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ASTROS

BY TEAM AI_04

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ADVANCE DRIVER ASSISTANCE SYSTEM

AGENDA

- Problem Statement
- Project Overview
- Who are the end users?
- Solution
- Wow in our solution
- Modelling
- Results
- Our Team

PROBLEM STATEMENT

For vehicles to be able to drive by themselves, they need to understand their surrounding world like human drivers, so they can navigate their way in streets, pause at stop signs and traffic lights, and avoid hitting obstacles such as other cars and pedestrians. Based on the problems encountered in detecting objects by autonomous vehicles an effort has been made to demonstrate lane detection using OpenCV library. The reason and procedure for choosing grayscale instead of colour, detecting edges in an image, selecting region of interest, applying Hough Transform and choosing polar coordinates over Cartesian coordinates has been discussed.

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PROJECT OVERVIEW

- During the driving operation, humans use their optical vision for vehicle maneuvering.
- One of the prerequisites to have in a self-driving car is the development of an Automatic Lane Detection system using an algorithm
- Computer vision is a technology that can enable cars to make sense of their surroundings.
- The current computer vision technology used in autonomous vehicles is also vulnerable to adversarial attacks, by manipulating the AI's input channels to force it to make mistakes

WHO ARE THE END USERS?

- A Convolutional Neural Network (CNN) based object detection model was trained on different vehicle classes that run on roads.
- It was found that high intra-class variation such as bicycle and rickshaws and less quantity of training samples were reducing the accuracy for some classes
- Training of this model to different cities traffic such as Bangalore and Mumbai will enhance the performance.
- The observations of installation and maintenance costs, traffic measurement effectiveness and rule violation would be shared with the traffic authorities.

USERS: CUSTOMERS AND VEHICLE OWNERES

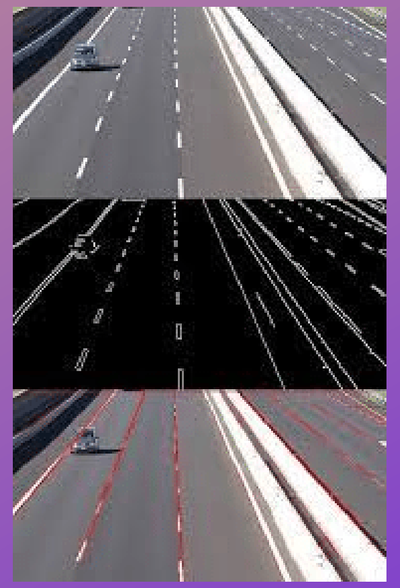
SOLUTION

The project involves detection of lane lines in an image using Python and OpenCV. OpenCV means “Open Source Computer Vision”, which is a package that has many useful tools for analyzing images.

THE CANNY EDGE DETECTION TECHNIQUE

The goal of edge detection is to identify the boundaries of objects within images. A detection is used to try and find regions in an image where there is a sharp change in intensity. We can recognize an image as a matrix or an array of pixels. A pixel contains the light intensity at some location in the image.

HOUGH TRANSFORM



Hough transform technique that will detect straight lines in the image and thus identify the lane lines.

Straight line is represented by the below equation:

$y = mx + b$

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WOW IN OUR SOLUTION

- OBJECT DETECTION & TRACKING
- LANE DETECTION
- PEDESTRIAN DETECTION
- DEPTH ESTIMATION
- INDOOR MONITORING
- VEHICLE DETECTION
- SIGN DETECTION
- COLLISION AVOIDANCE

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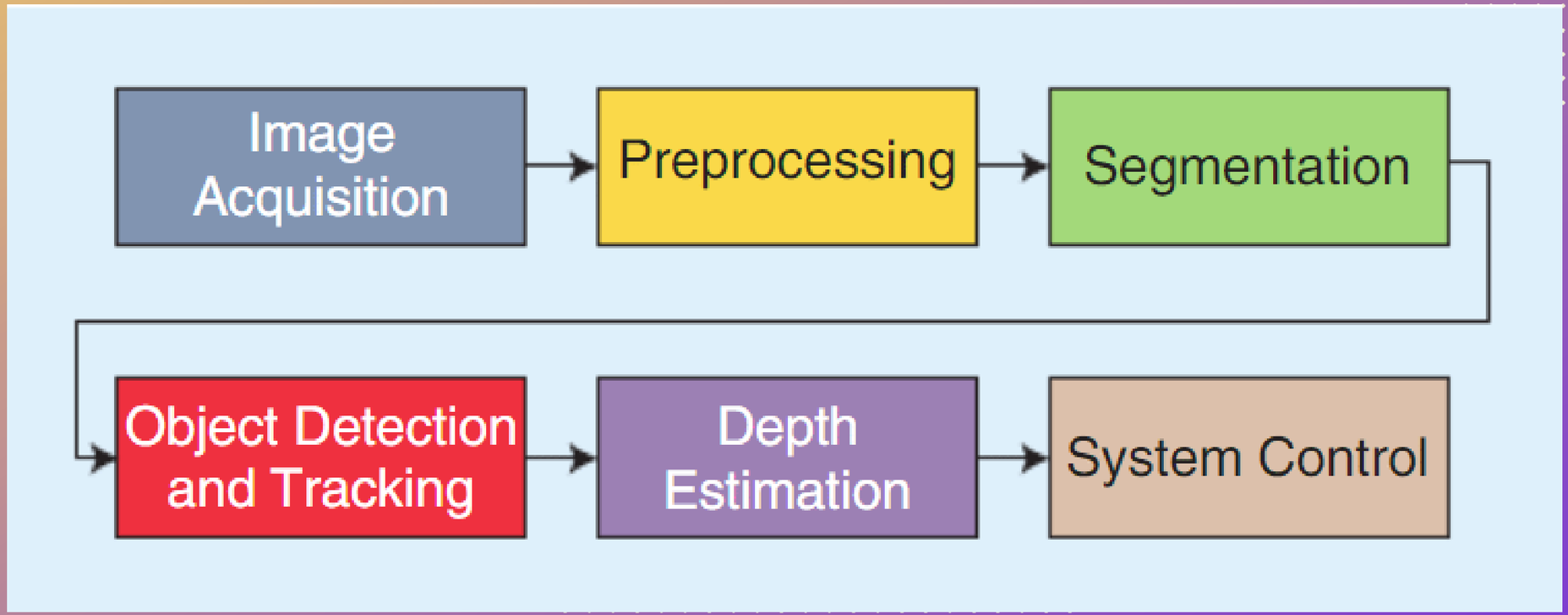
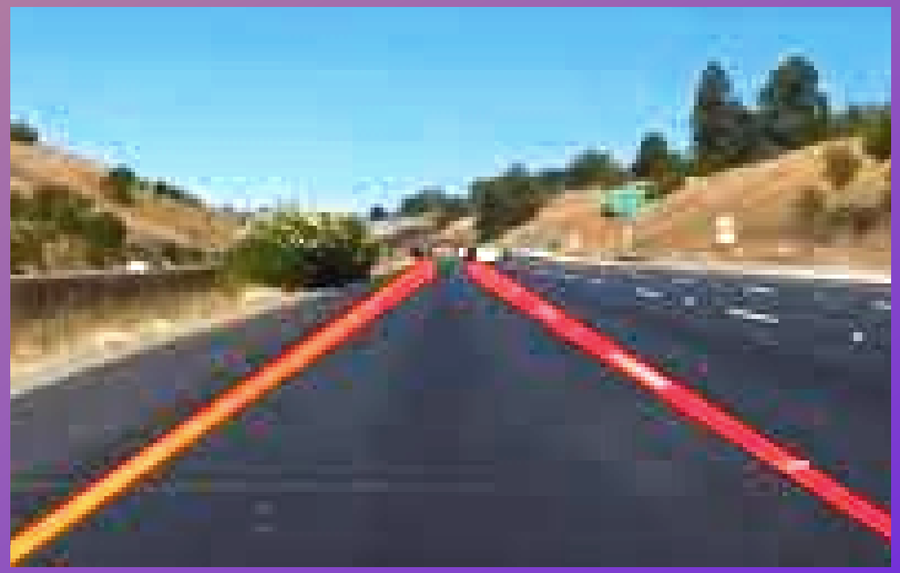
MODELLING



RESULTS

- We achieved edge detection by using OpenCV's Canny Function and other functions, including the OpenCV library.
- A mask of zero intensity was then prepared and a bitwise operation was used to map our region of interest.
- By using the Hough Transform technique, we were able to detect the straight lines in the image and identify the lane lines in the image.
- Due to the lack of slope information in Cartesian coordinates, we decided to use polar coordinates. In the final stage, we combined our zero-intensity image with the image of the lane to show the lines of the lane.



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OUR TEAM

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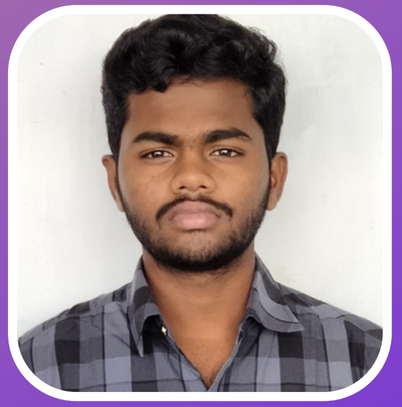

Jagadeeshwara Rao


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Thank
you