Verifying and Validating College ID cards

An efficient real time Deep Learning based system to verify and validate college ID cards.

Dr. Kavi Arya, Omkar Manjrekar, Andrea F, Akansh Maurya, Amith P, Sudhanshu Dubey

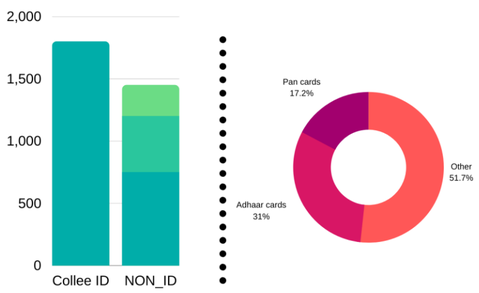
Introduction

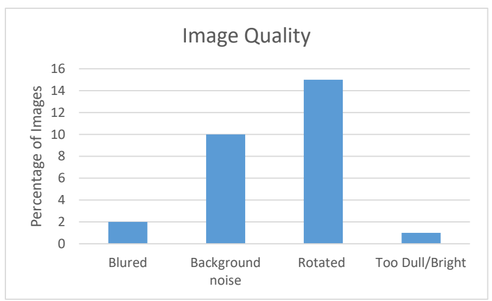
E-yantra organizes various competition and MOOCs for the student across India. The **staff spends** a **significant** amount of **time validating ID cards** uploaded by eYRC, eYIC and MOOCs participants. This project **is an endeavor to reduce that effort.** Project can be broken down into 4 main tasks

- Identify the college IDs from a pool of images.
- Extract the textual data from Image.
- Validate extracted data against the data provided by the student.
- Web service to consume these models.

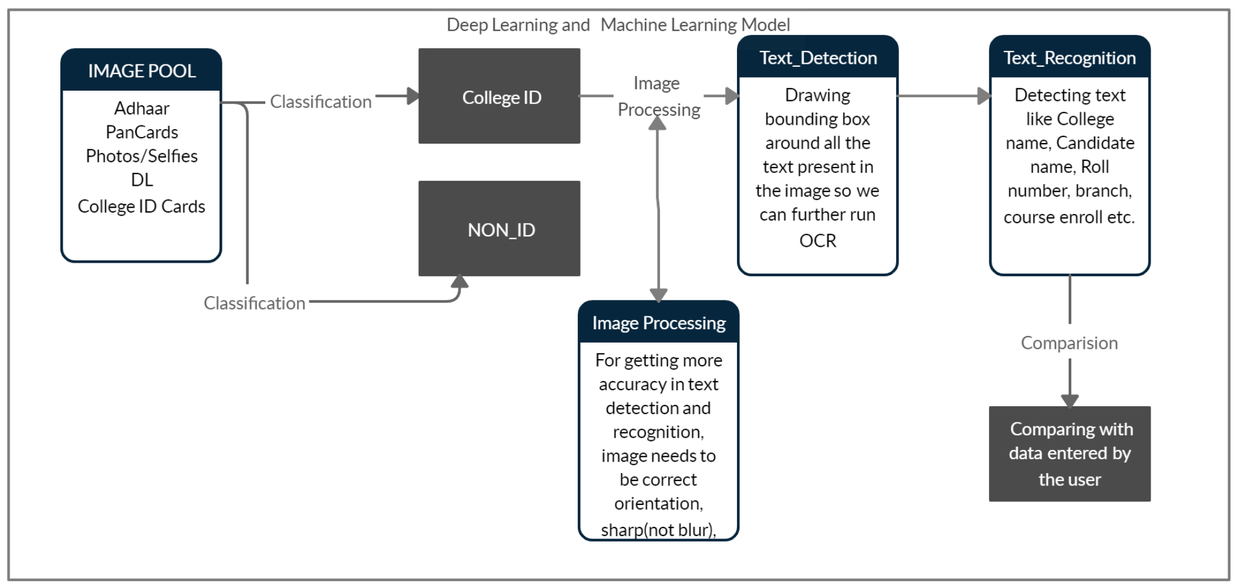
Data Analysis

Introspection of image data to measure the variation and build the pipeline. The **below results are 3500 images.**





Method



Classification Model

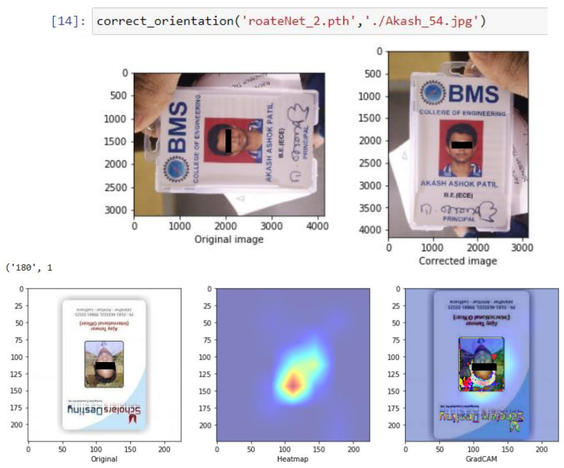
- A Deep Learning model to verify Image as College ID card.
- A **Resnet-50 Architecture**.
- Pre-trained weights of ImageNet Dataset as initialization to boost training speed.

Results (predicted classes just below the image):

Rotate-Net

- A Deep Learning based model to **automatically correct** the Image for OCR.
- Trained on **ID cards and Faces dataset**, so that it can extract **features of face** and **text** to **infer the orientation**

The Results are as follows:



Text detection and Recognition

- For text detection we used **DBnet,** performs better both in terms of accuracy and speed.
- For text recognition we used Convolutional recurrent neural Network also known as **CRNN.**

{ 'BMS': 0.9932370185852051,"COLLEGEOFENGINEERING": 0.9946616888046265,
"uaaauN": 0.8223435878753662,"AKASHASHOKPATIL": 0.988580584526062,
"B.E.(ECE)": 0.920192301273346,"PRINCIPAL": 0.9925515651702881}

String Matching

For comparing the OCR output to Ground truth we used Fuzzy-set with some Custom tweaks.

Web app Interference

ID Upload Web App

Name:

Email:

College Name:

Department:

Year:

Image File

Choose file No file chosen

Image from URL

Submit

Batch Upload Web App

Download the template csv file by clicking this button:

Download CSV

Instructions

1. Fill the temlpate csv with data.
2. In the "Images" column, put name of the image that corresponds to the student.
3. Compress all the images into a single zip file
4. Upload the csv and images here

CSV File

Choose file No file chosen

Compressed Images File

Choose file No file chosen

Submit

PyTorch PaddlePaddle OpenCV

Our approach is to identify valid college ID card from a pool of images which may contain other photos too. This is done by deep image classification model. To extract the textual information from the image we performed text detection and text recognition. Validation of ID card, matching of results of OCR to the ground truth, is done by custom algorithm which uses partial sting matching and fuzzy-set. To improve accuracy we correct the orientation of Image again by using deep learning model.

- Text detection model is used to localize the text present in the image.
- Differentiable Binarization (DBnet), performs better both in terms of accuracy and speed.

Rotate-Net

- A Deep Learning based model to automatically correct the orientation of Image for OCR.
- It is also based on Resnet-50 Architecture.
- Trained on ID cards and Faces dataset, so that it can extract features of face and text to infer the orientation

The Results are as follows:

```
[14]: correct_orientation('rotateNet_2.pth','./Akash_54.jpg')
```