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# Digital Hall Ticket System and Authentication System Using Face Bio Metrics

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**ABSTRACT:** During examinations, Authentication has always been the major challenge. The method of authenticating a student for an examination has an obvious problem such as presentation of fake clearance card, impersonation and so on and the unethical manner associated with the examination is a grim issue that requires the stakeholders in academic area to seek for alternative means of authenticating student for examination, because the manual paper-based clearance process is fundamentally flawed. Hall ticket and identity cards are normally used in the examination system for fraud detection. Existing examination system mainly deals with document image analysis techniques and biometric system in identification, recognition and classification of the candidate. Generally, fraud is detected by using document image analysis whereas the proposed model is focus on the image/video for analysis. In this project a deep learning model is made to develop automated face detection and recognition for detecting impersonation of candidate in examination system. Automated face detection and recognition system using convolutional neural network can further be used in Hall Number, Seating Allocation, identity verification and attendance monitoring in examination system. The proposed deep learning model comprises of two steps: enrolment and authentication. To validate the proposed framework, used a custom DeepFake dataset collected on our own.

## I. INTRODUCTION

Education as a planned undertaking, at a personal level on a small scale or institutional level on a large scale, aims at making student capable of becoming active, responsible, productive, and caring members of society. They are made be acquainted with the various practices of the society by imparting the relevant skills and ideas. Education encourages the students to analyses and evaluate their experiences, to doubt, to question, to investigate – in other words ,to be inquisitive and to think independently and acquire proficiency. Exams and tests are a great way to assess what the students have learned with regards to particular subjects. Exams will show what part of the lesson each student seems to have taken the most interest in and has remembered. With every pupil being so individual, exams are also a great way for teachers to find out more about the students themselves. The test environment comes with added stress, which allows teachers to work out how their students argue and how they think individually by their works, which is a great attribute for them to keep in mind for future class activities.

## II. LITERATURE SURVEY

### 1. A Hybrid Algorithm for Face Detection to Avoid Racial Inequity Due to Dark Skin

Authors: Muhammad, Syed Sarmad Abbas, Adnan Abid, Saim Rasheed

Year:2021

Link: <https://ieeexplore.ieee.org/document/9585604>

**Objective:**

The aim of this project is to face detection systems for people with dark skin using a hybrid algorithm based on Gaussian and Explicit rule model.

**Merits:**

- Its accuracy is high.
- It is efficient and time consuming is low.

**Demerits:**

- The accuracy is very low to detect people with dark skin.
- To detect the variation among the skin tone within races has been considered as major challenge for all skin modeling techniques.

**2. An End-To-End Emotion Recognition Framework Based on Temporal Aggregation of Multimodal Information**

Author: Anamaria Ra, Andreea Birhala, Nicolae-Catalin Ristea, Liviu-Cristian Dutu

Year:2021

Link: <https://ieeexplore.ieee.org/document/9552845>

**Objective:**

The aim of this project is to present a robust end-to-end architecture that incorporates multimodal information for emotion recognition using end-to-end neural network architecture, called TA-AVN.

**Merits:**

- It is efficient to use
- It is flexible in combining audio and video data with different sampling rates across modalities..

**Demerits:**

- Collecting annotated training data remains an important challenge when training emotion recognition systems.
- Its accuracy is low and not efficient.

**3. Exposing Fake Faces Through Deep Neural Networks Combining Content and Trace Feature Extractors**

Authors: Eunji Kim, Sungzoon Cho

Year:2021

Link: <https://ieeexplore.ieee.org/document/9531572>

**Objective:**

The aim of this project is to expose fake face media forensics using a hybrid face forensics framework based on a convolutional neural network (CNN).

**Merits:**

- Highest accuracy at various video compression levels when compared to the baseline models, confirming its robustness.
- It effectively learns the different characteristics of fake manipulation methods.

**Demerits:**

- It is less effective.
- Accuracy is low.

**III. EXISTING SYSTEM**

Facial recognition is a technology that is capable of recognizing a person based on their face. It employs machine learning algorithms which find, capture, store and analyses facial features in order to match them with images of individuals in a pre-existing database. Early approaches mainly focused on extracting different types of hand-crafted features with domain experts in computer vision and training effective classifiers for detection with traditional machine

learning algorithms. Such methods are limited in that they often require computer vision experts in crafting effective features, and each individual component is optimized separately, making the whole detection pipeline often sub-optimal. There are many existing FR methods that achieve a good performance

### Support Vector Machine (SVM)

Support Vector Machines (SVM) are a popular training tool which can be used to generate a model based on several classes of data, and then distinguish between them. For the basic two-class classification problem, the goal of an SVM is to separate the two classes by a function induced from available examples. In the case of facial recognition, a class represents a unique face, and the SVM attempts to find what best separates the multiple feature vectors of one unique face from those of another unique face

### Principal Component Analysis (PCA)

One of the most used and cited statistical method is the Principal Component Analysis. A mathematical procedure performs a dimensionality reduction by extracting the principal component of multi-dimensional data. Principal component analysis is reducing the Eigen value and Eigen vectors problem in a matrix. Simply Principal component analysis is used for a wide range of variety in different applications such as Digital image processing, Computer vision and Pattern recognition. The main principal of principal component analysis is reducing the dimensionality of a database. In the communication of large number of interrelated features and those retaining as much as possible of the variation in the database

## IV. PROPOSED SYSTEM

Face detection and recognition system for identity verification and attendance monitoring in the examination system. Fraud with respect to hall tickets and designs an automated system for impersonation or cross checking hall tickets using image processing techniques. The major problems occur in examination systems are malpractices. The fundamental Problem identified is the absence of a credible identity verification system for offline and also for online examination system. The solution for this problem is an examination system designed based face detection and verification technology incorporating the security strength of examination and the accuracy. Impersonation is nothing but to pretend to be for purposes of fraud or to assume the character or appearances of especially fraudulently, which is one of the main problems to be addressed in our project. Secondly in case of impersonation is detected whether the candidate is authenticated or not. If the person is authenticated his attendance also recorded. The message has to be sent to the exam in-charge by using alarm whether the candidate is authenticated or not. Deep learning in the form of Convolutional Neural Networks (CNNs) to perform the face recognition.

### Face recognition - dcnn

CNNs are a category of Neural Networks that have proven very effective in areas such as image recognition and classification. CNNs are a type of feed-forward neural networks made up of many layers. CNNs consist of filters or kernels or neurons that have learnable weights or parameters and biases. Each filter takes some inputs, performs convolution and optionally

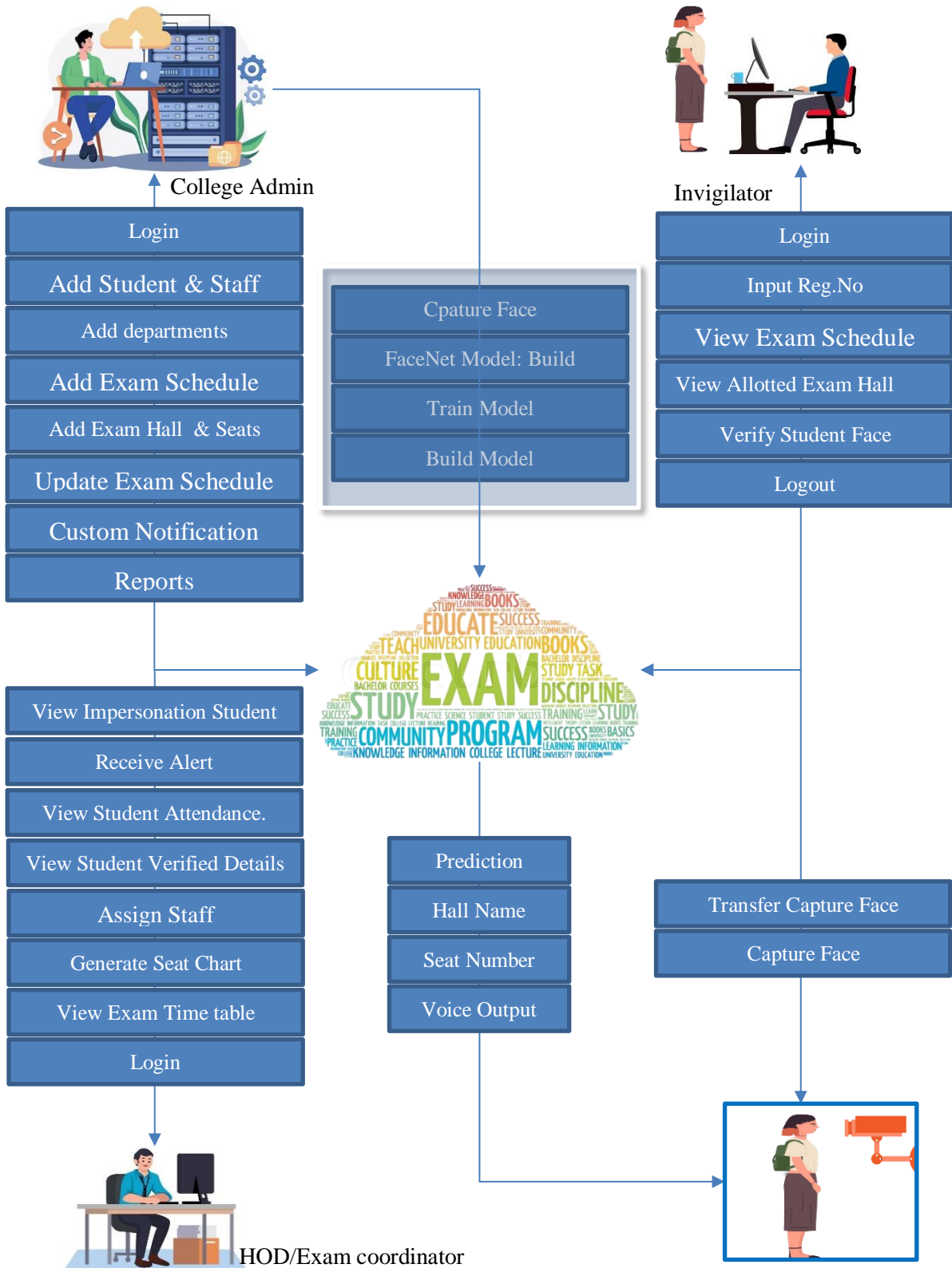
follows it with a non-linearity. A typical CNN architecture can be seen as The structure of CNN contains Convolutional, pooling, Rectified Linear Unit (ReLU), and Fully Connected layers.

### Advantages:

- The system stores the faces that are detected and automatically marks vaccinated or not or Dose 1.
- Provide authorized access.
- Multiple face detection.
- Provide methods to maximize the number of extracted faces from an image.
- Ease of use.

### Face Identification

After capturing the face image from the Camera, the image is given to face detection module. This module detects the image regions which are likely to be human. After the face detection using Region Proposal Network (RPN), face image is given as input to the feature extraction module to find the key features that will be used for classification. The module composes a very short feature vector that is well enough to the face authentication.



Sl.No	GLCM Feature	Formula
1.	<i>Contrast</i>	$\sum_{i,j=0}^{N-1} P_{ij} (i-j)^2$
2.	<i>Correlation</i>	$\frac{\sum_{i,j=0}^{N-1} P_{ij} (i-\mu_i)(j-\mu_j)}{\sqrt{\sigma_i^2 \sigma_j^2}}$
3.	<i>Dissimilarity</i>	$\sum_{i,j=0}^{N-1} P_{ij}  i-j $
4.	<i>Energy</i>	$\sum_{i,j=0}^{N-1} P_{ij}^2$
5.	<i>Entropy</i>	$\sum_{i,j=0}^{N-1} P_{ij} (-\ln P_{ij})$
6.	<i>Homogeneity</i>	$\sum_{i,j=0}^{N-1} \frac{P_{ij}}{1+(i-j)^2}$
7.	<i>Mean</i>	$\mu_i = \sum_{j=0}^{N-1} j (P_{ij}), \quad \mu_j = \sum_{i=0}^{N-1} i (P_{ij})$
8.	<i>Variance</i>	$\sigma_i^2 = \sum_{j=0}^{N-1} P_{ij} (j-\mu_i)^2, \quad \sigma_j^2 = \sum_{i=0}^{N-1} P_{ij} (i-\mu_j)^2$
9.	<i>Standard Deviation</i>	$\sigma_i = \sqrt{\sigma_i^2}, \quad \sigma_j = \sqrt{\sigma_j^2}$

### V. CONCLUSION

Traditionally student’s attendance in exam hall were taken manually by professor and it has to consume too much time of students as well as professor. A facial recognition system is a technology capable of matching a human face from a digital image or a video frame against database of faces, typically employed to authenticate users through ID verification services, works by pinpointing and measuring facial features from a given image. In the proposed system, we have developed face recognition system ready to be implemented for the purpose of live examinee authentication with minimal human interaction to verify the candidate using Convolutional Neural Network. This System represent an analysis of different technologies which are used for taking attendance system. Further it can be replaced by fully computerized system. This system can be implemented for better results regarding the management of attendance during exam.

### VI. FUTURE WORK

For the future, we will proceed to enhance the proposed classifier performance to be able to handle the spoof attacks problem that may be occurred by fake subjects. Also we can apply this technique to vote anywhere in India.



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