Candidate Authentication using OCR Techniques

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Abstract

This paper explores the application of Optical Character Recognition (OCR) techniques for authenticating candidates based on identity documents. As advancements in technology continue to redefine various industries, the integration of OCR into candidate authentication processes offers a streamlined and efficient solution. The aim is to design a system which gets the image of the identity proof and the details are being retrieved using the character segmentation which is done by a feature extraction optical character recognition algorithm (OCR).

The authentication process encompasses document validation and implementation of security measures to safeguard against fraud.By combining YOLO object detection, Optical Character Recognition (OCR) and fuzzy matching technique ,this approach aims to enhance the accuracy and reliability of candidate authentication. This underscores the importance of a comprehensive authentication framework, incorporating both technological and procedural elements, to establish a robust and secure candidate authentication process in diverse contexts.

Keywords: ID Verification,Optical Character Recognition (OCR), Text Extraction, YOLO,Object Detection,Image Segmentation, EasyOCR , Fuzzy Matching.

Introduction

The development of Information Technology has been increasingly changing the means of information exchange leading to the need of digitizing print documents. In the present era, there is a lot of fraud that often occurs, there are so many types of frauds in this era, for example account fraud. The ID card in India is Aadhar Card. The Aadhar Card is an Indian compulsory identity card. To avoid account fraud there was verification using an ID card(Aadhar Card), then the service operator extracts the data from the ID card.

Image Processing technique can be used as an alternative solution to the manually input process. This process will start by extracting information in the ID Card image. Then, it will be pre-processed to obtain the necessary part of the image using YOLO object detection.

Optical Character Recognition (OCR) technique will be performed in order to recognize text in images. OCR can recognize text characters automatically through an optical mechanism.

Furthermore,fuzzy matching will be used to validate extracted text with existing data.And the similarity score given by it,will declare whether the id card data is in the existing dataset or not.Finally, the result will be "Authenticated Successfully" or "Unauthorized".

Literature Review

An OCR system for Business Card was introduced by (Hisashi Saiga et al., 2003) Yasuhisa Nakamura et al.,[1] where the arrangement of the bounding rectangles is twice arranged into subsets in various ways in view of the separation between them: once to choose the course of lines in the image and once to extract the lines. After that, they are incorporated into character fragments. One direction is selected which each character on the card is expected to look by matching some character fragments with the standard patterns. The system works on a "line by line" basis through the remaining acknowledgment stage. Character fragments in a particular line and consolidation made by incorporating neighbouring ones are coordinated against the standard patterns. Their coordinated scores are distinguished in order to choose which fragments consist of which character. The matching scores and hopeful classifications compared to these combinations are stored in a 2-dimensional array. For that associated part , the extraction strategy was utilized by putting away the directions of the two closures of a corner to corner of the rectangle shape encompassing it. The framework disregards little rectangles, seeing them as a noise. The rectangles are the premise of character extraction in that all characters are created in later stages by incorporating them. After that instead of applying character fragmentation a better result was obtained using ROI (Tong li et al., 2017) followed by character recognition which was developed by Tao et al. utilizing the probability function and transforming the identification into a grouping issue based on corner detection. But, the corner detector fundamentally centers around the zone with rich texture data, and hence dismisses the global portrayal of the whole image.

To overcome the disadvantage that the salient points are not constantly accumulated in textured regions. The wavelet transform based method is suggested with respect to the ROI lies in the region changing essentially after change. A Segmentation based algorithm was presented to address this problem. Then ,for linguistic processing it was presented by Hisashi Saiga et al.

Proposed Methodology

The proposed method for our CANDIDATE AUTHENTICATION USING OCR TECHNIQUE consists of several key components:

1.YOLO(Object Detection and Image Segmentation Model):
YOLO (You Only Look Once) is a state-of-the-art object detection algorithm that revolutionized the field of computer vision.
Role Of YOLO :

1.   Single Shot Detection: YOLO is a single-shot detection algorithm, meaning it only requires a single forward pass through a neural network to make predictions. This makes it very fast compared to traditional two-stage detectors like R-CNN, which require multiple passes.
2.   Bounding Box Prediction: YOLO divides the input image into a grid and predicts bounding boxes and class probabilities for each grid cell. Each bounding box consists of 5 attributes: (x, y) coordinates of the bounding box's center, width, height, and confidence score. Additionally, class probabilities are predicted for each bounding box.
3.   Class Labelling: YOLO can be trained on datasets with class labels. During training, YOLO learns to associate each object in the image with its corresponding class label. This allows it to not only detect objects but also classify them into predefined classes.
4.   Real-time Processing: YOLO is optimized for real-time processing, making it suitable for applications where speed is crucial, such as autonomous driving, surveillance, and robotics.
5.   Image Segmentation: While YOLO is primarily an object detection algorithm, it can also be adapted for

image segmentation tasks. Image segmentation involves partitioning an image into multiple segments or regions based on certain attributes. Although YOLO wasn't originally designed for segmentation, researchers have explored techniques to adapt it for this purpose by modifying its architecture or combining it with other segmentation algorithms

Fig.1:Trained Custom Dataset

Used 100 epochs to train a model with a dataset which is a decision based on experimentation and evaluation of the model's performance.

The primary use of a trained dataset is for making predictions or inferences on new, unseen data. Once a model has been trained on a dataset, it can be deployed to analyze new images or videos and detect objects within them.

Trained model will be loaded which has learned patterns and features from the training data that enable it to make predictions on similar unseen data.

2.Loading Input Image using OpenCV:

When OpenCV reads an image, it loads the image into memory and represents it as a NumPy array. This NumPy array contains the pixel values of the image, which can be manipulated and processed using various image processing techniques provided by OpenCV.

Fig.2:Giving a test image as input

The trained model will be applied on the image.Then this model will predict the patterns and features of this input image.Predicted patterns will be cropped with respective boundaries.

Fig.3.Cropped images

3.Text Extraction using OCR

EasyOCR is a Python library that provides an easy-to-use interface for performing Optical Character Recognition (OCR) on images and extracting text from them.

EasyOCR will be performed on predicted cropped images and the text will be extracted from those images.

template: S/O Satyanarayan Sharma 2X4 mahaveer nagar tritiy Vigyan nagar Kota Kota Rajasthan-324005

316905945292

4.Fuzzy Matching

Fuzzy matching is a technique used to identify similar elements in a data set. The algorithm compares two strings and assigns a score to each string based on how similar they are. The closer the two scores are, the more similar the two strings are. Fuzzy matching can be used to match items in a data set based on their similarities.This will be used to compare extracted text with the data in the existing dataset and this helps in validating the authenticity.

Results

The results of the project will be as follows:

Fig.4. Sign Up Page

Fig.5.Login Page

Fig.6. ID card Image Uploading Page
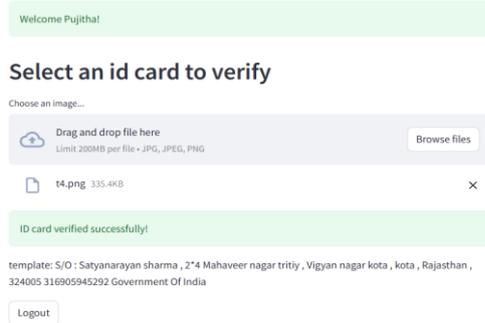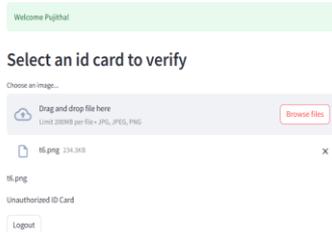
Fig.7. Authorized ID Card

Fig.8:Unauthorized ID Card

Conclusion

Candidate Authentication using OCR can be detected by using proposed image processing techniques and collaborating with OCR. Image processing techniques consist of preprocessing and text extraction.It involves verifying the identity of a person by analyzing their identification documents, such as ID cards or passports. The conclusion of this project typically includes confirming whether the candidate's identity matches the information extracted from the document. It assesses the accuracy and reliability of the authentication process, ensuring that it meets the required security standards and regulatory compilance.

References

[1]   Hisashi Saiga, Yasuhisa Nakamura, Yoshihiro Kitamura, Toshiaki Morita(1993). An OCR System for Business Cards. Information Technology Research Laboratories Corporate Research and Development Group Sharp Corporation. 0-81864960-7193 $3.00 0 1993 IEEE.

[2]   G. P. Moshi, L. S. P. Busagala, W.   Ohyama, T. Wak abayashi, and F. Kimura, "An impact of linguistic features on automated classification of OCR texts," in Proceedings of the 9th IAPR International Workshop on Document Analysis Systems, ser. DAS '10, New York, NY, USA: Association for Computing Machinery, Jun. 9, 2010, pp. 287–292, ISBN: 978-1-60558-773-8. DOI: 10.1145/1815330.1815367 [Online]. Available: https://doi.org/10.1145/1815330.1815367 (visited on 11/28/2020).

[3]   M. Andriansyah, M. Subali, I. Purwanto, S. A. Irianto, and R. A. Pramono, "E-KTP as the basis of home security system using arduino UNO," in 2017 4th International Conference on Computer Applications and Information Processing Technology (CAIPT), Aug. 2017, pp. 1–5. DOI: 10.1109/CAIPT.2017.8320693.

[4]   Z. L. Chen, B. J. Zou, J. F. Li, H. L. Shen, and Y. Mao. (2013). Hybrid ROI extraction with bottom-up and top-down visual attention. J. Inf. Comput. Sci., Vol. 8, No. 15, pp. 3481–3488.

[5]   M. O. Pratama, W. Satyawan, B. Fajar, R. Fikri, and H. Hamzah, "Indonesian ID card recognition using convolutional neural networks," in 2018 5th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI), Oct. 2018, pp. 178–181. DOI: 10.1109/EECSI.2018.8752769.

[6]   M. A. Alghamdi, I. S. Alkhazi, and W. J. Teahan, "Arabic OCR evaluation tool," in 2016 7th International Conference on Computer Science and Information Technology (CSIT), Jul. 2016, pp. 1–6. DOI: 10.1109/CSIT. 2016.7549460.

[7]   Li, P. Dong, B. Xiao, and L. Zhou. (2016). Object recognition based on the Region of Interest and optimal Bag of Words model. Neurocomputing, Vol. 172, pp. 271–280.

[8]   M. R. M. Ribeiro, D. Julio, V. Abelha, A. Abelha, and J. Machado, "A comparative study of optical character recognition in health information systems," in 2019 International Conference in Engineering Applications (ICEA), Jul. 2019, pp. 1–5. DOI: 10.1109/CEAP.2019. 8883448.

[9]   J. Li, D. He, F. Liu, and H. Wang, "The application of regex in advertisements filtration and performance analysis," in 2016 8th International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC), vol. 01, Aug. 2016, pp. 28–32. DOI: 10.1109/ IHMSC.2016.36.

[10]   Shan Du, Member, Mahmoud Ibrahim, Mohamed Shehata. (2013). Automatic License Plate Recognition (ALPR): A State-of-the-Art Review, IEEE Transactions on Circuits and System for Video Technology, Vol. 23, No. 2, pp. 311-324.

[11]   Yamaguchi, T., Nakano, Y., Maruyama, M., Miyao, H., and Hananoi, T. (2015). Digit Classification on Signboards for Telephone Number Recognition. Proceedings of the International Conference on Document Analysis and Recognition. UK, pp. 359-363.

[12]   Ryan M and Hanafiah N 2015 An Examination of Character Recognition on ID card using Template Matching Approach Procedia Computer Science vol 59 pp 520–9

[13]   Valiente R, Sadaike M T, Gutiérrez J C, Soriano D F and Bressan G 2016 A process for text recognition of generic identification documents over cloud computing IPCV'1 International Conf. Image Process. Comput. Vision, Pattern Recognit. 4

[14]   Sitthi A, Nagai M, Dailey M and Ninsawat S 2016 Exploring Land Use and Land Cover of Geotagged Social-Sensing Images Using Naive Bayes Classifier Sustainability 8 921

[15]   T. Nguyen, A. Jatowt, M. Coustaty, N. Nguyen, and A. Doucet, "Deep statistical analysis of OCR errors for effective post-OCR processing," in 2019 ACM/IEEE Joint Conference on Digital Libraries (JCDL), Jun. 2019, pp. 29–38. DOI: 10.1109/JCDL.2019.00015.