Authentication Using Artificial Intelligence And Optical Character Recognition

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Abstract- *In this paper, optical character face recognition has been implemented using OCR algorithm and compared with stored database. The main idea of the project is to validate the faulty admit card submitted by trainees. We have developed an efficient prototype capable to rectify the errors made by the trainees in uploading the images. Using HAAR Cascade if we detect a face we classify it as the passport photo, else it is a signature. If we can't find a face we don't assume that the image is signature, we also verify if both the documents are of the passport photo. If both documents are in wrong place, we swap the documents and validate. If both documents are photo, we display a warning. We also check the orientation of the image and make appropriate changes. If warning is generated more than three times, the user is blocked for one day. This is a complete Optical Recognition System using artificial intelligence. In this project we have dealt with words and character detection.*

Keywords- OCR, Artificial Intelligence, Neural Network. Feature extraction,.

I. INTRODUCTION

Authentication using AI and optical character recognition (OCR) can be a reliable and secure method for verifying identity. The main idea of the project is to validate the faulty admit card submitted by trainees. We have developed an efficient prototype capable to rectify the errors made by the trainees in uploading the images. Using HAAR Cascade if we detect a face we classify it as the passport photo, else it is a signature. If we can't find a face we don't assume that the image is signature, we also verify if both the documents are of the passport photo. If both documents are in wrong place, we swap the documents and validate. If both documents are photo, we display a warning. We also check the orientation of the image and make appropriate changes. If warning is generated more than three times, the user is blocked for one day. This is a complete Optical Recognition System using artificial intelligence. In this project we have dealt with words and character detection. In this paper Authentication using OCR is a process that uses OCR technology and artificial intelligence algorithms to verify the authenticity of a document or ID card. This process involves extracting specific features and text from the document, comparing them to a known database, and determining if the document is authentic or not. The second section gives the literature review followed by the theory of the method. The fourth section gives simulation environment, experimental results, and performance metrics. The fifth section proceeds with the conclusion followed by the future enhancement. This is a complete Optical Recognition System using artificial intelligence. In this poject we have dealt with words and character detection. The OCR system that will train itself and help in extracting text from any image by using neural networks and back propagation techniques. Earlier we had to store data in a database while performing operations but with this we will be able to train our systems. We will have to store only a limited amount of data and the software will self train itself for future entries. Optical Character Recognition, as the name suggests deals with the conversion of pictures that may be handwritten, typed or printed text into machine encoded text electronically on a scanned document, an image of a document with subtitles. With the rise of digital transactions and the increasing need for secure and reliable authentication methods, AI and OCR-based solutions offer a convenient and efficient way to verify the identity of users. The technology can be used in a variety of applications, including online banking, e-commerce, access control, and more.OCR technology enables computers to read and understand text that is present in images or videos. When coupled with facial recognition technology, it can identify and verify individuals by analyzing their facial features and comparing them with the database of pre-registered faces.One of the key benefits of using AI and OCR for authentication is that it can provide a high level of accuracy and security. The technology can detect fake faces, such as masks or photographs, and can prevent identity theft and fraud. Additionally, it is a non-intrusive method of authentication that is easy to use and does not require physical contact. As the technology continues to advance, it is likely to become even more accurate and reliable, making it a popular choice for businesses and individuals alike. While there are some concerns regarding privacy and security, with proper implementation and safeguards in place, AI and OCR-based authentication can

provide a secure and convenient way to verify identities in a digital world.

II. RELATED WORK

Sang Sung Park,[1] Won Gyo Jung, Young Geun Shin, Dong-Sik Jang "Optical Character Recognition System Using BP Algorithm" IJCSNS International Journal of Computer Sci 118 ence and Network Security, VOL.8 No.12, December 2008. Recently, most government agencies and companies have kept proof data and documentations which are passed certain period of time and exchanged electronic forms by the regulation of an office management.

Marcelo Rovai, Mar 12, 2018[2],Real-Time Face Recognition: An End-To-End Project, On my tutorial exploring OpenCV, we learned AUTOMATIC VISION OBJECT TRACKING. Now we will use our PiCam to recognize faces in real-time This project was done with this fantastic "Open Source Computer Vision Library", the OpenCV. On this tutorial, we will be focusing on Raspberry Pi (so, Raspbian as OS) and Python, but I also tested the code on my Mac and it also works fine.

P. Viola and M. J. Jones, [3]"Robust real-time face detection," Int. J. Comput. Vision, vol.57, no. 2, pp. 137–154, May 2004. Using HAAR Cascade if we detect a face we classify it as the passport photo, else it is a signature. If we can't find a face we don't assume that the image is signature, we also verify if both the documents are of the passport photo. Using HAAR Cascade if we detect a face we classify it as the passport photo, else it is a signature.

Beymer, D. and Poggio, T.[4] (1995) Face Recognition From One Example View, A.I. Memo No. 1536, C.B.C.L. Paper No. 121. MIT Face recognition is the task of identifying an already detected object as a known or unknown face.Often the problem of face recognition is confused with the problem of face detectionFace Recognition on the other hand is to decide if the "face" is someone known, or unknown, using for this purpose a database of faces in order to validate this input face

Dr. Mukul Kumar Gupta Analysing [5] Face Recognition using OpenCV, Dehradun- 248007 May-2021, Face recognition is an easy task for humans. Experiments have shown, that even one month old babies are able to distinguish between known faces. So how hard could it be for a computer. Jagtap, A. M., Kangale, V., Unune, K., & Gosavi, P.[6] (2019, February). A Study of LBPH, Eigenface, Fisherface and Haar-like features for Face recognition using OpenCV. In 2019 International Conference on Intelligent Sustainable Systems (ICISS) (pp. 219-224). IEEE

Dong chen He and Li Wang 2010, [7]Texture unit, texture spectrum, annd texture analysis. IEEE Transactions, Identifying a person with an image has been popularised through the mass media. However, it is less robust to finger print or retina scanning. This report describes the face detection and recognition mini-project undertaken for the visual.

Face Detection in Real Time Based on HOG. N. J. Wang,S. C. Chang and P. J. Chou. Taipei, Taiwan: IEEE, DOI:10.1109/ISPACS.2012.6473506, 2012. [8] International Symposium on Intelligent Signal Processing and Communications Systems. pp. 333-337. ISBN: 978-1-4673-5081-5. Face recognition is the technique in which the identity of a human being can beidentified using ones individual face. Such kind of systems can be used in photos, videos, or in real time machines

M.Hunke and A. Waibel, [9]"Face Locating And Tracking for Human Computer Interaction",in Proc. Conf. Signals Systems and Computers, Nov 1994, vol2 pp 1277-1281. Face detection has been a fascinating problem for image processing researchers during the last decade because of many important applications such as video face recognition at airports and security check-points, digital image archiving, etc.

R. Chellappa, C. L. Wilson, and S. Sirohey, [10]"Human and machine recognition of faces: a survey," Proc. IEEE, vol. 83, no. 5, pp. 705-740, 1995. Face recognition has been one of the most interesting and important research fields in the past two decades. The reasons come from the need of automatic recognitions and surveillance systems, the interest in human visual system on face recognition, and the design of human-computer interface, etc.

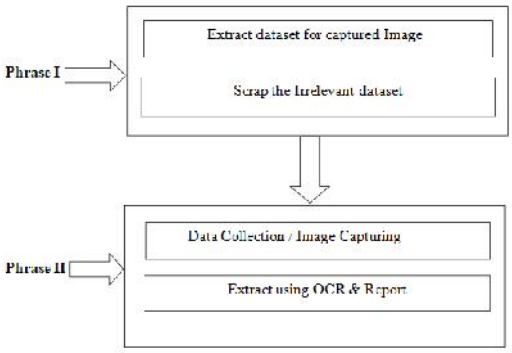
III. THEORY

Information given in the hall ticket is used as verification to check if student is exact person or not. Manual securities checks are performed with are not perfect and some time students can change image from hall ticket. Manual verification methods are used for checking personally for each student which is not possible to check each student personally. Chances of changing images from hall ticket are possible which doesn't have verification method. In proposed system initially images of each student are collected and each dataset consists of image of each student. These images are trained using k d tree algorithm using image processing technique and

model is saved in system this model can be used for automatic prediction of student in exam halls from live video or images. Student verification process is fast and accurate with least effort. Reduces impersonators issue with live verification. Time taken for prediction and processing is less and prediction done automatic trained model can be used to track live video and automates process of using trained model. Detecting students at exam center and display in video. In proposed system initially images of each student are collected and each dataset consists of image of each student. These images are trained using k d tree algorithm using image processing technique and model is saved in system this model can be used for automatic prediction of student in exam halls from live image.

A 1. Research Methodology

Face recognition is also one of the ways to identify any individual subject. Face recognition identifies any one by comparing the physical characteristics of the item. There are two face recognition modes, still images and live video. The first step in face recognition is face detection. Therefore, to perform facial recognition, the system must position the face earlier in the input image or video stream. The previous sections illustrate di erent techniques and methods of face detection and recognition. Each category of method performs well in certain criteria and also has draw backs as well. Systems with robustness and certain level of accuracy are still far away. Keeping in view case study the following architecture is proposed for the detection and recognition system. These face detection methods have come and are already used in many ways But what is my idea in this, how can we write an exam online, how can we use it, not register system how can we use it for facial recognition, I think. For online government exam we will do exam registration two to three months in advance. Sometimes the situation where we come and forget the password of the user name is a situation that may occur to us because the exam is delayed for a long time. n such times, when you first register your face, you put your face in it, the system of the exam will find out whether that face is yours, and we will identify you as such and take you to the exam. This is how I am going to d o my project.



Research Methodology

A 2. Algorithm Implementation

The authentication process using OCR and artificial intelligence involves the following steps:

Step 1: Image Pre-Processing, The input image is pre-processed to enhance the image quality and make it suitable for OCR recognition. Techniques such as noise removal, contrast enhancement, and skew correction are applied to the image.

Step 2: Text Extraction, OCR algorithms are used to extract the text from the image. This involves identifying individual characters and words and converting them into machine-readable text.

Step 3: Feature Extraction, Feature extraction methods are used to extract specific features from the text, such as the font type, font size, and spacing between characters and words.

Step 4: Classification, Machine learning algorithms are used to classify the extracted features and compare them to a known database of authentic documents. The algorithms use various techniques, such as decision trees, support vector machines, and neural networks to classify the document as authentic or not.

Step 5: Decision, Based on the results of the classification process, a decision is made regarding the authenticity of the document. If the document is found to be authentic, it is accepted, and if it is not authentic, it is rejected.

The formula for authentication using OCR and artificial intelligence involves the following steps:

Step 1: Image Pre-Processing, Various image processing techniques are used to enhance the quality of the input image. The image is demonized, enhanced, and transformed into a format that is suitable for OCR recognition.

Step 2: Text Extraction, OCR algorithms are used to extract the text from the image. This involves identifying individual characters and words and converting them into machine-readable text.

Step 3: Feature Extraction, Feature extraction methods are used to extract specific features from the text, such as the font type, font size, and spacing between characters and words.

IV. EXPERIMENTS AND RESULTS

A 1. Simulation Environment

A reliable and high-quality camera that can capture clear images and videos of the user's face is essential for face recognition. Additionally, a computer with a powerful graphics processing unit (GPU) is recommended to train and run the AI models efficiently setting up a working environment for authentication using AI and OCR for face recognition requires hardware and software components, data collection, model training, and testing, and deployment of the models to the authentication system. A programming language such as Python can be used to develop the AI models for face recognition using AI frameworks. For OCR, libraries like Tesseract can be used to extract text from images. An integrated development environment (IDE) such as visualstudio can also be used to write and run the code.

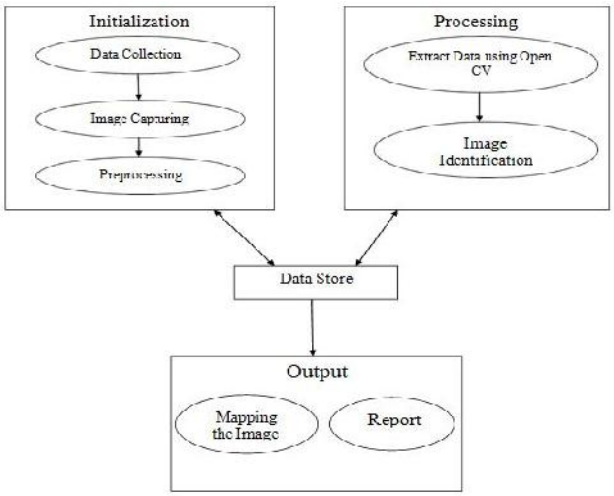
A 2. Architecture diagram

- Initialization: (Data Collection)
- Processing: (Extract Data)
- Data store:

Initialization: Object identification and face detection are probably the most popular applications of computer vision. This technology finds applications in various industries, such as security and social media. So we're building a face detection project through Python. Note that you should be familiar with programming in Python, Open CV, and Num Py. It will ensure that you don't get confused while working on this project. Let's get started. We've shared two methods to perform face recognition. The first uses Python's face recognition library, while the other one uses Open CV and Num Py. Check out our data science programs to learn more. Using it is quite simple and doesn't require much effort. Moreover, the library has a dedicated 'face recognition' command for identifying faces in images.

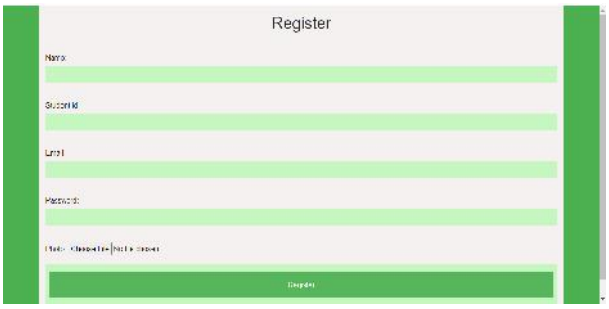
Processing: A user navigates to an application and is presented with a login page as a way to gain access to the application. There are two possible results: o Authentication is successful and the user is directed to the application landing page. o Authentication fails and the user remains on the login page. If authentication fails, the screen should show an informational or error message about the failure. There is another way, what is it if you forgot your username and password, it will open by analyzing your face. If you are already registered for the exam, then you have to provide your photo and that photo will verify you in the exam and that will take you to the exam.

Connect the Data: Online Examination System is a technology-driven way to simplify examination activities like defining exam patterns with question banks, defining exam timer, objective/ subjective question sections, conducting exams using the computer or mobile devices in a paperless manner. Online Examination System is a cost-effective, scalable way to convert traditional pen and paper-based exams to online and paperless mode. Candidates can appear for the exam using any desktop, laptop, or mobile device with a browser. Exam results can be generated instantly for the objective type of questions. It can simplify overall examination management and result in generation activity.

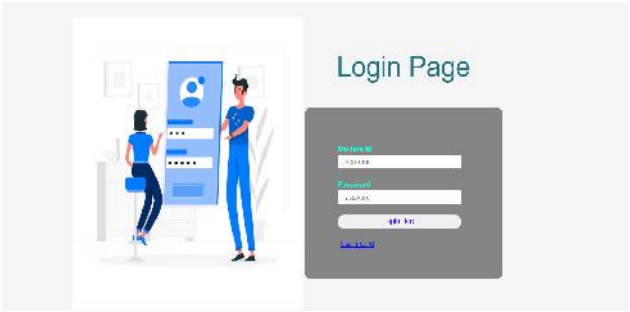


Architecture Diagram

Home Page



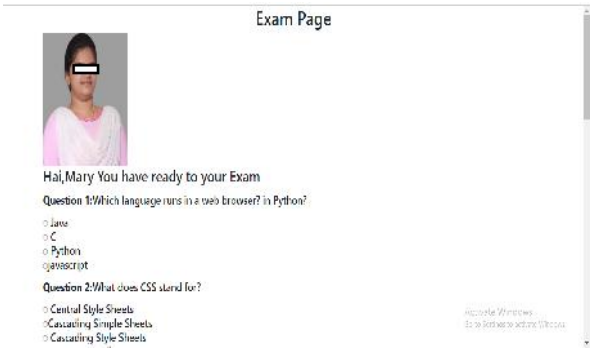
Registeration page



Login Page

Camera page

Capture the image



Exam page

A 3. Performance Metrics

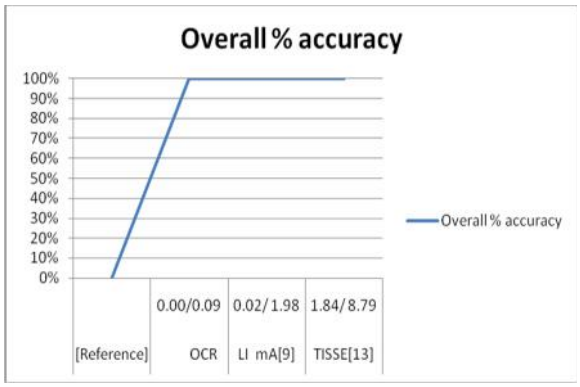
Performance evaluation for authentication using artificial intelligence (AI) and optical character recognition (OCR) for face recognition is crucial to ensure that the system is accurate and reliable. Several metrics can be used to evaluate the performance of such a system, including accuracy, precision, recall, and F1-score. Accuracy is the most commonly used metric and measures the proportion of correctly identified users out of all the users tested. Precision measures the proportion of true positives (i.e., correctly identified users) out of all the identified users, while recall measures the proportion of true positives out of all the actual users. The F1-score is a combination of precision and recall and provides a balanced evaluation of the system's performance. In addition to these metrics, receiver operating characteristic (ROC) curves and confusion matrices can be used to evaluate the performance of the system. ROC curves plot the true positive rate against the false positive rate at different threshold values, while confusion matrices provide a tabular summary of the model's performance at different levels of precision and recall. It is important to note that the performance of the system can be affected by several factors, including lighting conditions, facial expressions, occlusions, and variations in facial features. To improve the performance of the system, data augmentation techniques, such as rotation, translation, and scaling, can be used to increase the diversity of the dataset and enhance the model's robustness. Overall, performance evaluation is critical for authentication using AI and OCR for face recognition. It helps to identify weaknesses in the system and provides insights on how to improve its accuracy and reliability.

Packet Delivery Ratio graph

The packet delivery ratio is comparatively good for MPAODV and OLSR and the results are shown in Table VIII. The comparative study is given in Figure 4

algorithms prediction result

Algorithm [Reference]	FAR/FRR	Overall % accuracy
OCR	0.00/0.09	99.90
LI mA[9]	0.02/ 1.98	98.00
TISSE[13]	1.84/ 8.79	89.37
DAUGMAN	0.01/0.09	99.00



Packet Delivery Ratio graph

V. DISCUSSION AND CONCLUSION

In conclusion, authentication using artificial intelligence (AI) and optical character recognition (OCR) for face recognition has become an increasingly popular approach for verifying the identity of users in various applications, such as financial transactions and access control systems. The accuracy and reliability of such systems depend on several factors, including the quality of the training data, the selection of appropriate AI algorithms, and the evaluation of the system's performance. Performance evaluation of the system is critical to ensuring that the system is accurate and reliable, and several metrics can be used to evaluate the system's performance, such as accuracy, precision, recall, and F1-score. Moreover, the incorporation of future enhancements such as multi-modal biometric authentication, continuous authentication, and federated learning can improve the accuracy, security, and privacy of the system. Overall, authentication using AI and OCR for face recognition holds immense potential for revolutionizing the way we authenticate and verify users, and with the advancements in technology, it is expected to become more accurate, secure, and reliable in the future.

VI. FUTURE SCOPE

One potential future enhancement for authentication using artificial intelligence (AI) and optical character recognition (OCR) for face recognition is to incorporate multi-modal biometric authentication. Multi-modal biometric authentication involves combining multiple biometric modalities, such as face recognition, voice recognition, and fingerprint recognition, to increase the system's accuracy and security. By integrating multiple biometric modalities, the system can provide more robust authentication, even in scenarios where one modality may not work effectively, such as low light conditions that may affect face recognition. The system can also be designed to require multiple modes of authentication to grant access, which increases the security level of the system. Another future enhancement is to incorporate continuous authentication, which involves continuously monitoring the user's biometric data, such as face and voice, during the authentication process. This approach can help to detect and prevent impersonation attacks, where an unauthorized user attempts to access the system by imitating the authorized user's biometric features. Finally, the use of federated learning techniques can also be a future enhancement for authentication using AI and OCR for face recognition. Federated learning involves training the AI models using decentralized data sources, such as user's devices, rather than a central server. This approach helps to protect user privacy and improves the accuracy of the models by using a more diverse set of data sources. Overall, the future enhancements for authentication using AI and OCR for face recognition involve incorporating multi-modal biometric authentication, continuous authentication, and federated learning techniques to increase the system's accuracy, security, and privacy.

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