

# Implementation Paper on Smart Banking Locker Management System using IoT and ML

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**Abstract—** In today's times, security plays a crucial role. For that purpose, we proposed advance security systems for banking locker system and therefore the bank customers. The Smart Bank Locker System is a modern way to secure the locker system and it is new concept. These systems replace the complete hassling system by managing the locker online using the basics of internet of things IOT. This specialized security system is proposed through two different techniques as RFID detection and face detection technique. In this system user have to Scan the RFID tag issued to him and then he is allow to go for next stage which is face detection using PCNN and after that allow to access the locker. At that movement user get message about the operation of locker through app. This system hence offered reliable and secure system by replacing the whole lock and key traditional system and making it digital, fast and protected.

**Keywords—** Camera, DC Motor, raspberry pi, PCNN, ML

## I. INTRODUCTION

The customary locking framework incorporates keeping up a 'lock and key' based component for every one of its storage spaces. Overseeing such a storage framework is additionally a hard errand in light of the fact that the individual in control needs to genuinely check and keep up a rundown of storage spaces being used which isn't a proficient technique and can make a great deal of issues. The issue happens in keeping up numerous keys for various storage spaces and to ensure every last one of them is utilized proficiently. This conventional storage framework as we as a whole know has been there for longer than a century and its execution hasn't changed a lot thus hasn't the lock which doesn't meet the security necessities required for the present world. [4]

This keen storage the board framework gives highlights like simple task of new storage spaces to clients, the executives of existing storage spaces and support for the equivalent. The greater part of the capacities included are mechanized so the procedure is quicker, in this venture, a shrewd storage framework model utilizing Internet of Things (IOT) will be introduced to investigate the normality of the storage being utilized and distantly utilize the storage spaces for streamlining the current assets and accommodation of the client. In this storage framework the microcontroller is the

core of the whole framework as it is answerable for all the controlling of the equipment and keeping up the computerized solicitations and information. [4] The microcontroller framework (Raspberry) here goes about as the extension between the equipment and the product gadget and is basically used to interface them with the goal that they can cooperate. All the procedure done by the equipment in the storage is procedure and sent by the microcontroller. [6]

While the microcontroller will be utilized to trigger the locking framework and choose which storage spaces ought to be opened? Alongside an android application that interfaces with the security framework. Controlling the entryway locking framework utilizing the application itself. To share simple and protected access with others. To make it easy to bolt and open our entryway lock. To get basic establishment framework. [7] [8]

## II. LITERATURE SURVEY

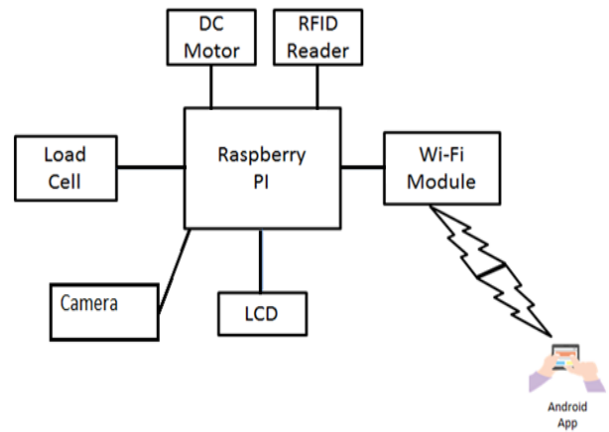
ParthParab ,ManasKulkarni , Dr. VinayakShinde [1] centers around simple administration and task of storage spaces to clients by taking the whole bothering framework web based utilizing the essentials of web of things (iot). This keen storage the executives framework gives highlights like simple task of new storage spaces to clients, the board of existing storage spaces and support for the equivalent. The vast majority of the capacities included are mechanized so the procedure is quicker

Rahul Satoskar [3] proposed thought, a savvy entryway lock and lighting framework utilizing IoT for brilliant home is introduced. A brilliant entryway lock framework is a framework which utilizes computerized secret word for opening and shutting the entryway. The entryway lock is the first and endmost thing individuals go over in entering and leaving the home separately, the home mechanization work in advanced entryway lock framework permits clients to easily control and screen home condition and circumstance at the same time. It likewise permits clients to distantly ignore the circumstance inside the house through World Wide Web or some other open system. A savvy lighting is proposed which can be distantly controlled utilizing Internet.

SuvamBasak [5] proposed work alongside conventional entryway lock – open framework, we have built up a particularly extemporized framework by which bolt and open of primary entryway distantly without necessity of any physical exertion or need of a key. At the point when an obscure individual presses the calling chime, quickly the entryway camera catch his/her picture and send the equivalent to proprietor brilliant application utilizing web. Proprietor can bolt or open the entryway distantly through the protected application introduced in his/her PDA. The application has extra component to take outside picture/video for checking the action going on outside the entryway. The framework has the capacity of sending the warning if the entryway - lock goes disconnected. proposed web of things or IoT based framework encourage the client peril free, straightforward, vigorous and secure answer for home security and kill manual exertion towards entryway lock – open issues.

### III.PROPOSED SYSTEM

Fig. 1 Block Diagram of Smart locker system



The square outline of the framework is appeared in Fig.1 The significant segments utilized in the framework are Raspberry pi 3B+, camera Logitech 5MP, Load cell HX711, LCD 16X2 showcase gadget, transfer and hand-off driver circuit, DC Motor(12v/24v), RFID TAG RC522, WI-FI module ESP8622. The bank storage is associated with the record holder utilizing web (IOT). The interfacing circuit comprises a Relay. Transfer is utilized for giving optical disconnection between an information source and yield load. The live readings from the bank storage are gathered by the Raspberry pi. This can be seen through a LCD show which is associated with the Raspberry pi and on web/portable application utilizing web (IoT). The LCD show shows the readings of the approved individual or unapproved individual status.that at whatever point the opening or rolling out any improvements in bank storage, the camera get identify, and the message "Burglary happened" will be shown on portable application. At that point the shutdown hand-off will work and this can be utilized for lock the bank locker.Using UART, the raspberry pi is associated with sensors hardware. The perusing from the sensors is utilized for refreshing the substance of the website page. The site page shows the readings. These qualities are appeared in page just as on client cell phone. Thinking from the record holder side, this site page is a genuine help since they can screen their bank use effectively.

#### Algorithm-Pulse Coupled Neural Network

The PCNN model consists of the receptive field, the modulation field, and the pulse generator. In the receptive field, the neuron, respectively, receives the coupling pulse input  $Y$  and external stimulus input  $S$  of neighboring neurons and consists of  $L$  and  $F$  channels, which is described by (1). In  $L$  and  $F$  channels of the neuron, the neuron links with its neighborhood neurons via the synaptic linking weights  $W$  and  $M$ , respectively; the two channels accumulate input and exponential decay changes at the same

time; the decay exponentials of  $L$  and  $F$  channels are  $\alpha L$  and  $\alpha F$ , while the channel amplitudes are  $V_L$  and  $V_F$ :

$$F_{ij}(n) = V_F \sum_{kl} W_{ijkl} Y_{kl}(n-1) + e^{-\alpha F} F_{ij}(n-1) + S_{ij}$$

$$L_{ij}(n) = V_L \sum_{kl} W_{ijkl} Y_{kl}(n-1) + L_{ij}(n-1) e^{-\alpha} \quad (1)$$

In the modulation field, the linking input  $L_i(n)$  is added a constant positive bias; then, it is multiplied by the feeding input; the bias is unitary,  $\beta$  is the linking strength, and the total internal activity  $U$  is the result of modulation, which is described by

$$U_{ij}(n) = F_{ij}(n) [1 + \beta L_{ij}(n)] \quad (2)$$

Pulse generator consists of a threshold adjuster, a comparison organ, and a pulse generator. Its function is to generate the pulse output  $Y$ , and it adjusts threshold value  $\theta_{ij}$ ;  $V\theta_{ij}$  is threshold range coefficient, which is described by (3). When the internal state  $U$  is larger than the threshold  $\theta$ , the neuron generates a pulse, which is described by

$$\theta_{ij}(n) = e^{-\alpha \theta} \theta_{ij}(n-1) + V\theta_{ij} Y_{ij}(n-1) \quad (3)$$

$$Y_{ij}(n) = \begin{cases} 1, & U_{ij}(n) > \theta_{ij}(n) \\ 0, & \text{otherwise.} \end{cases} \quad (4)$$

In the above equations, the subscripts  $i$  and  $j$  denote the neuron location in a PCNN and  $n$  denotes the current iteration (discrete time step), where  $n$  varies from 1 to  $N$  ( $N$  is the total number of iterations). The PCNN used for image processing is a single layer twodimensional array of laterally linked pulse coupled neurons as shown in Figure 2, and all neurons are identical.

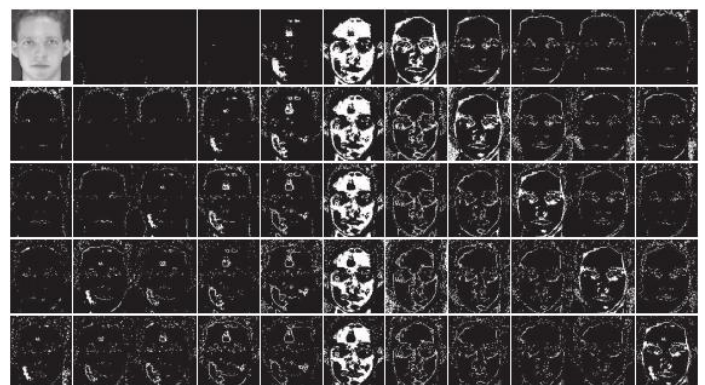


Fig.2 PNN diagram

The number of neurons in the network is equal to the number of pixels in the input image. There exists one-to-one correspondence between the image pixels and network

neurons, and the gray value of a pixel is taken as the external input stimulus of the neuron in  $F$  channel; namely,  $S_{ij} = (i, j)$ . The output of each neuron results is two states, namely, pulse (1 state) and nonpulse (0 state), so the output states of neurons comprise a binary map

IV. FLOW DIAGRAM

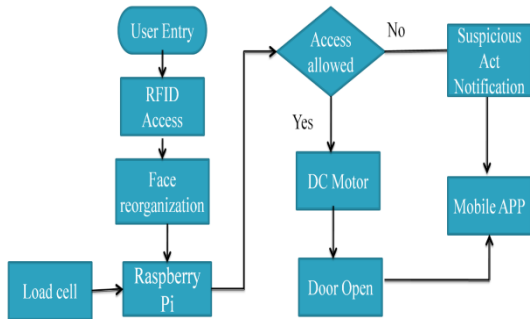


Fig.3 Flow diagram of Smart Banking system

V.RESULT

In this system, when user pass through two securities like RFID access and Face recognition using PCNN then system will allow user to access the locker after that admin as well as user get indication on mobile through IoT. If one of the accesses go wrong or not passed then admin and user get theft indication for security purpose.

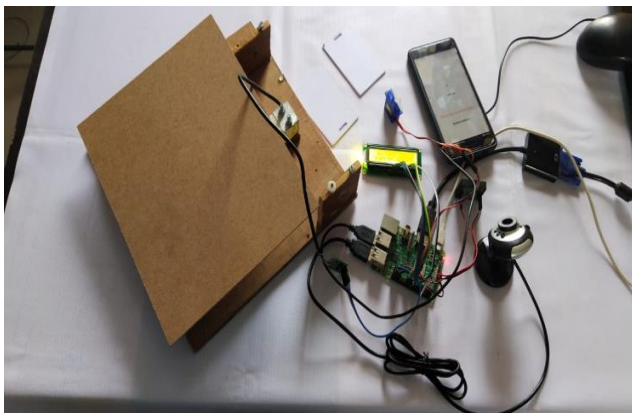


Fig.4 Interfacing Raspberry Pi with RFID and LCD

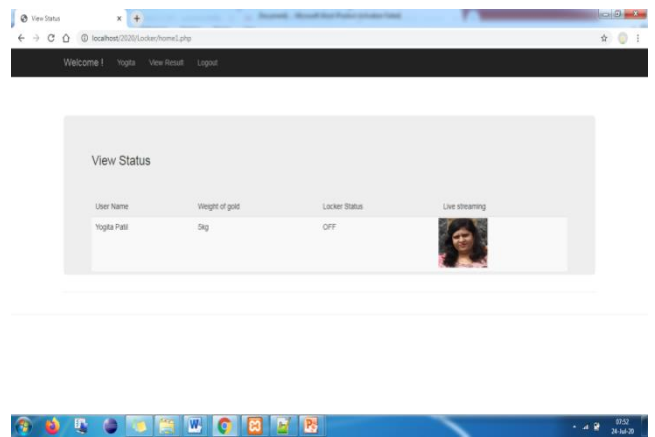


Fig.5.User Registration



Fig. 6. User Login

Fig. 7. Result View Locker Status



VI.CONCLUSION

This above proposed system is designed to provide easy management of lockers by digitizing them and connecting them to the Internet by means of cloud computing and Internet of things to provide a smarter user interface between the user who is using the lockers and the admin managing it.

- Improving awareness in banking sector at urban level.
- Monitoring bank locker through IoT.
- Theft detection.

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