CS 101 PROJECT
License Plate Detecting Bot

Motivation

Problem Statement

To implement license plate capturing in Firebird V using Image Processing.

- The bot is designed to scan for license plate numbers.

- It uses a camera attached on one of its sides.

- It compares against a predecided set of numbers, the hotlist.

- It acts accordingly, subject to the result of the comparison.

Task Specifications

- The bot will follow a straight line and stop as soon as it detects a car on the side of the camera.

- Once it stops, the image processing module will be called and the bot will display the plate number of the car, and whether it is "SECURE" or "STOLEN".

- It will create an alert (buzzer) if the license plate number matches with any number on the hotlist; else it will proceed forward and continue detection.

- The bot is programmed to stop permanently after detecting a maximum of five cars.
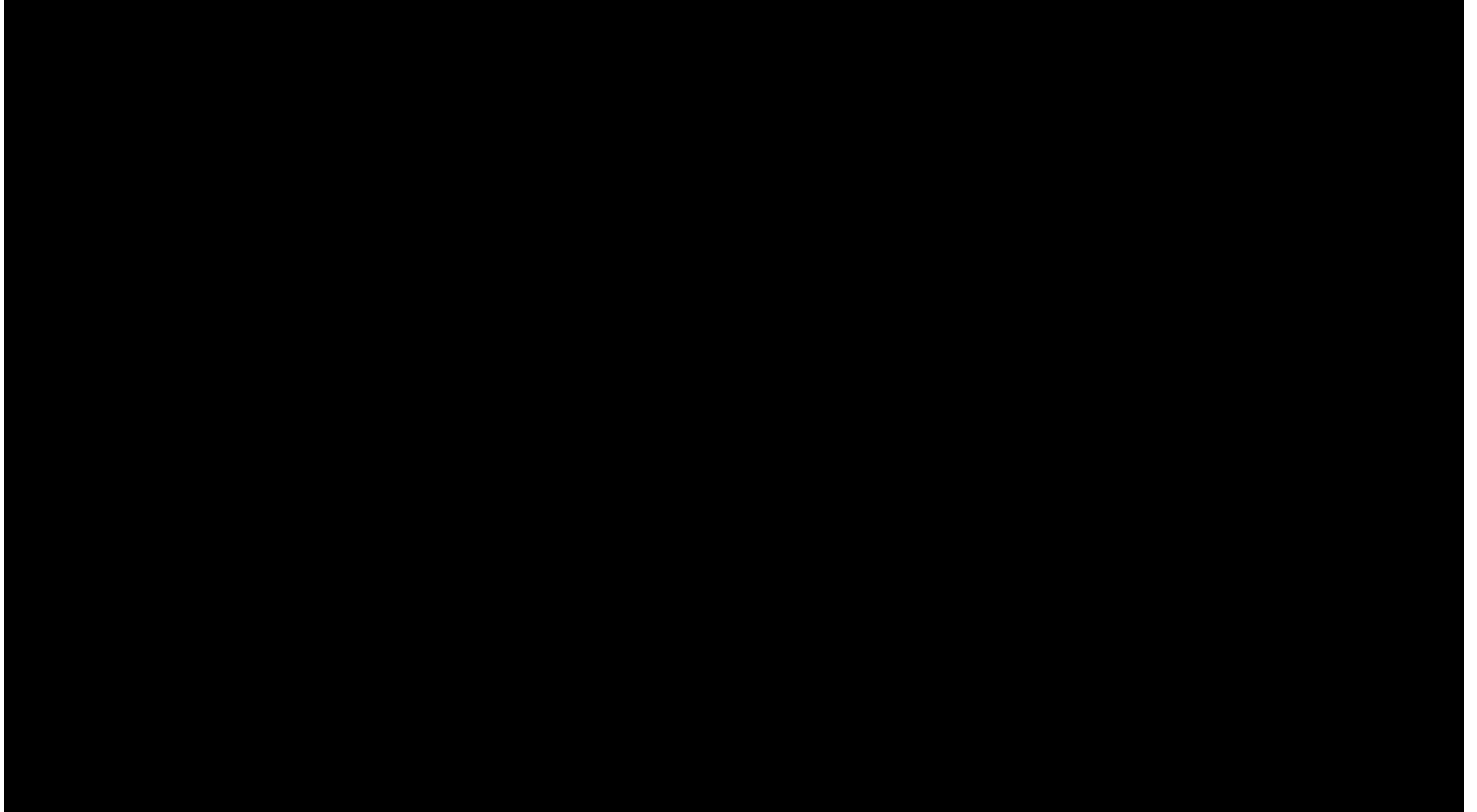
Project Plan

Critical Tasks

- The image processing module, which is written in python.

- The wireless communication between the bot and the laptop running the image processing module, implemented via XBee.
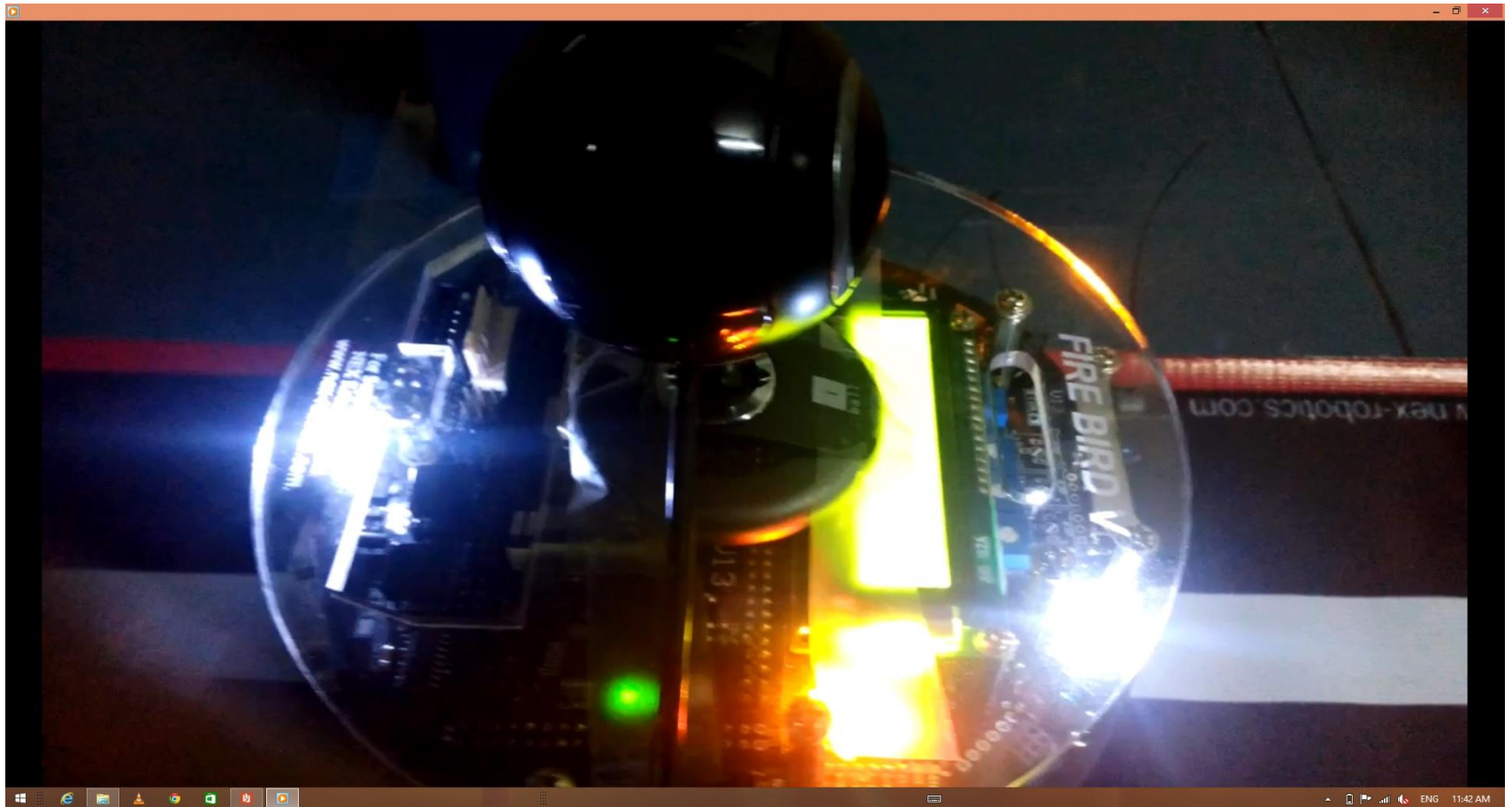
FLOWCHART
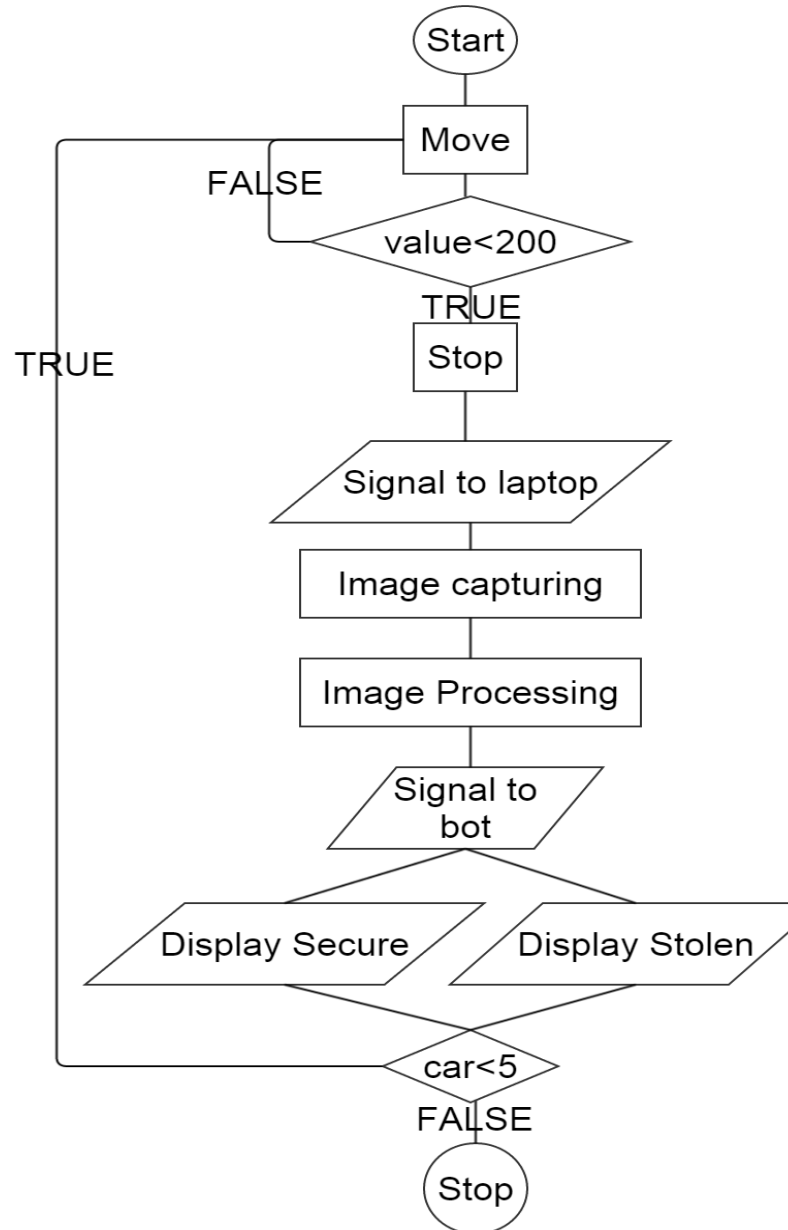
CAR=number of cars detected
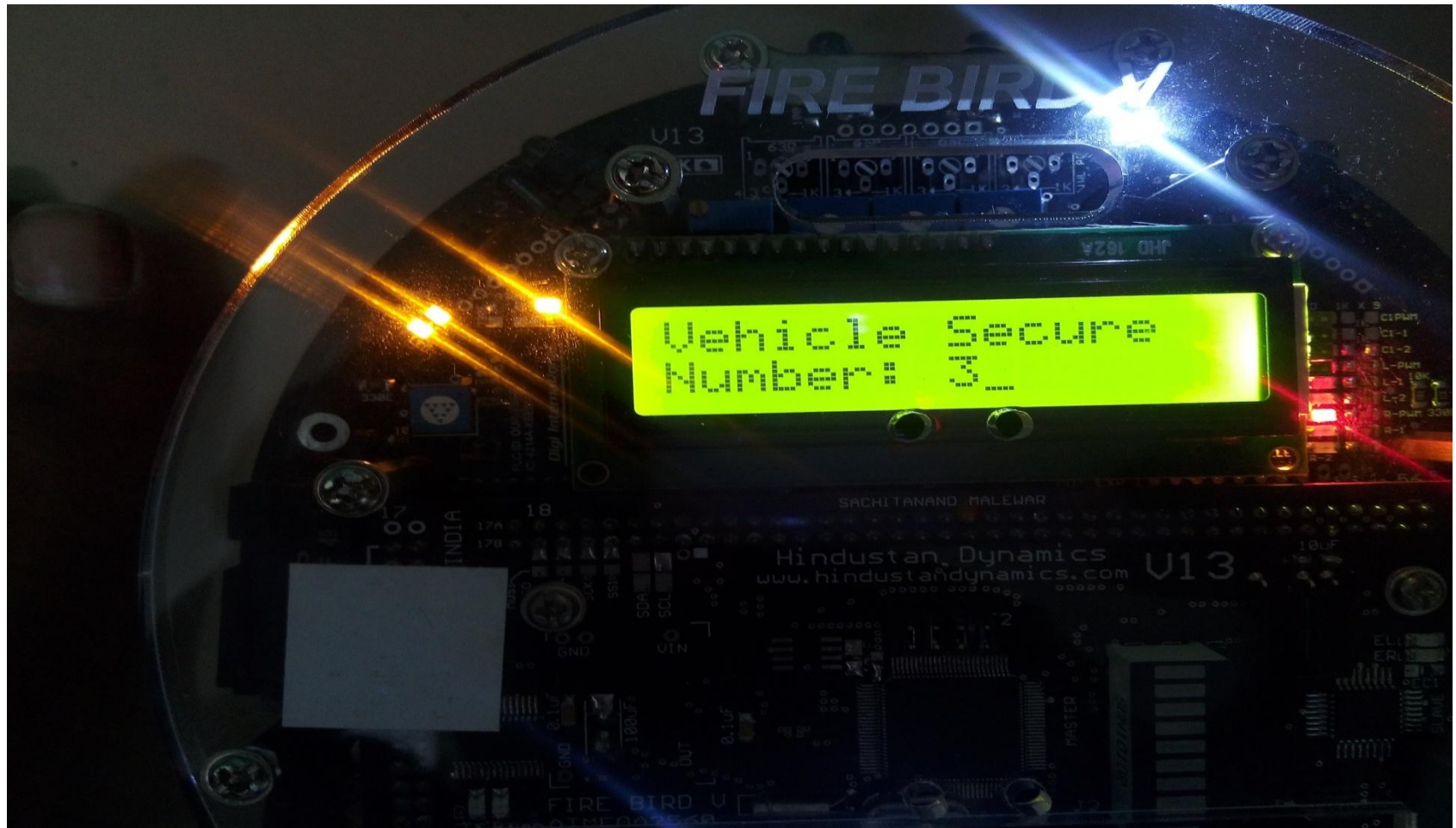VALUE=reading of sharp sensor(mm)
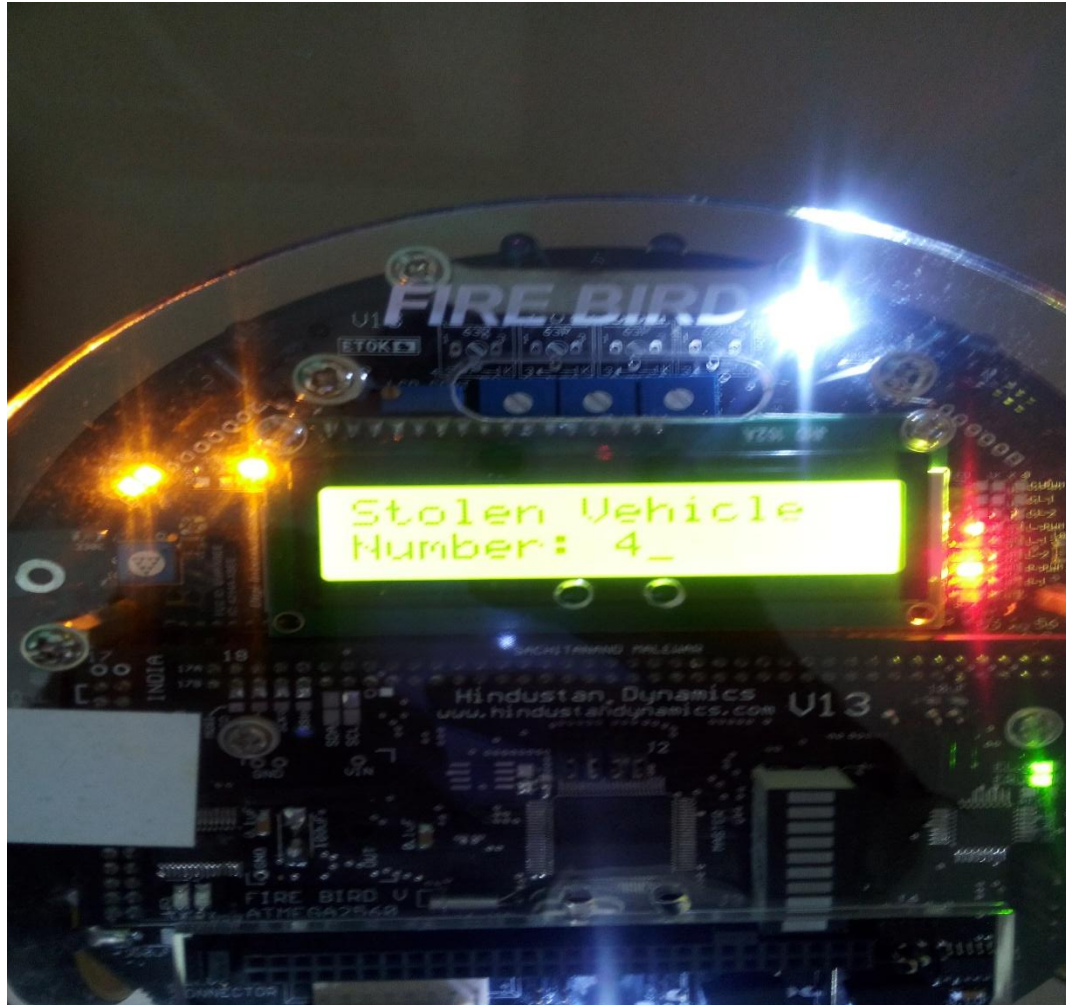
Project Video

Screenshots

Screenshots

Screenshots

Challenges

- Installing OpenCV

  Installing OpenCV on Windows was difficult. So we shifted to Linux.

- Image Processing Module

Ensuring the extraction of the numeral from the photo captured by the bot and displaying it on the LCD screen was no easy feat

Challenges

- Line Following

   We initially planned for the bot to follow a white line ,incorporating dynamic terrain. This challenge proved to be insurmountable.

- XBee

Configuring Xbee to enable wireless communication was an involved job

Future Work

- Right now, the bot follows a straight line and stops after a maximum of five cars. The terrain can be rugged and the number of cars detected increased.

- **MULTIPLE CAMERAS:** to be used in place of a single cam to increase the bot's response time. This would provide an efficient viewing in all the directions and hence a better response time.

- **DAY AND NIGHT VISION:** we need use both visible and infrared spectrum , allowing the bot to work while in light as well in the dark. This would increase its efficiency.

- **IMAGE PROCESSING:** The efficiency of image processing to be improved further by using best image capturing devices as well as adding multiple fonts to verify the license plate if in some other language.

- **COD COPTER BOT:** Usually some vehicles like motorbikes are stacked in orientations like a matrix(rows and columns). So, the bot cannot enter such places while on land hence a cod copter can be used to serve this purpose. Also angular orientation needs to be captured by the bot so better cameras to be used.

- **AUTOMATED SECURE GARAGE SYSTEM:** The bot will come with an additional function of controlling the door opener and closer to specific vehicles only.

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Conclusion

• The main aim of this project is to implement the License Plate Detection(LPD) using Image processing.

• In this work, the plate's plane is assumed to be collinear with that of the camera and the vehicle has no movement during the snapshot. We are also provided with hotlist license plate which (here) depicts stolen cars and after Image processing it displays the status of the car license plate(stolen or secure) under observation on the LCD screen.

• Our Bot presently find its use in:

POLICE PATROLLING: Identification of stolen cars from the hotlist containing the license plate number. Buzzer will ring if stolen vehicle is detected.

BORDER SECURITY: Border is a highly secured area requiring special permits to only secured vehicle. This bot allows the vehicle only if it is present on the list of secured vehicles.

The further research can be focused on using more number of fonts for improving accuracy of Optical Character Recognition(OCR).

THANK YOU!!