IOT BASED SMART DOOR LOCK SYSTEM USING RASPBERRY PI, 2D BARCODE SCANNING AND SERVO MOTOR

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Abstract: In recent days home security and remote monitoring have become necessary and most important with the drawn of new concept like internet of things and development of advanced authentication and security technologies. The door lock security system was designed in a simple and easily installable device that was build by using Raspberry Pi, Web Cam and servo motor.The system designed in this project can be installed at the main entrance of a house. The system starts capturing the images with the help of a USB web cam. If the visitor tries to scan the QR code and fails to enter correct password more than three times, the web cam captures the photos of the visitor and sends the images to the owner through email which he can check through his smart phones and also there will be a buzzer or alarm which rings when the three attempts fail. If the visitor enters the correct password the door is opened using servo motor.

IndexTerms **- Quick Response system, Raspberry Pi, Servo Motor, USB web cam.**

I. INTRODUCTION

Humans have invented locks since past, to use them to guard their privacy and private belongings. they are constantly developing over the ages for better protection. But the matter is that locking the door lately isn't safe and may be easily bypassed. Our doors are often forgotten, and this is often a standard occurrence for many people. Locks try lately to depends on technology by employing a code or phone or by card to form our things safer. But there are limits, which are the shortage of features to be combined in one place. also, the lack of high-security features. For the biometric doors, you need to arrange for everyone to enter their fingerprints into the system which means a lengthier and involved process. The most important point is that due this pandemic situation this security process is risk prone as many people touches the scanner and it may lead to spread of the virus.The drawbacks of the face recognition system include, pose change, aging, light variation and many more.

To solve these all these problems, we need to combine all the modern security features into one lock as well as monitoring features. Thus, we've high security, comfortable opening, and shutting systems, and features that help us easier and faster, all requirements do not conflict and help to form our homes safer than before.

II. LITERATURE SURVEY

According to previous work by Farooq a secure access control system based on RFID has been developed that use the RFID tag as the access system. To complete the required task, the system needed to combine RFID technology and biometrics. When the RFID reader installed at the entrance of hostel detected the RFID tag, the system captured the user image and scanned the database for a match. If both the card and captured image belong to the registered user, entrance door will be opened; otherwise, the system turned on the alarm and alerted the security via emergency call through GSM modem in order to address the situation. The downside of this project is that if the person lost the RFID tag, the cost to create another RFID tag was more expensive and it was less financial friendly. Furthermore, the RFID system usually involves an expensive piece of scanning equipment that is designed to do one task only – scan and decode RFID tags. Compared to the proposed project that implemented QR code, it is much more accessible and affordable compared to RFID and it can print on any surface while RFID need specialized code to generate code in tag. QR system is easy to generate, hence the system has been used in various applications.

In related work in, the author has developed a QR based attendance management system for recording the students' attendance daily. The author claimed that the QR implementation was user friendly and cost of effective because of no use of paperwork.

In other related work by K. Rajesh et. al, a unique QR code was allotted at the parking slot for the purpose of tracing the vehicle location efficiently by using quick sort algorithm. The author has also said that most companies prefer to provide higher, more cost-effective service, hence QR system is considered as one of the best solutions. Apart from tracking the presence of people and objects, QR system has also been used for sharing personal confidential information.

III. PROPOSED SYSTEM

Here we use mobile application to scan the QR code if QR code is valid then login page will be displayed on the screen .user ID and password is entered.

If the login details are valid the door is opened automatically by using servo motor.

If login details mismatched more than or equal to 3, we proposed alerting system by using buzzer. Even though if no one present around your home door or office door at that time , after mismatched limit exceeds there is a camera which captures the image of that person and it is send to the owner email So that he can check his mail and immediately calls to the police.

Advantages of Proposed System:

- It was using an alarm system which uses to alert the owner by an image.
- It was convenient in use, relatively free from false alarms and does not require frequent user action to arm and disarm the system.
- Person identification is easy.
- Easy to implement, Low cost with High quality pictures.
- Unnecessary alarming is not done

IV. SYSTEM DESIGN

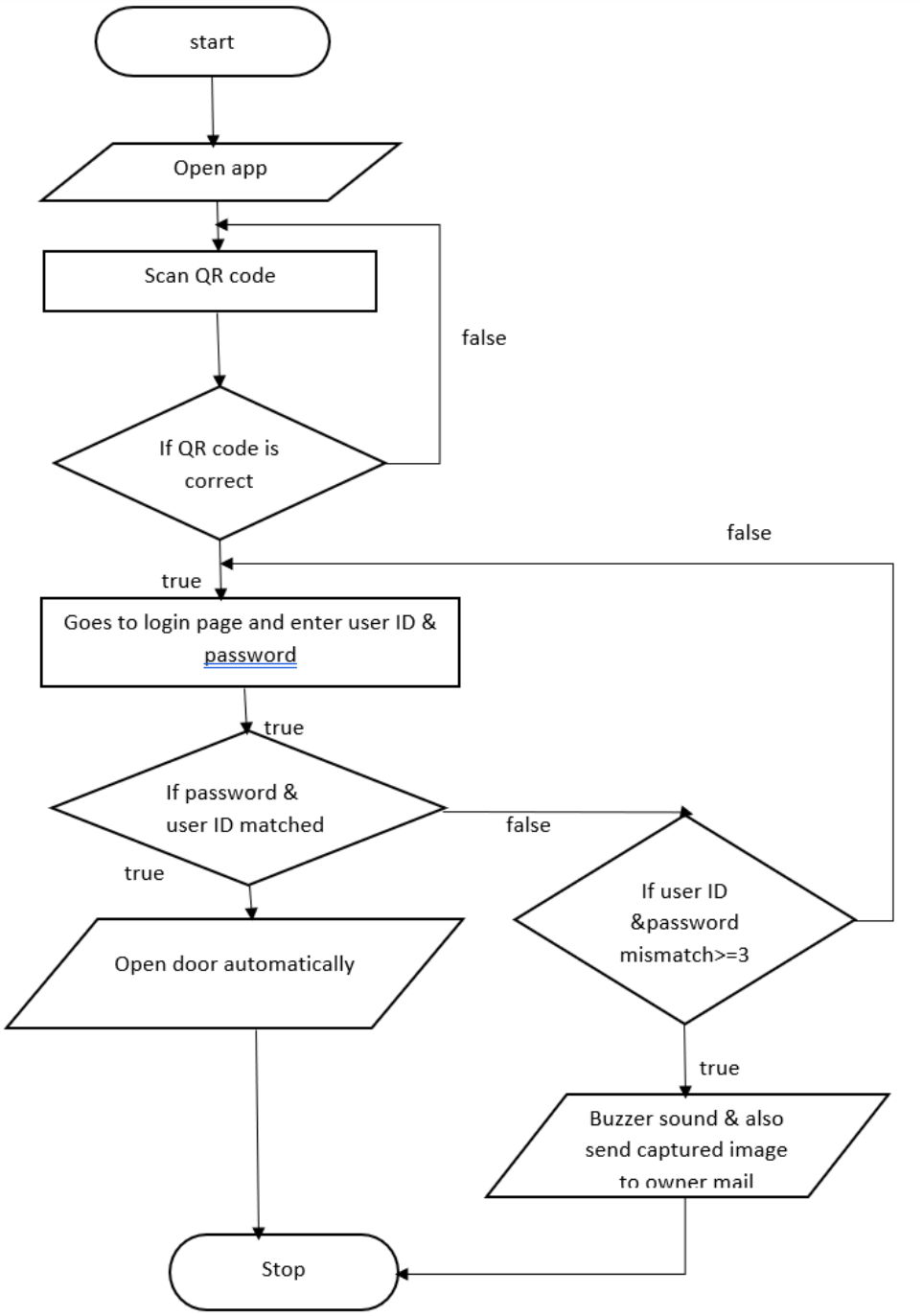

Fig-1 Flow Chart

Steps:

- We are creating an Android app for door lock security system.
- The user needs to create their login to enter into house in this app.
- Whenever the user needs to enter into to their house they need to open the app and need to scan the QR code that was present outside the house.
- After scanning the QR code then it re-directs to the login page.
- The user need to enter the their login credentials.
- These login credentials will be verified, if the login credentials are matched then door opens.
- If the login credentials are not matched then we can to login again.
- If login id or password mismatch occurs more than 3 times then the camera present outside the house will capture your image and send it to the owner by using Gmail and also gives alert by using buzzer.

V. RESULTS

Fig- 2 : Android App.

The above figure shows us the android app that was created for door lock security system.

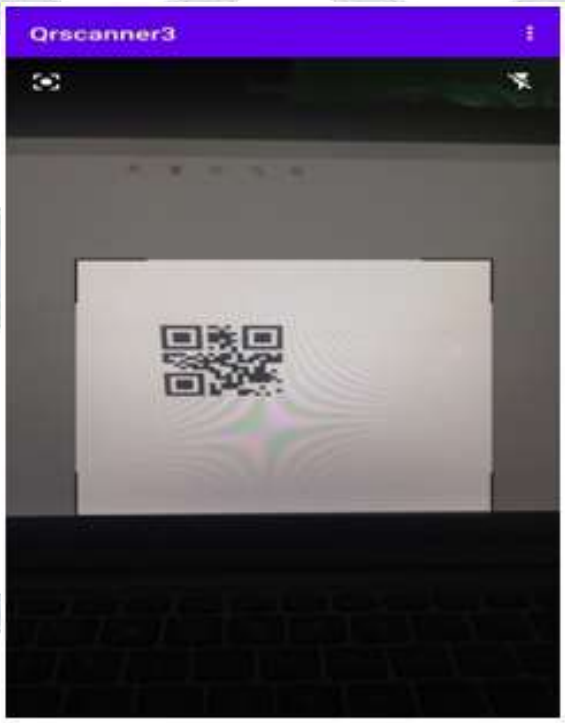

Fig- 3: QR Scanner.

The above figure shows the QR scanner that is used to scan the QR code that was present outside the house. Each and every house had separate QR code.

Fig-4: Login Page.

After QR code scanning is done then it will redirects to the above shown login page. Each and every user has their login id and password, the user entered login id and password is matched with login id and password in the data base.

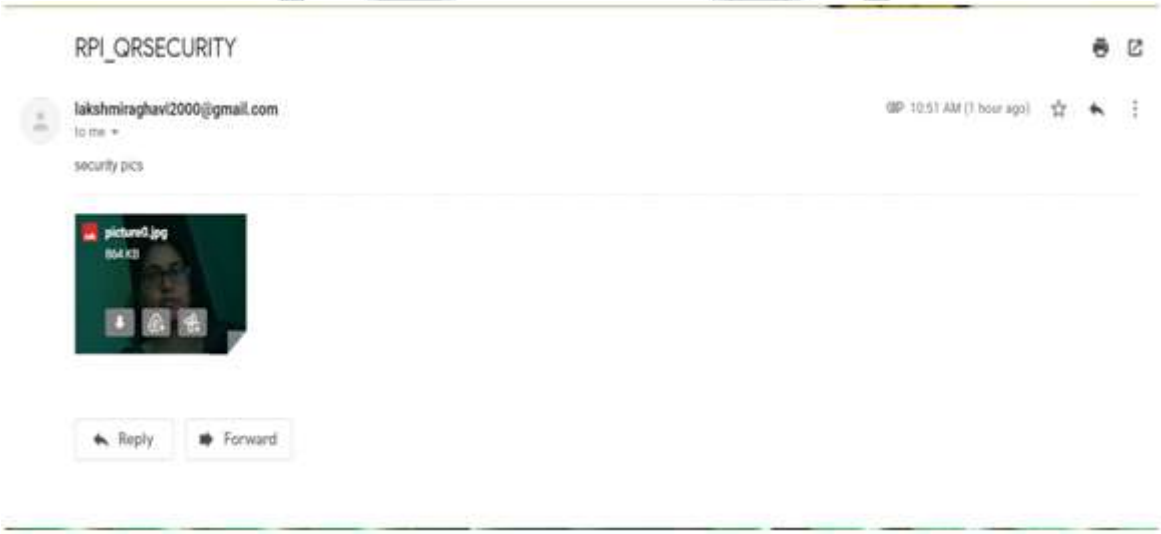

Fig-5: Person photo send to mail.

Whenever the login id and password miss match then the image of that particular person is send to the mail of their owner as shown in above figure and alerts by using buzzer.

VI. Conclusion

This paper presents the planning and implementation of a two-way authentication door lock security system for general users. The security level is increased thanks to the usage of Raspberry pi which sends the door status to the user, has inbuilt capabilities and is definitely connectable to external devices. Raspberry pi proves to be smart and efficient platform for implementing the house security system. Two advantages provided by the system are that Necessary action is often taken in current status span of your time within the case of emergency condition and style of a PCB board which is also small in size. Reduced size makes it more applicable to commercial manufacturing and distribution. A raspberry pi applications with its ever- growing community and development provide great hope in the near future.

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