

Title: ALPR: ResNet50 powered Bangla License Plate Detection and OCR by Root Mean Square Propagation Optimizer and Linear SVM Classifier

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Abstract: This paper implements the MATLAB Image Processing Toolbox in detecting the license plate region using several user-defined functions in order to pre-process and process the image up until the point of extraction of characters. The extracted characters were then classified by utilizing ResNet50 from the Deep Learning Toolbox of MATLAB, custom training it on above a thousand images of Bangla and English characters and numbers alongside possible categories of noise extracted from the ROI after processing the image which resulted in a datastore of 103 total categories. The output is converted to a string and saved in an excel sheet to be accessed later on. In this ALPR model, the model will scan through the images of vehicles from a folder in a destination specified by the code to identify the license plates and characters and perform necessary actions on them. The aim of this paper is to properly implement the Image Processing Toolbox by MATLAB in order to identify the Region of Interest and study the performance of the Linear SVM (Support Vector Machine) classifier with ResNet50 when it comes to Bangla OCR. The training and validation accuracy achieved by using the Root Mean Square Optimizer was 97.57%. The final accuracies and precision achieved while testing the model on 50% of the image dataset was 99.2%. Moreover, the ER (Error Rate) and FPR (False Positive Rate) were limited within 0.02%. The model scored 100% on F1 scores and Matthews Correlation Coefficient for every category of image classified.

Keywords: Training , Support vector machines , Correlation coefficient , Image processing , Mathematical models , Vectors , Root mean square

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