# Vehicle Security and Road Sign Detection using Image Processing

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*Abstract:* *An overview of the roadand traffic sign detection and recognition with the SMS alert system when an accident occurred . Road sign detection and recognition technique is important to support a driver. Failure detection by the driver of any traffic sign may increase accident risk significantly The time between an accident occurrence and the emergency medical personnel are dispatched to the accident location is the important factor in the survival rates after an accident. By eliminating that time between an accident occurrence and the first responders are dispatched to the scene decreases mortality rates so that we can save lives. One approach to eliminate that delay between accident occurrence and first responder dispatch is to use an Accident Alert system , which senses when a traffic accident is likely to occur and immediately notify emergency occurred . A system that can automatically recognize the traffic signs has been needed to reduce traffic accidents and to drive more freely. Traffic sign recognition system meet this need. This study includes traffic sign detection and recognition application .*
*Keywords—Digital Image Processing, Traffic Sign Detection, Arduino , GSM, GPS, LCD, MEMS.*

## I.   Introduction

The usage of Automobiles has improved  linearly overthe past decade, which increased the risk of  human life. The vehicle driving has been more and more common in the life of people. Thus, the traffic security is very important. Traffic sign detection and recognition is a key enabling technology to control and guide traffic to favor road safety. It regulates traffic and report traffic information to drivers on different aspects about road perambulation. This technology has the ability to detect the exact location of the road signs and what exactly the road signs stand for. Automatic traffic sign detection and recognition systems are very helpful for intelligent vehicle development and road maintenance. This task is very complex and it requires high accuracy in real time because generally traffic signs are detected from live video during fast movement of vehicles. The aim of the traffic sign detection systems are to help system users to detect a road sign and interpret. This system also detects the accident occurrence and the co-ordinates of the accident are messaged to the predefined number. The Accident is detected with the help of  MEMS Sensor and  This application helps in providing feasible solution to the  Emergency  facilitates.

## II.   Related Work And Methodology

Project consist of two part:
- Road sign detection using Image
processing
- SMS alert system using GSM/ GPS

### A.  Road sign detection using image processing:

This system consists of two modules, detection module and classification module. For image acquisition the camera will record the video and for particular seconds it will click images from the video. Than that image will be captured and will be further processed for mathematical operations. The main aim is to identify respective image, many methods have been employed for traffic signs identification or classification. In our project, the input image is first captured and further traffic sign location in the image is specified by ROI extraction based on color and mathematical morphology. In this project we can also browse the already stored image for further processing. The images taken will be stored one above the other, as the new image will replace the old image and will be processed.

**Steps involving in road sign detection:**
1. ROI Extraction based on color
2. Mathematical morphology
3. Detection of traffic sign by comparing

**1. ROI Extraction based on color:**
      A region of interest(ROI) is a part of an image that we can filter or perform some other operation on. Traffic signs are characterized by different shapes and color which distinguish them from surrounding environment. The traffic sign (which is our ROI here) is extracted by using its color characteristics. This part will focus on area which we want from the surrounding.



*Fig 1.  ROI extraction*

**2. Mathematical morphology:**
      Mathematical Morphology ,is a branch of image processing which is particularly useful for analyzing shapes in image. Some basic properties of Mathematical morphology are erosion, dilation, opening and closing. In this step, first we perform closing operation on extracted ROI. The morphological close operation is a dilation followed by an erosion, using the same structuring element for both operations. Next we perform only dilation on closed image as shown in Fig 2.
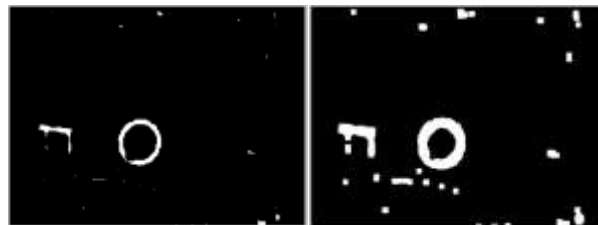


*Fig 2. (a)Morphological closed image (b) Morphological dilated image*

**3. Detection of traffic sign:**
      In this part the processed image is compared with the image taken for reference. If the image matches the stored image then output is received.In this Project, our technique has been actualized under Matlab condition. We  are using Matlab for development of GUI  as well as for image extraction and image identification by comparing the  image taken with already stored image for reference.



*Fig 3.GUI for Road sign detection system*

**B. SMS alert system using GSM/ GPS:**
      The basic block  diagram  SMS alert system is shown below.This system consists of Arduino , ADXL335 ,GPS, GSM module , LCD display etc. In this project, Arduino is used for controlling whole the process with a GPS Receiver and GSM module.GPS Receiver is used for detecting coordinates of the vehicle, GSM module is used for sending the alert SMS with the coordinates and the link to Google Map..
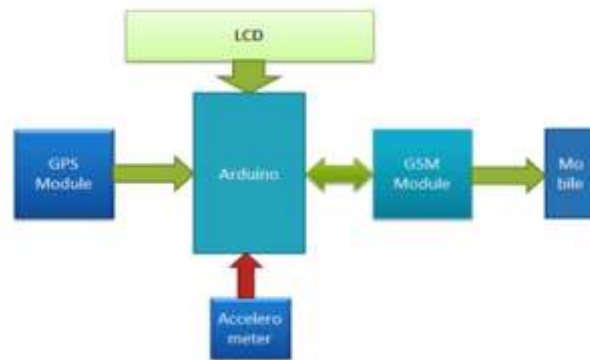
***Fig 4.****Block diagram SMS alert system*

Accelerometer namely ADXL335 is used for detecting accident or sudden change in any axis. And an optional 16x2 LCD is also used for displaying status messages or coordinates. We have used GPS Module SIM28ML and GSM Module SIM800C. Now whenever there is an accident, the car gets tilt and accelerometer changes his axis values. These values read by Arduino and checks if any change occurs in any axis. If any change occurs then Arduino reads coordinates and send SMS to the predefined number. The message will contain a Google Map link to the accident location, so that location can be easily tracked. When we receive the message then we only need to click the link and we will redirect to the Google map and then we can see the exact location of the vehicle.

## III. Conclusion And Future Scope

In this paper, we propose an approach based on shape And color based traffic sign detection along with an SMS alert system that enhance the security of the vehicle when any accident occurs. The proposed method was run with utilizing traffic sign images in Matlab. SMS alert system is created to give the data about the accident happen and the area of the accident . It serves to effectively give the associate and help to the casualty of the mishap. This framework utilizes GPS module to find the vehicle. GSM is utilized to give the data of accident.If sufficient progress is made on this problem, the team can also decide to apply some of the image processing algorithms to use with night vision and also to pratically implement it.

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