scanned using smart phone application.

Step2: Check whether QR code scanning is successful or not.

Step3: If it is not successful then repeat STEP 1.



Step4: After QR code verification is successful, and then it enters to the Biometric verification for security purpose using face recognition to achieve verification in central database.

Step5: If the error occurs, repeat STEP 4

Step6: If the matches are successful, attendance is recorded in the system

Step7: Else it is terminated; repeat the process until it gets success.

QR-CODE PROCESS

In this system every employee has unique QR codes which will hold their details. The process of QR code can be explained. The process of QR code can be explained precisely using block diagram as given below:

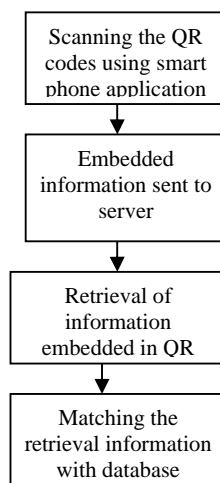


Figure-3. Steps in QR code scan.

BIOMETRIC VERIFICATION PROCESS

To avoid fraudulent activity we also include the biometric verification using smart phone application. The process can be explained as follows:

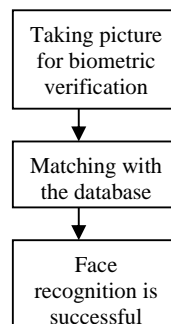


Figure-4. Steps in bio metric authentication.

OUTCOME AND DISCUSSIONS

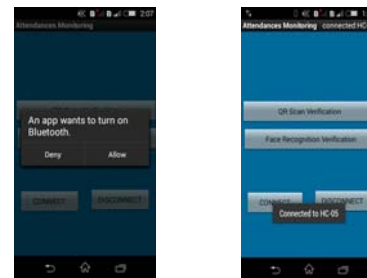


Figure-5. Interface of BLE with mobile device.

BLE automatically enables installed application in employee smart phone as they come within the range of BLE. In case if application is not installed, the BLE sends the APK file so that application gets installed. The BLE establishes an interface to the smart phone through application.

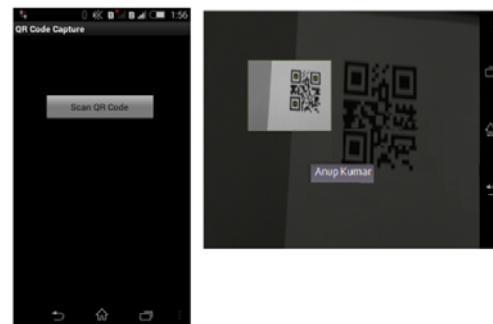


Figure-6. Scanning of QR code for quick access of employee identity.

Once the interface is successful, the hierarchy of operation starts with scanning of unique QR codes designated for each individual. This process enables us a quick access of stored identity corresponding to each employee.

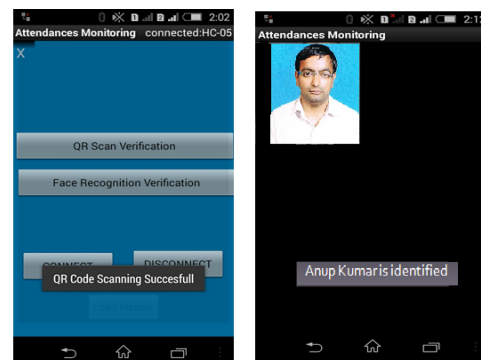


Figure-7. Face recognition for attendance entry.



The completion of QR code scan triggers the next step by initiating biometric authentication through face recognition. Employee entries are registered with time if authentication matches with stored data base.

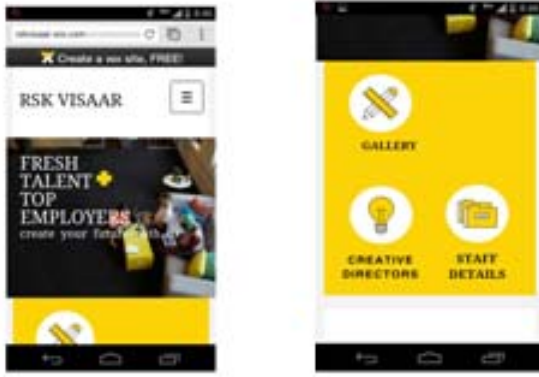


Figure-8. Organization website with employee detail.



Figure-9. Remote access of employee identity to avoid fake ID cards.

ADVANTAGES

- Ease of use and fast access which is considered to be employee friendly.
- Less time consumption of entry purpose by avoiding huge queues.
- Smart ID card provides high efficiency for security purpose.
- Smart card are much more difficult to falsify, they reduce the risk of fraud.
- BLE establishes an online communication for downloading mobile based android apps.
- This system also eliminates loss of pay for the employee.
- The Time duration of entire system takes about 31.54 seconds.

CONCLUSIONS

In this system, android based mobile application for attendance marking using biometrics. The unique QR code can provide utmost security and helps to store personal information and the biometric based mobile application assures security level and prevents fraudulent activity. By giving unique QR code for individual employee we can avoid fake ID cards. Integration of these two mobile based applications can avoid the difficulties faced in the centralised existing system. Large queue can be avoided for attendance marking in working zone. Fast access of attendance marking can be achieved. RFID tags mainly provide location tracking mechanism in the working premises.

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