License Plate detection Using Deep Neural Network

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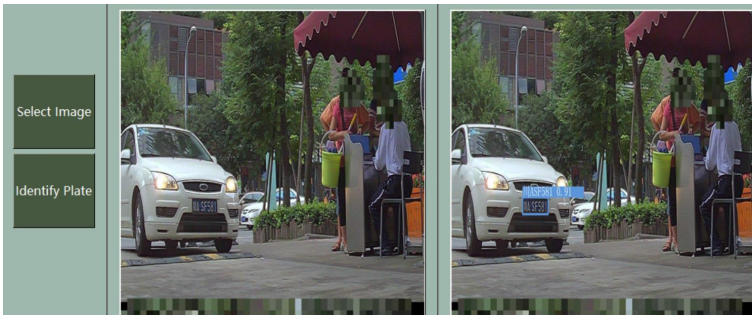
ABSTRACT

Deep learning is a technology that has valuable applications in areas such as image recognition and autonomous driving. The purpose of this study is to build a Yolov5 model and enable the model to recognize vehicle license plates on the road. In this process, the convolutional layer is used to retrieve the features of the input image. Then, use activation functions such as ReLU to refine the data. Finally, a fully connected layer is introduced to capture all the features and combine them to get the predicted results. Government agencies and traffic law enforcement officers can use the technology to monitor and identify vehicles on the road and improve their work efficiency.

METHODOLOGY

The input end of the YOLOv5 model adopts the same data enhancement method as that of the YOLOv4 model, namely Mosaic data enhancement, which uses random scaling, random clipping and random arrangement for stitching, significantly improving the detection effect of small targets. The YOLOv5 algorithm has an initial length and width anchor frame for different data sets. In network training, the network outputs the prediction box on the basis of the initial anchor box, and then compares it with the Ground Truth of the real box, calculates the gap between them, and then reversely updates and iterates the network parameters

GUI



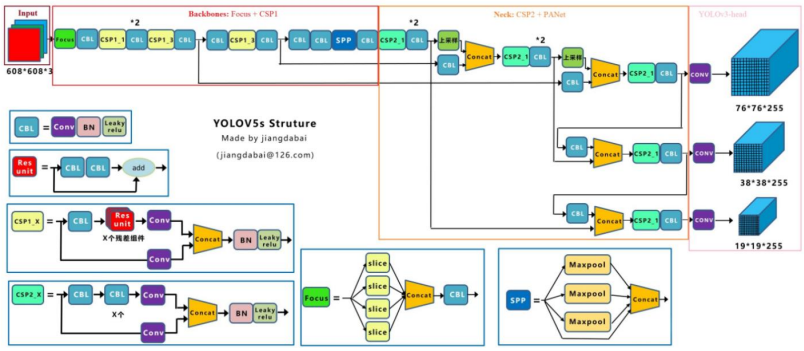
Results

The experimental results show that the higher the correlation between test sample scenes and visual tasks, the better the effect of target detection model and license plate recognition model, which can provide reliable and efficient vehicle information for traffic vehicle recognition and management.

INTRODUCTION

The YOLOv5 target detection algorithm combines target location and classification, and returns the position and category of the enclosing box in the output layer. In the bounding box of complex scenes, error detection is relatively abundant, but LPRNet adopts end-to-end training method and consists of lightweight convolutional neural network. And create embedded deployment solutions to improve the accuracy and computational efficiency of license plate recognition. In the process of vehicle object detection and license plate recognition, LPRNet Backbone is used to extract features of vehicle image information. These characteristics were then used to train the neck and head parts of LPRNET and YOLOv5. Finally, the trained model is used for target detection of vehicles and license plates

ARCHITECTURE



References

[1] T. Naito, T. Tsukada, K. Yamada, K. Kozuka, and S. Yamamoto, “Robust license-plate recognition method for passing vehicles under outside environment,” IEEE Trans. Veh. Technol., vol. 49, no. 6, pp. 2309–2319,Nov. 2000.

[2] J.-W. Hsieh, S.-H. Yu, and Y. S. Chen, "Morphology-based license plate detection from complex scenes," in Proc. 16th Int. Conf. Pattem Recog2-op 176-179

[3] S.-H. Le, Y.-S. Seok, and E.-J. Lee, "Multi-national integrated car-license plate recognition system using geometrical feature and hybrid pattem vector," in Proc. Int. Tech. Conf. Circuits Syst. Comput. Commun., Phuket, -Thailand. 2002, pp. 1256-1259

[4] "S. Kim, D. Kim, Y. Ryu, and G. Kilm, "A robust license-plate extraction method under complex image conditions," in Proc. 16th Int. Conf. Patterm Recognit.. Quebec City, QC, Canada, 2002, pp. 216-219.

[5] J. Matas and K. Zimmermann, "Unconstrained license plate and text localization and recognition," in Proc. IEEE Int.