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# Examination Forgery Avoidance System Using Image Processing and IoT

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**Abstract -** *According to the improvement of the technology, a new system based on encryption has been found. This project has been used encrypted data sharing has been used in education. To develop a secured examination system helps to detect a wide variety of cheating behaviors during the examination session. The forgery of examination becomes familiar and this made a lot of problems and difficulties to the official institutions. Image processing techniques for detection forgery in the examination. In this project, the proposed model for a secured examination system uses user verification to detect cheating behaviors during an exam, using biometric recognition and RF-ID verification. Any mismatch when compared with dataset then send alert (captured image and candidate details) to management. The project aims to design a quick and most efficient system for detecting forgery in official examination*

***Key Words***: Proxy, Raspberry pi, Fingerprint Module, Camera, PIR Sensor

## 1.INTRODUCTION

Our Project titled "Examination Forgery Avoidance System using image Processing and IoT" has been undertaken to avoid proxy in the examination. In this competitive world, everyone shows their knowledge and skills are depending only through examinations. So, everywhere conduct exams for filtering candidates who have good knowledge compared to one another. There is no system for checking whether the legal student writing the examination or not. Nowadays most of the students are allowing other persons to write their exams in the government exams as well as private institution exams. Due to this, government posts and college seats are going to the ineligible persons. So, we are proposing a paper to monitor students who are writing the government exams and entrance exams. In this project, we can reduce the proxy in the examination.

## 2. EXISTING SYSTEM

In the existing system, they detect the proxy through the handwriting of the candidate and verify the candidate through the barcode of the application form. So, a knowledgeable person gets affected. This is not working in the real-time examination.

### 2.1 Drawback

- Handwriting can be written by anyone
- Existing system is not more reliable
- Most of the people easily do proxy
- Difficult to find the authorized person

## 3. PROPOSED SYSTEM

In the proposed system, we are overcoming the drawbacks of the existing system. Here we are using a camera to capture the candidate face and biometric sensor to fetch the candidate details and the details will be sent to Raspberry pi for verification. If the candidate image is verified as unauthorized, then an alarm will be activated and also the alert message will send to the management through the mail. After the verification done successfully then, the door will open, the authorized candidate allowed to write the exam and candidate data store in the cloud. Every status will be displayed in LCD.

## 4. BLOCK DIAGRAM

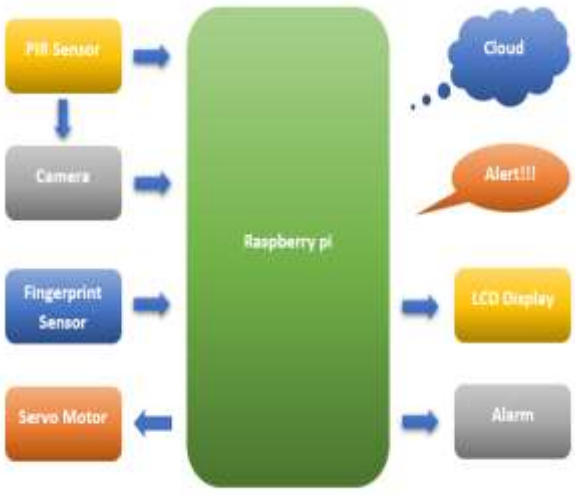


**Fig -1**: Block diagram of Proposed System

## 5. HARDWARE DESCRIPTION

### 5.1 Raspberry Pi 3

**Fig -2:** Raspberry Pi 3

The Raspberry Pi 3 is the third generation Raspberry Pi. This powerful credit-card-sized single-board computer can be used for many applications. This is 10x faster than the first-generation Raspberry Pi. This Raspberry Pi has GPIO pins, USB slot, HDMI Port, Ethernet Port, and Micro SD card slot.

Each column has 20 pins total of 40 GPIO pins. It has a 64-bit CPU Quad-Core ARM Cortex-A53 processor with 1GB of RAM which works at 1.2 GHz. Micro USB slot used to connect the power supply. It has four USB ports. The Ethernet port is used to connect the network connectivity. This pi 3 has the inbuilt Bluetooth and wi-fi connectivity. To connect the projector or monitor or Tv using HDMI port and the HDMI to VGA converter used to connect to the projector. We can use the SD card for loading the operating system for it. We use the smartphone charger for providing the power supply.

Operating System for the Raspberry Pi is Raspbian. This free operating system is known as the modified version of the popular OS Debian. It promotes python and scratch as the main programming languages, with support for many other languages. We can use Python language for programming in Raspberry pi. Python is a wonderful and powerful programming language that's easy to use.

### 5.2 Fingerprint Module

**Fig -3**: Fingerprint Module R307

R307 fingerprint module is a fingerprint sensor with a transistor-transistor logic interface. The fingerprint module can directly interface with 3.3 or 5v Microcontroller. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person.

Fingerprint Module consists of high-speed DSP processor, high-performance fingerprint alignment algorithm, high-capacity FLASH chips, and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template storage, and other functions.

### 5.3 Webcam

**Fig -4:** Webcam

A camera records and stores photographic images in digital form. Many current models are also able to capture sound or video, in addition to still images. Capture is usually accomplished by the use of a photosensor, using a charged coupled device.

An image sensor is an electronic, photosensitive device that converts an optical image into an electronic signal. This light detector is one of two types, either a charge-coupled device (CCD) or a CMOS image sensor. In a camera, light from the thing you are photographing zooms into the camera lens. This incoming "picture" hits the image sensor chip, which breaks it up into millions of pixels. The sensor measures the color and brightness of each pixel and stores it as a number. Here we use a normal USB web camera to capture the candidate image and store it as a digital image.

### 5.4 PIR Sensor

Passive Infrared sensors (PIRs) are electronic devices that are used in some security alarm systems to detect motion of an infrared emitting source, usually a human body. PIR is made of a pyroelectric sensor, which can detect different levels of infrared radiation. It works entirely by detecting the IR radiation emitted by the objects.

Outdoor passive infrared: The detection distance ranges from 10 meters to 150 meters. When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first

intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

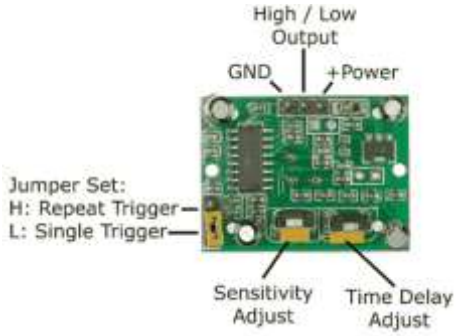


**Fig -5**: PIR Sensor

Window made of IR transmissive material that protects the sensing element. This sensor has three pins. They are Drain/VCC, Source/Out, Ground. Usually, it uses the power is 3v to 5v DC input but maybe high as 12 v. The output digital pulse is 3.3v when it is triggered. The output digital pulse is 0v when it is idle. Indoor passive infrared detection distances range from 25 cm to 20 m. It has low power consumption of 65mA and the operating temperature is -20° to 80°C.

### 5.5 Liquid-Crystal Display

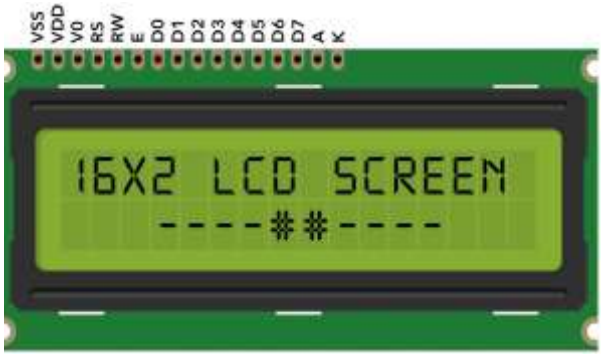


**Fig -6:** Liquid-Crystal Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD is a very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in the 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display, etc. The data register stores the data to be displayed on the LCD and brightness can be adjusted by external potentiometer.

## 6. METHODOLOGY

The step-by-step procedure of the proposed system.

- Capture the candidate face by camera
- Use Image Restoration convert it into grayscale image
- Scan the fingerprint of candidate
- Matching with dataset values
- Every status display using LCD
- Verification done successfully the door will open then allow to attend examination
- If any mismatch, send alert to management, trigger alarm and door remains closed

### 6.1 Camera

Use of camera, we can capture the candidate and detect their face by using the Haar Cascade Classifier algorithm with defining the height and width of the image.

### 6.2 Image Restoration

Image restoration is an area that also deals with improving the appearance of an image. However, unlike enhancement, which is subjective, image restoration is objective, in the sense that restoration techniques tend to be based on mathematical or probabilistic models of image degradation.

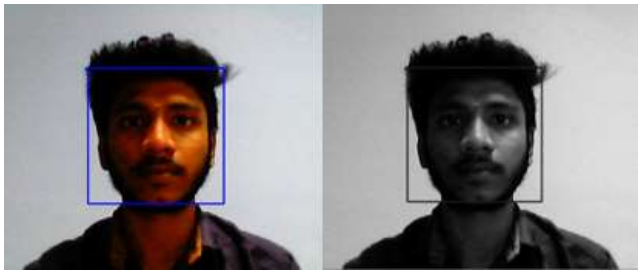

**Fig -7:** Image Restoration

### 6.3 Fingerprints

Fingerprints are one of many forms of biometrics used to identify an individual and verify their identity. The analysis of fingerprints for matching purposes generally requires the comparison of several features of the print pattern. These include patterns, which are aggregate characteristics of ridges, and minutia points, which are unique features found within the patterns.

The three basic patterns of fingerprint ridges are the arch, loop, and whorl.

**Arch Pattern -** An arch is a pattern where the ridges enter from one side of the finger, rise in the center forming an arc, and then exit the other side of the finger.

**Loop Pattern -** The loop is a pattern where the ridges enter from one side of a finger, form a curve, and tend to exit from the same side they enter.
**Whorl Pattern -** In the whorl pattern, ridges form circularly around a central point on the finger.


**Fig -8:** Fingerprint Patterns

### 6.4 Dataset

Store the candidate's image in the dataset on the registration of the examination. Later on, use OpenCV to perform face recognition on a dataset of our faces before the examination. Examples of images in the dataset, here 30 photos but we can take n number of candidate photos to improve matching efficiency.

**Fig -9:** Images in Dataset

### 6.5 Servomotor

Here we use servomotor for opening and closing a door depends on the candidate verification process. If verification is done successfully then the door will open. Otherwise, the door remains closed.

## 7. CONCLUSIONS

The proposed system used PIR sensor. If any object motion is there it helps to turn on the camera to capture the candidate image and compare it with the existing images in datasets. If the image matched then checks the biometric data by using the fingerprint module and then the authorized to attend the examination. If any mismatch in the image and the biometric data an alert mail will send to the management that includes captured image and the candidate details. It is help to reduce the proxy in the examination. This system is more reliable and easier to find an unauthorized person.

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