Algorithms in multimedia and machine learning in the Python environment

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License plate recognition
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Summary

Image processing technology is used in Automatic Number Plate Recognition. Automatic Number Plate Recognition is useful for identifying stolen vehicles, smart parking systems, and the use of automobiles in unlawful operations. Character recognition is the first step of ANPR, followed by character segmentation and localization. The technique uses contours and morphological processes to locate the number plate initially. We execute character segmentation after localization. Convolution neural networks (CNN) are used by a segmented character to recognize things because they are known to be good at it. The trained CNN model has an 85.31% accuracy rate.

License plate Detection

RESIZING THE IMAGE

GRAYSCALE CONVERSION

BINARIZATION

NOISE REMOVAL

ALL CONTOURS ARE FOUND

ROTATE IMAGE

Character Segmentation

CONTOUR

PREDICT SEGMENTS

SEPARATE LETTERS

Character Recognition

MODEL.FIT()

Our Challenge:
Character Segmentation algorithm

- We create a sequential object.
- We use 4 convolutional layers with 'Relu' as the activation function.
- we add a max-pooling layer with a window size of (4,4).
- we add a dropout rate of 0.4 meaning 60% of the node will be retained.
- we add a flatten layer that takes data from the previous layer and represents it in a single dimension. The last Dense layer has 36 outputs (26 alphabets(A-Z) and 10 digits(0-9)).
- we add 2 dense layers, one with the dimensionality of the output space as 128, activation function='ReLU' and other, our final layer with 36 outputs.

Conclusions

Automatic number plate recognition is a broad field that can be implemented in a variety of ways. The Automatic NumberPlate employed using Contours and convolution neural network (CNN) is our proposed technique. Python was used to complete this implementation, which includes procedures such as localization, segmentation, and recognition. The data set we used contains more than 150 images randomly selected. Finally, the accuracy is calculated for all the car images in the data set and the accuracy that our model obtained was 85.31%.

Further Development

- Create a hybrid model with contour and YOLOv3 for the license detection methods.
- Identify vehicle numbers while in motion when the image is more blurred