
AUTOMATIC NUMBER PLATE RECOGNITION IN KANNADA USING MACHINE LEARNING

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Abstract.

The Detection of Kannada number plates is the most fascinating and research.

ANPR (Automatic Number Plate recognition) is a form of monitoring model that takes vehicle license number plates. Our main aim of this project is detecting kannada number plates/fonts. This paper introduces a model for number plate recognition, segmentation of character and detection of the characters in the Kannada License plate. Used OpenCV to identify number plates and OCR to detect and extract the characters and digits from the number plates. We analyze the working procedure of the ANPR by utilizing Open-CV and Python.

Optical character recognition (OCR) is executed using machine learning algorithms used for recognition of characters. The algorithm is simulated in python and their accuracy of detecting is evaluated on the pictures. We came to know that the model recognizes the kannada number license plate localization, identifies the letters and numbers.

For English language already ANPR system is available. For kannada language number plate we are proposing this model.

Keywords. ANPR, OpenCV, OCR.

1. INTRODUCTION

ANPR is a image pre-processing technique used for detecting stolen vehicle number plate.

ANPR is a process that contains the following stages:

- 1) Detecting the license plate from picture given as input.
- 2) Extract the numbers and letters from the license plate.
- 3) Identifying extracted characters by applying Optical Character Recognition The localization of the license plate image is done after image pre-processing step. Plate localization is step for detecting a number plate. To capturing the picture of number plate looks easy but, it very tough to capture clear image due to various factors. Capturing

images of moving vehicle without missing any component of number plate is very difficult. Main factors like dynamic lighting conditions, shadows, and obstacles.

2. LITERATURE SURVEY

1. Q. Wang et al., "License plate recognition via convolutional neural networks" This paper portrays about the license plate detection using an S.S.D model trained on license plate photos is used in this study. S.S.D. The SSD method makes use of a feed-forward CNN to create a fixed-size collection of bounding boxes and scores the existence of object class instances inside these boxes. The final detection is obtained after a non-maximum suppression (NMS) phase. A Deep neural network - CNN classifier is used for LP character recognition. The network performance was thoroughly analyzed and evaluated, yielding the best results.
2. R. R. Palekar et al., "Real time license plate detection using openCV and tesseract" This paper portrays about license plate detection using Python IDE and openCV , pytesseract . The planned research is divided into many parts, the first of which is the collecting of photographs consisting of license plates. In the second step, several preprocessing methods. In the third step, the processed picture is passed into Tesseract OCR Machine, which uses a command-line interface to turn the detected license plate picture into text.
3. Quiros et al., "A kNN -based approach for the machine vision of character recognition of license plate numbers" This paper portrays about KNN algorithm which is used for classification of characters from number plate. An image processing camera installed on a highway analyses the feed received capturing the images of vehicles along that highway. A contour within a number plate is computed as if they are valid characters along with their size and after that plates are segmented from detected contours. Each contour is classified using KNN algorithm. The KNN algorithm is trained using different set of training data which contains 36 characters comprising 26 alphabets and 10 numerical digits. The algorithm is tested on formerly segmented characters and compared with character recognition technique such as artificial neural networks.
4. Hendry Hendry , "Automatic License Plate Recognition Via SlidingWindow Darknet-Yolo Deep Learning", this project paper address the problem of car license plate detection using a You Only Look Once (YOLO)-darknet deep learning framework. In this paper, we use YOLO's 7 convolutional layers to detect a single class. The detection method is a sliding-window process. The object is to recognize Taiwan's car license plates.
5. V Gnanaprakash et al., " Automatic number plate recognition using deep learning", this paper tells about This paper suggests an automated vehicle tracking system for the fast moving vehicles with the help of the surveillance cameras on the roadside. The process of getting CCTV footage in the real time background is

very tedious process. To cater to this problem, an efficient deep learning model such as You Only Look Once (YOLO) is used for object detection.

3. RELATED WORK

In this paper we proposed the model for detecting the vehicles license plate in kannada , the image taken through the camera will be taken as input , for the input image we apply image preprocessing techniques like gray-scaling, noise removal after that plate localization and character segment and detection contained in the number plate. For real time application a license board detection requires a video camera that takes picture of vehicles from rear or front for the present work. The images of different vehicles have been captured manually from the camera and feed to the model.

4. METHODOLOGY

Automatic license plate recognition in kannada (anpr) contain the following steps:

Step 1: Capturing vehicle number plate by using camera.

In this step we have take pictures through digital camera. Which contain license plate.

Step 2: Conversion of the number plate image to grayscale image.

After taking the picture, we have to feed that photo types image pre-processing techniques, such as image brightness correction, image restoration, in the final step we will convert image into grayscale image. We use openCV library in this preprocessing process.

Step 3: Detection and localization a license plate.

In this step, plate localization in the given image taken place, we use canny algorithm for image plate(edge) detection. After that contour detection and apply mask around the plate for accurate number plate localization.

Step 4: extracted characters and recognizing characters.

In this step characters from image will be extracted using OCR and finally detected characters will go through CNN algorithm for identification then the output will be shown in the end.

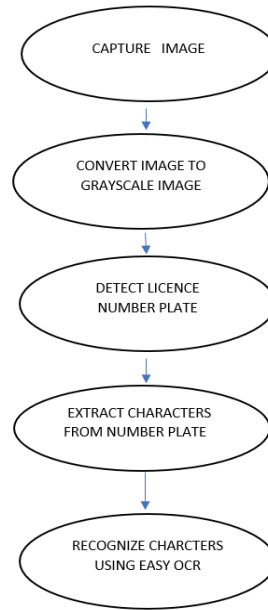


Fig 1- View for the proposed model

5. EXPERIMENTAL RESULTS

1. Image taken through the digital camera



Fig .2- Images captured from the camera

2. Image gone through the image preprocessing techniques, in the final step converted to grayscale image as shown in the fig(3)



Fig .3- Gray Scale images

3. Applying canny algorithm for number plate edge localization .



Fig. 4- Apply filter find edges for localization

4. contour detection and applying mask around the detected number plate for only number plate detection. As shown in below figures fig(5)&fig(6).



Fig .5- mask around the number plate

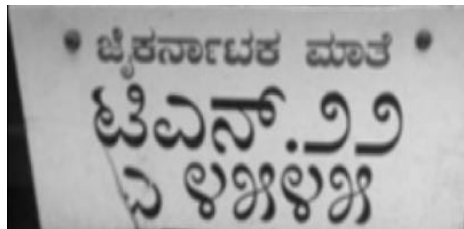


Fig .6– Detection of number plate

5. Applying OCR to Exatrcet the characters from image and showing the results.

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ಎ.೨೫೨೫

Fig 6 – Extracted characters from plate

6. CONCLUSION AND FUTURE WORK

The automatic recognition of kannada license plate is proposed. In this model we use different types of picture preprocessing methods for detecting number plate within the dataset present inside computer. The model simulated output appears that the model localizes and recognizing the vehicles kannada number plate in various light states. The proposed model works very well, despite that, there are some improvements are required. The digital camera utilized in this working model is reactive to shaking. The model accurate rate will be increased if we use more resolution camera. This model can also be used for detecting other than license plate and with some modifications can be used for blind person help.

7. FUTURE WORK

In the future development of projects, we can make the model to detect text to audio conversion. And it will be helpful for blind persons.

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9. REFERENCES

- [1] M. T. Qadri and M. Asif, "Automatic Number Plate Recognition System for Vehicle Identification Using Optical Character Recognition," 2009 International Conference on Education Technology and Computer, 2009, pp. 335-338, doi: 10.1109/ICETC.2009.54.
- [2] R. R. Palekar, S. U. Parab, D. P. Parikh and V. N. Kamble, "Real time license plate detection using openCV and tesseract," 2017 International Conference on Communication and SignalProcessing (ICCSP), 2017, pp. 2111-2115, doi: 10.1109/ICCSP.2017.8286778.
- [3] K. Yogheedha, A. S. A. Nasir, H. Jaafar and S. M. Mamduh, "Automatic Vehicle License Plate Recognition System Based on Image Processing and Template Matching Approach," 2018 International Conference on Computational Approach in Smart Systems Design and Applications (ICASSDA), 2018, pp. 1-8, doi:10.1109/ICASSDA.2018.8477639.
- [4] Q. Wang, "License plate recognition via convolutional neural networks," 2017 8th IEEE International Conference on Software Engineering and Service Science (ICSESS), 2017, pp. 926-929, doi: 10.1109/ICSESS.2017.8343061.
- [5] A. E. Rashid, "A fast algorithm for license plate detection," 2013 International Conference on Signal Processing, Image Processing & Pattern Recognition, 2013, pp. 44-48, doi: 10.1109/ICSIPR.2013.6497956
- [6] S. N. H. S. Abdullah, K. Omar, S. Sahran and M. Khalid, "License plate recognition based on support vector machine," 2009 International Conference on Electrical Engineering and Informatics, 2009, pp. 78-82, doi: 10.1109/ICEEL.2009.5254811.
- [7] Hendry and Rung-Ching Chen. (2019). Automatic License Plate Recognition Via SlidingWindow Darknet-Yolo Deep Learning. *Image VisionComputing*87,(2019), 47–56.doi:10.1016/j.imavis.2019.04.007
- [8] Gnanaprakash, V & Kanthimathi, N & Naga, Saranya. (2021). Automatic number plate recognition using deep learning. *IOP Conference Series: Materials Science and Engineering*. 1084. 012027. 10.1088/1757-899X/1084/1/012027.
- [9] C. -H. Lin, Y. -S. Lin and W. -C. Liu, "An efficient license plate recognition system using convolution neural networks," *2018 IEEE International Conference on Applied System Invention (ICASI)*, 2018, pp. 224-227, doi: 10.1109/ICASI.2018.8394573.
- [10] Quiros,A.R.F,Bedruz,R.A,Uy,A.C,Abad,A,Bandala,A,Dadios,E.P.,Salle,D.L,A kNN - based approach for the machine vision of character recognition of license plate numbers, *TENCON 2017 – 2017 IEEE Region 10 Conference*

- [11] Shashirangana, Jithmi & Padmasiri, Heshan & Meedeniya, Dulani & Perera, Charith. (2020). Automated License Plate Recognition: A Survey on Methods and Techniques. *IEEE Access*. 9. 11203-11225. 10.1109/ACCESS.2020.3047929.
- [12] Padmasiri, Heshan & Shashirangana, Jithmi & Meedeniya, Dulani & Rana, Omer & Perera, Charith. (2022). Automated License Plate Recognition for Resource-Constrained Environments. *Sensors*. 22. 1434. 10.3390/s22041434.
- [13] Ghadage, Shraddha. (2020). A Review Paper on Automatic Number Plate Recognition System Using Machine Learning Algorithms. *International Journal of Engineering Research and*. V8. 10.17577/IJERTV8IS120398.