Approach:

* Dataset observations : The given dataset contains cropped images of license plate . It has equal number of hd and normal images.The images are rotated in some samples and are of low resolution in few .
* Tesseract :
  + Tesserasct is a popular ocr engine and hence decided to evaluate it .
  + Applied rescaling , conversion to gray scale , noise removal and binary thresholding on the images.
  + After inspecting the processed images , realized that few of the words were missed out after preprocessing
  + Tesseract is also not rotation invariant and deskewing the image didn’t work as intented .
  + Hence , switched to a deep learning based model instead of training tesseract as tesseract needs to be trained from scratch.
* Deep learning model :
  + Given the dataset size and limited necessity for language model , went with CRNN based approach – CNNS followed by LSTM layers with CTC loss.
  + Data preprocessing : Padded the label sequences as not alllabels were of equal length.Images were resized to 200,50 and converted to greyscale.Split the data randomly into 80/20 .
  + Model details : The model is built on Collab using keras as I was having installation issues in my local system . The model contains 7 CNN layers and 2 LSTM layers with maxpool and batch normalisation layers in between . Started with 3 CNN layers and kept increasing till 8 adding batch norm in between to increase the training speed . I observed a dip in validation accuracy after I increased from 7 to 8 and hence went with 7 CNN as the final model . CTC loss was used here because we don’t have character level annotation for the data .
* Accuracy :
  + Sequence error rate and character error rate are the popular metrics used for OCR .
  + For the given application sequence error rate is more applicable and used it for measuring the accuracy .
  + Achieved an accuracy of around 83% (109/131)