AUTOMATIC NUMBER PLATE DETECTION USING MACHINE LEARNING

under the guidance of

Dr.K.SUBHASH BHAGAVAN

HOD

Presented By:

A. SANDHYA DEVI (19K61A1202)

K. RANGA SWAMI (19K61A1224)

M.L.V. DURGA (19K61A1236)

Batch No:1923ITP002

April 23, 2023

TABLE OF CONTENTS

ABSTRACT

There are enormous vehicles across the world and Automatic Number Plate Recognition (ANPR) has become increasingly important due to this growing of vehicles on the road.Automatic number plate recognition (ANPR) is a widely used technology for vehicle identification and tracking. ANPR systems utilize cameras to capture images of vehicle number plates and machine learning algorithms to extract the characters from the images for recognition and the ANPR is widely used in parking management and traffic management.

INTRODUCTION

Automatic Number Plate Recognition (ANPR) is a technology that uses machine learning algorithms to automatically detect, read, and recognize license plates on vehicles.he ANPR process involves several stages, input image, converting into grayscale,Adaptive thresholding,Finding contours,Bounding Boxes, OCR implementation. These algorithms analyze the image and extract the license plate number from it, using techniques such as image segmentation, character recognition.

Machine learning is an essential component of ANPR systems, as it enables the system to learn from a large dataset of license plate images and improve its accuracy over time.ANPR systems have many benefits, such as reducing traffic congestion, improving public safety, and enhancing the efficiency of law enforcement operations. As machine learning technology continues to advance, ANPR systems are becoming more accurate and reliable, and their applications are expanding into new areas, such as smart city management and autonomous vehicles.

PROBLEM STATEMENT

Many existing systems fails at character recognition and are with low accuracy,Therefore to overcome this problem the ANPR uses machine learning which involves designing and developing a system that can accurately recognize license plates from digital images taken from camera or other resource(dataset). The system should be able to handle a wide range of lighting and environmental conditions. The performance of the system is based on accuracy, speed, and reliability.

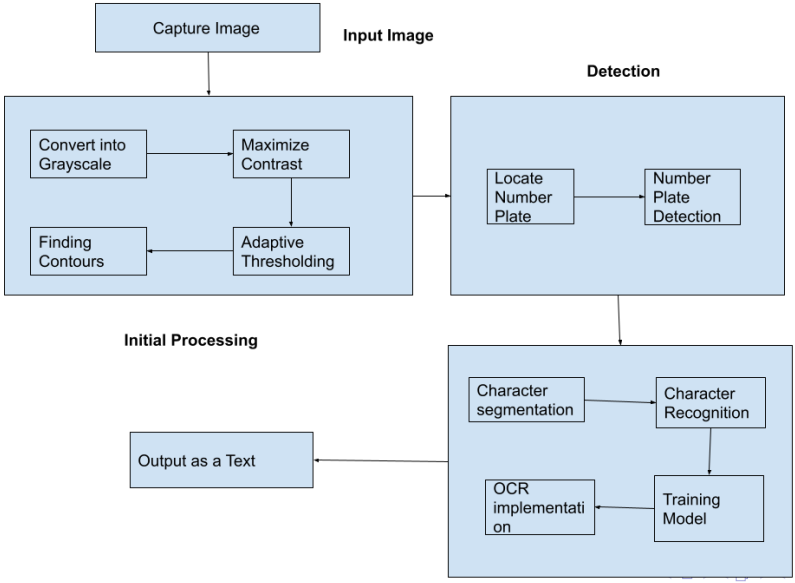
METHODOLOGY

1.Converting into Grayscale:
It is an image conversion technique in digital photography. It eliminates every form of colour information and only leaves different shades of gray; the brightest being white and the darkest of it being black.
2.Adaptive Thresholding :
Adaptive thresholding is a technique used in image processing to automatically adjust the threshold value of an image based on its local characteristics. This technique is commonly used in automatic number plate recognition (ANPR) systems to segment the characters of a license plate from the background.
3.Bounding boxes:
The bounding box is an imaginary rectangular box that contains an object or a set of points. When used in digital image processing, the bounding box refers to the border's coordinates that enclose an image.

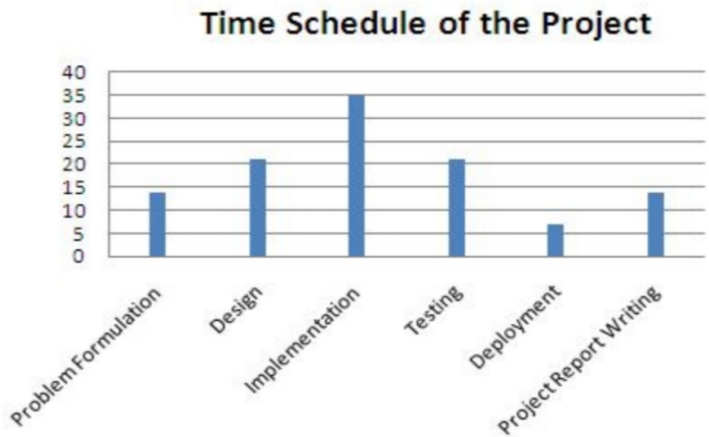
METHODOLOGY

4.Finding Contours:
Contours are defined as the line joining all the points along the boundary of an image that are having the same intensity.
5.Character Segmentation:
Character segmentation is an operation that seeks to decompose an image of a sequence of characters into subimages of individual symbols.
6.Character Recognition:
It is an important computer vision technique foe reading text from images and it is used to detect individual characters,verifying the sequence of those characters and converting number plate image to text.
7.OCR:
Optical Character Recognition is a technology that recognizes text within a digital image.

ARCHITECTURE FOR AUTOMATIC NUMBER PLATE RECOGNITION



GANT CHART


Time Schedule of the Project
40
35
30
25
20
15
10
5
0
Problem Formulation
Design
Implementation
Testing
Deployment
Project Report Writing

SYSTEM DESIGN

The proposed system consist of three different phases ;
1.input a image
2.Processing phase:processing phase includes covert into grayscale, finding Contours, locating number plate, character segmentation, character recognition.
3.OCR implementation
4.Output as Text of the number plate

SOFTWARE AND HARDWARE REQUIREMENTS

- System: intel i3 or above
- Hard Disk :512 GB
- RAM: At least 4GB
- OS: Windows 7/Windows 10
- System type: 64-bit Operating System
- Coding Language: Python
- IDE: Jupyter Notebook

LITERATURE SURVEY-1

Tittle	Automatic Number Plate Recognition System using CNN.
Published Year	2021 May
Objectives	The main objective is to efficiently design an automatic number plate recognition system.
Methodology	1.Capture image 2.Covert into gray scale 3.gaussian blur 4. noise detection 5.character recognition 6.converting into ASCII code.
Conclusion	Produce output as a text of a capture number plate.
Limitations	The system is with an accuracy of 90 percentage.

LITERATURE SURVEY-2

Tittle	Automatic vehicle number plate recognition system using ML.
Published Year	2021 Feb
Objectives	To make vehicle management easier and to minimize manpower requirement.
Methodology	1.Input a image 2.image desaturation 3.image threshold 4.gaussian filter 5. character segementation 6.character recognition.
Conclusion	The output is shown as a text after recognition.
Limitations	1.Time taking 2.Less performance.

LITERATURE SURVEY-3

Tittle	Car license plate detection and recognition using modified U-net deep learning.
Published Year	2022 April
Objectives	As , a result An integrated deep neural network has been proposed,capable of Locating the license plate and recognition characters in a single forward pass.
Methodology	1.Image capture 2.vehicle detection 3.license plate recognition 4.character segmentation 5.character recognition.
Conclusion	The characters from license plate will be entered into Excel sheet along with time date of the vehicle was entered.
Limitations	Character recognition with an accuracy of 93 percentage.

LITERATURE SURVEY-4

Tittle	Automatic Number Plate Recognition System for Indian Number Plates using Machine Learning Techniques.
Published Year	2022
Objectives	This assists authorities to maintain legislation and rules, which also in return help them to decrease vehicle collisions.
Methodology	1) Acquisition of the image 2)License Plate Detection using the YOLOv5 model 3)Plate Segmentation 4)Character recognition using OCR.
Conclusion	ANPR model which can detect all these types of number plates with maximum accuracy and speed.
Limitations	Fails in blur and low vision.

TECHNIQUES

Techniques used in AUTOMATIC NUMBER PLATE DETECTION:
1.Capture image: capturing image of vehicle that include number plate in it using mobile or camera .

2.Image Processing: It is used to normalize and prepare images for being processed by the OCR algorithm. image processing functions are used to sharpen or crop images

4.Training Machine Learning model:Train the OCR model using the preprocessed dataset and the selected machine learning algorithm. Validate the model on a separate test set to ensure that it generalizes well to new, unseen data.

3.OCR(optical character recognition):Optical Character Recognition (OCR) is the electronic or mechanical conversion of images of typed, handwritten or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene photo or from subtitle text superimposed on an image. In more simple way, OCR is a process of extracting text from images.

EXPERIMENTAL RESULTS

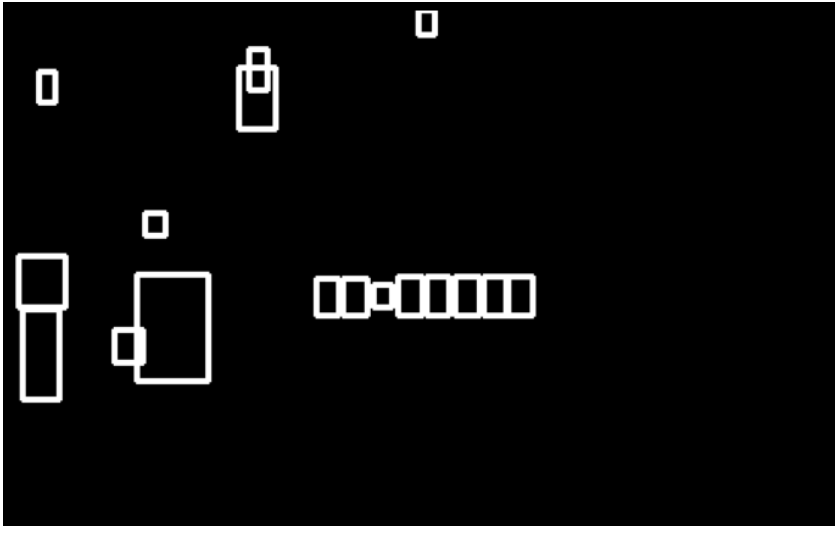
Input Image

Convert image into grayscale

Adaptive Thresholding

Finding Contours

Selecting Boxes



Output as Text

PGMN112

CONTRIBUTION

Project Associate (PA)	Problem Formulation	Design	Implementation	Testing	Deployment	Project Report Writing
PA1 19K61A1202	Yes	Yes	Yes	Yes	Yes	Yes
PA2 19K61A1224	Yes	Yes	Yes	Yes	Yes	Yes
PA3 19K61A1236	Yes	Yes	Yes	Yes	Yes	Yes

EXISTING SYSTEM

Currently in many sectors vehicle is identified using the number plate which is manually noted by a human which is a slow process and also the other ANPR using CNN are with low accuracy and also fails at image recognition process.Thus, vehicle number plate recognition is an intensive manual process which can perhaps be automated using machine learning

CONCLUSION

In this study, we proposed a Automatic number Plate Recognition using machine learning to detect, extract, and recognize license plate information from images . These algorithms can be trained on large datasets of license plate images to improve their accuracy and performance.Overall, ANPR using machine learning has many advantages, including high accuracy, speed, scalability, and versatility. It can be used in a variety of settings and can help to improve public safety, enhance traffic management, and reduce congestion.

SCOPE FOR FUTURE WORK

ANPR for Environmental Monitoring, ANPR systems can be used to monitor traffic and identify vehicles that emit high levels of pollutants. This information can be used to enforce regulations on emissions and reduce air pollution.
In conclusion, ANPR systems have great potential in improving the efficiency, safety, and security of various applications. With the continued development of machine learning techniques, we can expect more accurate and efficient ANPR systems in the future.

REFERENCES

[1] Dhar, Prashengit and Guha, Sunanda and Biswas, Tonoy and Abedin, Md Zainal:"A System Design for License Plate Recognition by Using Edge Detection and Convolution Neural Network," IEEE , pp.1–4 , 2018.
[2] Rokonuzzaman, Mohammad and Al Amin, M Abdullah and Ahmed, MasumHowlader Kazi Main Uddin and Rahman, Muhammad Towhidur: "Automaticvehicle identification system using machine learning " IEEE , pp.253–258 , 2017
[3] Abedin, Md Zainal and Nath, Atul Chandra and Dhar, Prashengit and Deb,Kaushik and Hossain, Mohammad Shahadat: "License plate recognition system based deep learning model," IEEE , pp. 590–593 , 2017.

Thank You