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**Synopsis Report**

**&**

**Justification Report**

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**Department of Computer Science and Engineering**

Academic Year: 2022-23

**Synopsis Report**

**Real Time Driver Assistance System**

**Introduction**

Vision-based driving assistants have been developed for

decades. Their results are almost ready to be equipped in con-

ventional vehicles. Most of the existing methods are targeted

at the embedded market, but not at mobile platforms. The

mobile technology has been improving dramatically in recent

years, such that applications that could once perform real-time

only on PC are now ready to be ported on mobile devices.

However there are still barriers in terms of processing power

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The project is divided into 7 major phases as follows:

* Classification
* Lane marking detection and Road Sign
* Corner detection and obstacle detection
* Ego vehicle position estimation
* Obstacle detection on three detection ranges
* Lane departure warning
* Indication of driving area and direction for hazard obstacles

The proposed solution can also parse a real-time video in the format of (.mp4) and extract info about all the moving and non-vehicular objects present in the video feed.

The software can run on any platform, including Windows, macOS, Linux and making it portable to Android.

**Tools to be Used:**

* Java/Kotlin
* FastCV/OpenCV
* Qualcomm HetCompute SDK
* Android Studio

**Rationale: Justification, why needed?**

It is seen that the security forces and authorities face problems whenever security forces

chase a vehicle or they can’t catch a vehicle which broke traffic rules. Authorities find it very

hectic on a busy day to log the vehicle numbers manually in a parking lot. So, to

make the entire process autonomous, we can install this system to automatically detect

the vehicle which breaks the traffic rules, take a picture of it and store the number in the

database to fine the respective owner afterwards. The system can be used in parking so

as to take the picture of the vehicle and log the vehicle number in the database (or the cloud,

if connected to the internet). This technology reduces the unnecessary hectic manual work

required on any busy day, saves the labour cost and is far more efficient than humans. The

number of any vehicle once obtained as text, can be displayed, saved in the database or can

be searched through the entire database for the details. This project is so versatile that it can

be used as an entire application once converted to a software or can be used as a part of any

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According to the [2020 Traffic Safety Facts Research Note](https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318) by the Ministry of Road Transport and Highways (MORTH) “The Nation lost 1,31,714 people in crashes on Indian roadways during 2020. An analysis revealed that about 94% of those accidents were caused by human error, and the rest by the environment and mechanical failures.

The opportunity to reduce fatal accidents is making assistance system even more critical. Pedestrian detection, Traffic Sign, Lane Change Detection and Ego vehicle position detection are among the many applications that assist drivers with safety-critical functionality to reduce fatal accidents and save lives.

**Methodology/ Planning of work**

* Image Acquisition using the phone’s primary camera.
* Image Enhancement and pre-processing to improve the quality of the image and convert the image to binary scale so as to use it in contour extraction.
* Extract the region of interest from the binary image and display it separately or highlight it.
* Give user the necessary detail on-screen or via notifications.

**Working of the Proposed Methodology**

* The primary camera of the device is accessed and a real time image stream is given as input.
* The input image is then fed in the system, for further processing.
* This first step is used to classify each pixel in the image as sky, road or background area and further steps such as Lane marking, traffic signs, corner detection and obstacle detection is done.
* The final step involves showing the relevant information to user.

**Facilities required for proposed work**

* Disk space: 10 GB
* Operating systems: Android
* Development Environment: Android St
* Java versions: Java 8 or above
* Compatible tools: Microsoft Visual Studio, IntelliJ
* Included Packages: MARE, OpenCV
* Processors: Snapdragon or Mediatek

**Expected outcomes:**

This project performs mainly four tasks. The first task is to input an image of the surronding and this will happen with help of the camera of the phone for the prototype. When the image is fed the image is enhanced in quality. The enhancement is done in the resolution and the thresholding. The image is constrained to a fixed image frame size. After the enhancement, the image is processed to segment the necessary details from the full image. The extracted detail is shown to user on screen or as notification. The project is designed so that we can understand the technology used nowadays. Moreover we provide a real-time application that is able to run on both single core platforms and multicore ones by parallelizing heavy computation parts.

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