August 15, 2021

0.1 Project Description

- The project is built in two segments:
  - Image Segmentation
  - Model Building

0.1.1 Image Segmentaion

- The data collected is first applied with the different basic filtering approaches based on their properties.
- With the help of openCV framework the contours were drawn on the filtered data.
- The required contours(Number plate characters) were then extracted individualy in the sequential form to preserve the hierarchy and stored as good data.
- If we fail to extract the data or get the required contours at initial step, the data is labeled as bad data and further extensive filtering was applied over them, useful information was then collected and sent back as good data for training the model.
- If we further fail to classify even after extensive filtering they were labeled bad data.

0.1.2 Model Building

- The alphabets in the number plate were encoded with digits from 10 to 36 for training purpose.
- The filtered good data was then used to train the simple 4 layered CNN model to classify individual digits.
- Test and validation accuracy of 0.99 and 0.97 was obtained with just 20 epochs of training. The 'Sparse Categorical Cross Entropy' is used as loss function. 'Adam' optimiser is used for optimisation purpose.
- During the prediction the png images were first filtered and segmented with the help of segmentation block and later fed to CNN model for prediction.

0.1.3 File System Description:

- **Image_Segmentation** file has Segmentation class which has all the filtering methods in it.
- **CNN_Model** file has Model class with training and prediction methods.
- **Testing_built_model** file has code for testing and predicting the model.

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