

Hall Ticket Fraud Detection System Using ANN Classifier

SANSKRUTI BAITULE

M.Tech

Dept of Computer Science and Engineering,

PRMIT&R, Badnera

Prof. A. A. Chaudhari

Assistant Professor

Dept of Computer Science and Engineering,

PRMIT &R, Badnera

Dr. M. A. Pund

Professor

Dept of Computer Science and Engineering,

PRMIT &R, Badnera

Abstract - This paper presents an automated hall ticket fraud detection system using image processing and Artificial Neural Network (ANN) classification. Examination malpractice, particularly impersonation and forged hall tickets, has become a critical issue in offline examination systems. The proposed system integrates preprocessing, segmentation, face detection, feature extraction, and ANN-based classification to identify fraudulent hall tickets. The system extracts textual and graphical features such as candidate name, seat number, and photograph from hall ticket images using Optical Character Recognition (OCR) and image processing techniques. Haar Cascade with AdaBoost is used for face detection, while shape and histogram features are extracted for classification. Document image analysis is a major research area in pattern recognition system for identification image objects within a document and their classification. Face recognition is most widely used and efficient system in biometric. Existing methods worked on these areas of document image analysis and face recognition separately. In this paper, an attempt is made to develop a novel system to authenticate a person to appear exam by comparing name, seat number, and photograph images on the hall ticket. An ANN classifier is used to detect fraud in the exam hall tickets. The extracted

features are fed into an ANN classifier to determine authenticity. Experimental results show that the proposed system achieves an accuracy of **94.12%**, demonstrating its effectiveness in detecting duplicate, altered, and fake hall tickets.

.Key Words: Hall Ticket Fraud Detection, ANN Classifier, Image Processing, OCR, Face Detection, AdaBoost, Feature Extraction

1.INTRODUCTION

Examinations are conducted in both online and offline modes, but offline examinations still rely heavily on manual invigilation, making them vulnerable to malpractice and impersonation. Fraudulent activities such as the use of fake or altered hall tickets create serious challenges in maintaining examination integrity. Therefore, an automated system is required to reduce human effort and improve the efficiency of candidate verification.

This paper proposes an automated hall ticket fraud detection system using image processing and Artificial Neural Network (ANN) classifier. The system detects

fraudulent hall tickets by analyzing both textual information such as candidate name and seat number, and graphical information such as candidate photographs. The proposed methodology segments the hall ticket image, extracts important features, and verifies candidate authenticity using ANN classification. Haar Cascade with AdaBoost algorithm is used for face detection and recognition.

Previous research has focused on examination malpractice detection, online authentication systems, credit card fraud detection, and face recognition techniques. Motivated by these studies, the proposed system aims to provide an efficient fraud detection mechanism for offline examination systems. Experimental results demonstrate that the system can effectively identify unauthorized candidates and improve examination security.

2. Body of Paper

2.1 Literature Survey

Existing examination fraud detection systems mainly focus on image and video analysis for detecting impersonation during examinations. Various authentication techniques such as unimodal and multimodal verification, behavior analysis, and visualization methods have been proposed to improve examination security. Previous studies also focused on online examination fraud detection, face recognition systems, and document verification techniques.

Researchers have applied machine learning and image processing techniques for fraud detection in areas such as online banking, credit card transactions, and biometric authentication. These studies indicate that face recognition and ANN-based classification methods can effectively identify unauthorized users and fraudulent activities.

2.2 Proposed Methodology

The proposed system is designed to detect fraud in hall tickets by verifying candidate information and photographs using image processing and ANN classification techniques. The system consists of the following phases:

1. Image Preprocessing
2. Segmentation
3. Face Detection
4. Feature Extraction

5. ANN Classification

The hall ticket image is first preprocessed to remove noise and improve image quality. Morphological operations and connected component labeling are used for segmentation of candidate name, seat number, and photograph regions.

Face detection is performed using the Haar Cascade with AdaBoost algorithm. The detected face image is cropped and compared with the stored database image for authentication.

2.3 Feature Extraction

Feature extraction is an important phase of the proposed system. Shape and histogram features are extracted from segmented hall ticket images to identify fraud. The extracted shape features include:

- Area
- Perimeter
- Form Factor
- Major Axis
- Minor Axis
- Compactness
- Density

Histogram-based statistical features such as mean, variance, skewness, kurtosis, entropy, and energy are also extracted for classification. These features are stored as feature vectors and provided as input to the ANN classifier.

2.4 ANN Classifier

Artificial Neural Network (ANN) is used for classification of hall ticket images into genuine or fraudulent categories. The extracted features are trained using ANN, and similarity matching is performed between trained and test hall ticket images. If the candidate name or seat number does not match the candidate photograph, the system identifies the hall ticket as fraudulent.

2.5 Implementation and Results

The proposed system is implemented using Python, OpenCV, OCR, and ANN techniques. The hall ticket images are scanned using a hall ticket scanner and processed for verification. The system successfully performs:

- Image Upload
- Segmentation Process
- Face Capture
- Database Comparison
- Fraud Detection

Experimental results demonstrate that the system effectively detects duplicate and fake hall tickets. Various screenshots such as image upload, segmentation process, image comparison, and final fraud detection outputs are obtained during implementation.

2.6 Discussion

The proposed hall ticket fraud detection system reduces manual effort and improves examination security by automating candidate verification. The integration of image processing, OCR, face detection, and ANN classification improves fraud detection accuracy and reliability. The system can be effectively used in offline examination environments to prevent impersonation and unauthorized access.

3.SYSTEM ARCHITEURE

3.1 Image Processing

Image processing is a technique used to convert an image into digital form and perform operations on it to improve image quality or extract useful information. It plays an important role in computer vision and machine learning applications.

In the proposed system, image processing is used to analyze hall ticket images for fraud detection. The process includes image acquisition, preprocessing, segmentation, and feature extraction. The hall ticket image is first scanned and converted into a digital image. Noise and distortions are removed using preprocessing techniques to improve image quality. The processed image is then analyzed to extract important information such as candidate name, seat number, and photograph.

The main steps involved in image processing are:

1. Image acquisition using scanner or digital image capture
2. Image preprocessing and enhancement
3. Feature extraction and analysis

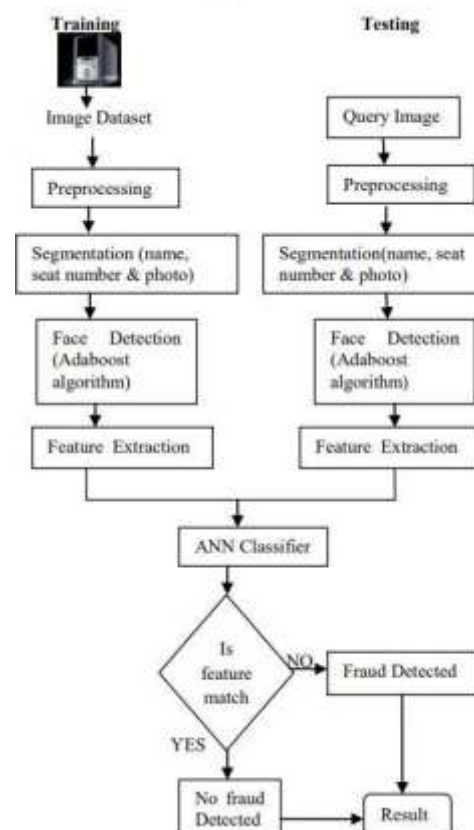
3.2 Data Flow Diagram (DFD)

The Data Flow Diagram represents the flow of data in the proposed hall ticket fraud detection system. The examination authorities scan the hall ticket using a hall ticket scanner. The scanned image is preprocessed and provided as input to the ANN classifier. The classifier verifies whether the hall ticket is genuine or fake. If fraud is detected, an alert notification is generated for the examination authorities.

3.2.1 Image Selection

Image selection is an important step in fraud detection because the accuracy of the ANN classifier depends on the quality of the input images. High-quality images of both genuine and fake hall tickets are collected under proper lighting conditions.

The dataset includes variations in fonts, image formats, and candidate photographs to improve classifier performance. Fake hall tickets are created by modifying genuine hall tickets, such as changing the photograph or candidate details. The selected images are then preprocessed before classification.



3.2.2 Examination Authorities

Examination authorities are responsible for conducting examinations and verifying hall tickets. In the proposed system, authorities scan the hall tickets and receive fraud alert notifications if a fake hall ticket is detected. Their role is important in maintaining examination security and preventing malpractice.

3.2.3 Hall Ticket Scanner

The hall ticket scanner is used to capture high-quality digital images of hall tickets. OCR technology is used to extract textual information from the scanned hall tickets. The scanned images are processed and analyzed by the ANN classifier to determine authenticity.

Using a hall ticket scanner reduces human error and improves the speed and accuracy of fraud detection.

4. IMPLEMENTATION

4.1 Modules Used

4.1.1 PIL Library

Python Imaging Library (PIL) is used for image processing operations such as image enhancement, resizing, and manipulation. It helps in preprocessing hall ticket images before analysis.

4.1.2 OS Library

The OS library provides functions to interact with the operating system and file management. It is used to access image files and manage directories during implementation.

4.1.3 OpenCV

OpenCV is an open-source computer vision and image processing library used for image analysis, segmentation, object detection, and face recognition. It plays a major role in hall ticket verification and fraud detection.

4.1.4 Tesseract-OCR

Tesseract OCR is used to extract textual information such as candidate name, seat number, and registration details from hall ticket images.

4.1.5 Python-Tesseract

Python-Tesseract is a Python wrapper for the Tesseract OCR engine. It helps in reading and recognizing text from scanned hall ticket images.

4.1.6 Pandas

Pandas is used for data processing and analysis. It helps in organizing extracted hall ticket data and comparing it with stored database records for verification.

4.2 Application of Image Processing

Image processing is used to analyze hall ticket images and detect fraudulent modifications. The proposed system applies image processing techniques for image matching, forgery detection, OCR processing, and face recognition.

The main applications include:

1. Image Matching:

Matching the hall ticket photograph with the candidate image captured during examination.

2. Forgery Detection:

Detecting tampering, edited photographs, or modified hall ticket details.

3. Barcode and QR Code Verification:

Verifying authenticity using encoded information on hall tickets.

4. Anomaly Detection:

Identifying suspicious changes in fonts, colors, or image structures.

4.3 Face Detection and Recognition

Face detection and recognition are important components of the proposed fraud detection system. Haar Cascade with AdaBoost algorithm is used to detect candidate faces from hall ticket images.

The extracted face image is compared with the authorized database image to verify candidate authenticity. This process helps in detecting impersonation and unauthorized candidates during examinations.

4.4 Performance Analysis

Parameter	Value
Accuracy	94.12%
Error Rate	Low
Processing Speed	Moderate
Efficiency	High

5.1 CONCLUSION

Hall tickets are commonly used in both online and offline examinations. The problem of fraud in hall ticket detection and recognition is of great interest in the document domain as it enables us to identify the ownership of the document. In the context of document image retrieval, hall tickets provide an important form of indexing that enables effective exploration of data. Given a large collection of hall tickets, detecting a fraud hall ticket is a highly effective way of retrieving documents. The main focus of this paper is to detect fraud in the exam hall tickets which consists of textual elements like name, register number, etc and graphical elements like a photo of the candidate. The system is aimed to detect unauthorized person appearing for examination i.e., by replacing the original candidate photo with an unauthorized person. The detection of fraud in hall tickets is a challenging task for the purpose of classifying the distinct image entities in an automated approach. The hall ticket images are used in the proposed system for off-line exams to provide security based on their entities. The hall ticket images are processed and segmented using morphological operation. Each segment is labeled using connected component labeling technique. The features such as area, form vector, roundness, compactness, density, etc are extracted. ANN classifier is used to detect the fraud in hall ticket images i.e., if candidate name, seat number is mismatched with candidate photo then the system displays person is unauthenticated. The system is developed for the offline examination system to detect

the fraudulent hall ticket. The behavior of the student is visualized by using different visualization techniques. Different data visualization techniques are discussed, for varying dimensional data. Scatter plot, survey plot, line graph and bar charts are used for visualizing two dimensional data. The same techniques are used in visualization of three dimensional data, by addition of the third dimension perpendicular to the remaining two dimensions. Icon based, hierarchical methods, geometrical methods and pixel oriented techniques are used for visualizing high dimensional data. By usage of these techniques, tracking of the student behavior is done and continues monitoring is provided thus implementing an enhanced security in online exam.

REFERENCES

- [1] "Anandavalli D1, Devi Nachiyar N2, Deepshika H3, Priyadharshini M4" Automated Fraud Detection Framework in Examination Halls, International Research Journal of Engineering and Technology (IRJET).
- [2] Sejal. S. Chhabile*1, Dr. Ashwini Kumar Varma*2 "AUTOMATED FRAUD DETECTION IN EXAMINATION FROM HALL TICKET" International Research Journal of Modernization in Engineering Technology and Science. Volume:03/Issue:03/March-2021.
- [3] Shridevi Soma, Vidyashree S.A , An Automated Fraud Detection of Hall Ticket in an Offline Examination System using ANN Classifier International Journal of Computer Applications (0975 – 8887) Volume 126 – No.8, September 2015.
- [4] Tejaswini.S.G. FRAUD DETECTION IN EXAMINATION USING LBP METHOD" International Journal of Latest Engineering and Management Research (IJLEMR) ISSN: 2455-4847.
- [5] Liang, X., Cai, X., Li, L., & Chen, Y. (2019). Facial feature extraction method based on shallow and deep fusion CNN. 2019 13th International Conference on Natural Computation, Fuzzy Systems and Knowledge Discovery (ICNC-FSKD). doi:10.1109/fskd.2019.8393320.
- [6] Suriya Prakash, J., Annamalai Vignesh, K., Ashok, C., & Adithyan, R. (2012). Multi-class Support Vector Machines classifier for machine vision application. 2021 International Conference on Machine Vision and Image Processing (MVIP). doi:10.1109/mvip.2012.6428794.

- [7] Tyas Purwa Hapsari, D., Gusti Berliana, C., Winda, P., & Arief Soeleman, M. (2020). Face Detection Using Haar Cascade in Difference Illumination. 2018 International Seminar on Application for Technology of Information and Communication. doi:10.1109/isemantic.2018.8549752.
- [8] Beveridge, J. Ross, et al. , Face Recognition Across Pose and Illumination ("Factors that influence algorithm performance in the face recognition grand challenge." Computer Vision and Image Understanding113.6 (2021): 750-762.).
- PRMIT&R//DCSE//2022-23 Page 43Hall Ticket Fraud Detection System using ANN Classifier
- [9] Smart card technology IJSER International Journal of Scientific & Engineering Research, Volume 7, Issue 3, March-2016 157 ISSN 2229-5518 IJSER © 2020.
- [10] Adams O. U. Onuka¹ , Esther O. Durowoju² "Stakeholder 'Role in Curbing Examination in Nigeria" International Journal of Economy, Management, and social sciences, Malpractice 2(6) June 2013 pp:342- 348.
- [11] Marcus de Melo Braga & Mario Antonio RibeiroDantas "Fraud Detection in Selection Exams Using Knowledge Engineering Tools". Universidade Federal de santacatarina(UFSC) Florianopolis, Brazil.
- [12] HarishBabu. Kalidasu, B.PrasannaKumar, Haripriya.P "A Fraud Detection based Online Test and Behavior Identification Implementing Visualization Technique", IJCSET, August 2012,vol 2,issue 8 pp:1338-1344,ISSN:2231-0711.
- [13] Sri Anusha.N¹, Sai Soujanya. T² Drs.Vasavi³ "Study on Techniques for Providing Enhanced Security During Online Exam" International Journal of Engineering Inventions, ISSN:2278-7461,vol 1,issue 1(Aug 2012) pp:32-3.
- [14] Stephan Kovach and Wilson Vicente Ruggiero "Online Banking Fraud Detection Based on Local and Global Behavior".ICDS 2011:The fifth International Conference On Society pp:166-171.
- [15] A. Brabazon, J. Cahill, P. Keenan, D. Walsh "Identifying Online Credit Card Fraud using Artificial Immune System". UCD Business school,UniversitycollegDublin, Dublin 4, Ireland.