

# ADVANCED ONLINE EXAMINATION USING RASPBERRY PI BASED ON IoT

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**Abstract :** Education is one of the main needs for man to develop socially and intellectually. Today need of exams in universities, schools,colleges and even companies for recruitment process .The general paper-pen exams are now being slowly replaced by the online internet based exam system .But on this manual system of writing examination has introducing many demerits. Manual examination process is time consuming and tedious, but student need faster and more reliable examination i.e. online examination.

Online examination is referred as an e-examination which is conducted through internet or intranet. In this paper, we have proposed advance online examination based on IoT system.

**keywords-** Raspberry pi,open CV, Python, face recognition, Raspbian

## I. INTRODUCTION

In this paper, we have proposed advance online examination based on IoT system. Here we initially all the examination details are stored in the server. Then if someone wants to starts online examination, first they should apply face recognition (in Open CV based) technique. Because some time unwanted person also enter to write the exam, so this is the best way to identify any culprits are found or not. Then examine enter to write the exam, here also I am apply some security. Now a day's already questions are stored in the online or any paper printed copy. But here not like that, if you entered to write the exam that time only teachers are start to write questions on server. This will be printed automatically to the examine browser window. So easy avoid the question paper leakage before the exam.Traditional examinations with pen and paper play an integral part in evaluating the academic results of the students. Currently, with the development of education system, many people argued that this way is not optimal to assess education achievement. To begin with, there are some positive influences of applying conventional examinations in schools. First and foremost, taking exams makes students have more motivation to study hard. Due to the fact that the formal exams indicate the score and rank of students in the class, pupils will try my best not only to not fall behind with their studies but also to to gain good results. In addition, formal "pen and paper" examinations are equal to all students. In detailed, traditional examinations require students to sit an exam which has the same condition & level so cheating will not occur.

On the other hands, there are some drawbacks of considering formal examinations as the best method to assess the results of students. Firstly, that attending exam is a compulsory way can create unreliable pressure for scholars. It is clearly seen that when students study under pressure, they will fell tired and as a result, these learners will not make the grade in studying. Secondly, "pen and paper" examinations are not fair to students who are bad at performing knowledge in the paper. For instance, a huge number of scholars have the advantages of verbal performance rather than in writing. Others are better at body movements of different talents such as dancing or acting. Therefore, schools should carry out versatile kinds of skills in exams to provide fail opportunities for students who are good at different aspects. Moreover, to remember and use the knowledge in the life, students must practise again and again, hence, continuous assessment at all times ought to implemented to evaluate students'achievements.

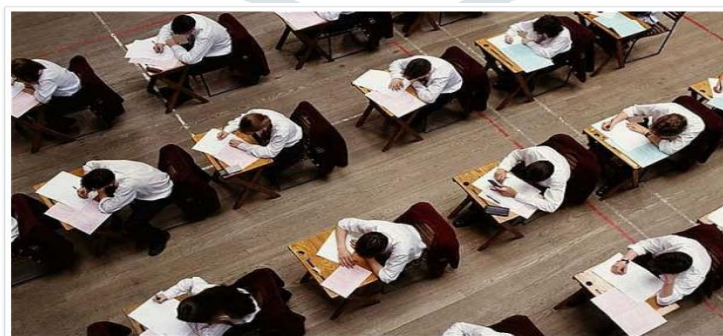
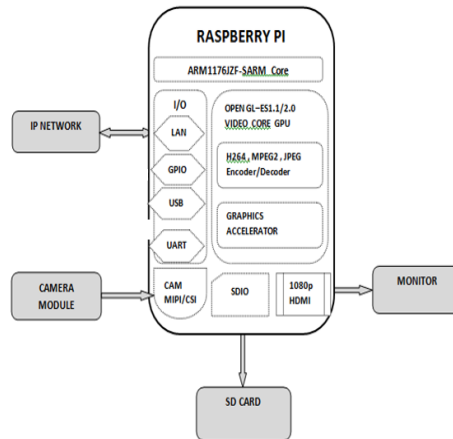


Figure 1.1 Manual Examination

## II. METHODOLOGY

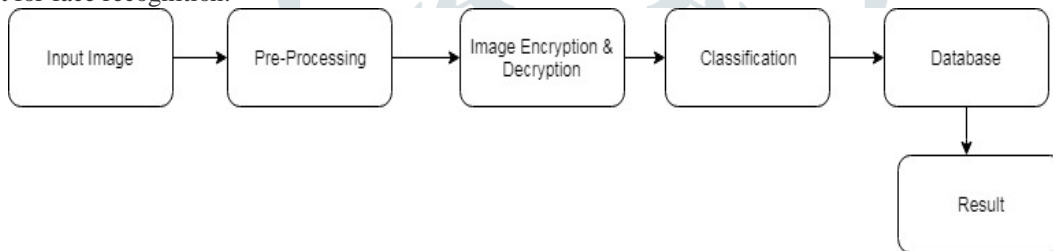
Figure 2.1 shows block diagram of Online Examination in which Raspberry Pi is main controller which used to conduct examination. Camera connected to Raspberry Pi used for face recognition. Monitor is used to display GUI.OS is stored in SD card.

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample of the study, Data and Sources of Data, study's variables and analytical framework. The details are as follows;



**Figure 2.1 Block Diagram of Online Examination**

Figure 2.2 shows working block diagram of system. As shown in figure process starts from taking images from webcam and then analyzing it for face recognition.



**Figure 2.2 Block Diagram of Face Reorganization**

### A. Software Development

In software system development, the face recognition method is completed in OpenCV. The system is developed victimization pc Vision tool case, applied mathematics and Image Acquisition tool case. Eigen faces methodology: an initial set of pictures of faces are accustomed produce a coaching set. The quantity of face shots of every person keep within the information depends on what quantity processing time they'll take. These faces are then de-escalated into individual vectors. The magnitude of every vector represents the brightness of individual sectors of the grey scale image. A variance matrix is created by normalizing these vectors. After this, eigenvectors are derived from this variance matrix and a collection of eigenvectors of a picture forms an Eigen face. Eigen face helps in precisely focusing at the most face features instead of the total face information. In different words, it permits to find the load of every face.

When a replacement face image is non-inheritable the load of that face is calculated then deducted from the every of the weights of different pictures within the information. Those distinction numbers represents what quantity completely different every image is from the initial image. The lower the quantity the nearer is that the match. This distinction is additionally referred to as the easy lay geometer distance.

**Input image:** Image acquisition is the first process in the system development. The images are captured by placing camera in front of seat; by using same back ground and same visible light condition

**Preprocessing:** Camera captured image is in RGB Color space. Convert it to gray scale image. Gray scale digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest

**Image encryption and decryption:** Image encryption techniques try to convert an image to another image that is hard to understand; to keep the image confidential between users, in other word, it is essential that nobody could get to know the content without a key for decryption. All the public key cryptosystems have a public and a private key. The public key is used in the encryption procedure and can be published, while the private key must be possessed only by the recipient of the message and used in the decryption procedure.

**Haar-cascade detection in OpenCv:** OpenCV comes with a trainer as well as detector. If you want to train your own classifier for any object like car, planes etc. you can use OpenCV to create one. Its full details are given here: Cascade Classifier Training. Here we will deal with detection. OpenCV already contains many pre-trained classifiers for face, eyes, smile etc. Those XML files are stored in opencv/data/haarcascades/ folder. Let's create face and eye detector with OpenCV.

First we need to load the required XML classifiers. Then load our input image (or video) in grayscale mode.

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages, pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

The initial build of over 35,000 Raspbian packages, optimized for best performance on the Raspberry Pi, was completed in June of 2012. However, Raspbian is still under active development with an emphasis on improving the stability and performance of as many Debian packages as possible.



Figure 2.3 Raspbian

Raspbian uses PIXEL, Pi Improved X-Window Environment, Lightweight as its main desktop environment as of the latest update. It is composed of a modified LXDE desktop environment and the Openbox stacking window manager with a new theme and few other changes.

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

### **B.Hardware Development using Raspberry pi**

The Raspberry Pi is a series of credit card sized single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to push the teaching of basic computer science in colleges and developing countries. Raspberry Pi 2 includes a quad-core Cortex-A7 C.P.U. running at 900 megacycle per second and one GB RAM. it's represented as 4– 6 times additional powerful than its forerunner. The GPU is similar to the initial. The Raspberry Pi doesn't have a built-in real clock, and doesn't "know" the time of day. It have several models All models feature a Broadcom system on a chip (SoC), which incorporates an ARM compatible central process unit (CPU) and an on chip graphics process unit (GPU, a Video Core IV). CPU speed ranges from 700 MHz to one.2 GHz for the Pi three and on board memory vary from 256 MB to 1 GB RAM. Secure Digital (SD) cards ar wont to store the package and program memory in either the SDHC or small SDHC sizes. Most boards have between one and 4 USB slots, HDMI and composite video output, and a 3.5 mm telephone jack for audio.



Figure 2.4 Raspberry pi

III. RESULTS AND DISCUSSION

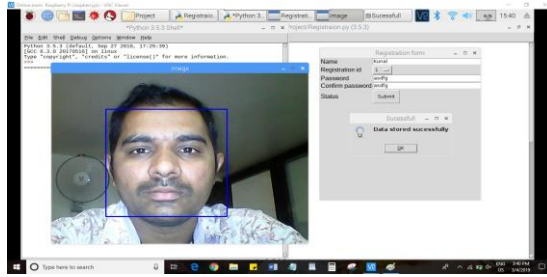


figure 3.1 adding new registration by creating dataset



figure 3.2 image stored in dataset folder

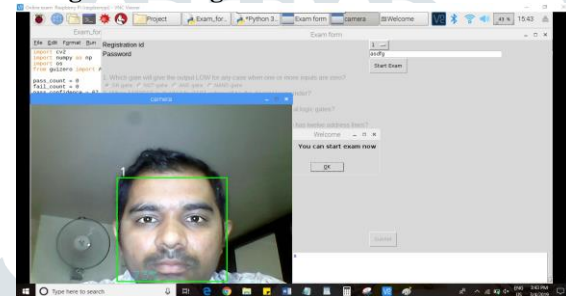


figure 3.3 Image matching from dataset

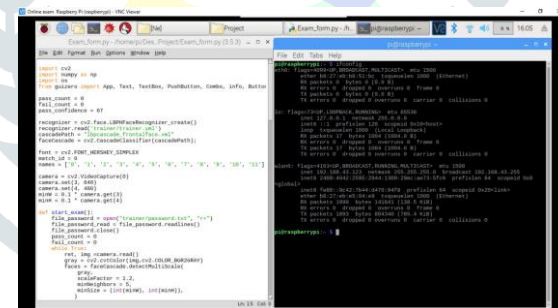


Figure 3.4 IP address of dataset

Here, we found that the possibility to start an exam with valid face is about 80%.

Result Table-

Sr No.	Task	Total attempt	Exam starts	Exam not starts
1	Attempt with valid face	10	8	2
2	Attempt with invalid face	10	1	9

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