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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING.
(Accredited by NBA, New Delhi)

A PROJECT REPORT ON

"SPEED TRAP – AUTOMATIC NUMBER PLATE RECOGNITION SYSTEM"

BACHELOR OF ENGINEERING
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Under the Guidance of

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CHAPTER 1

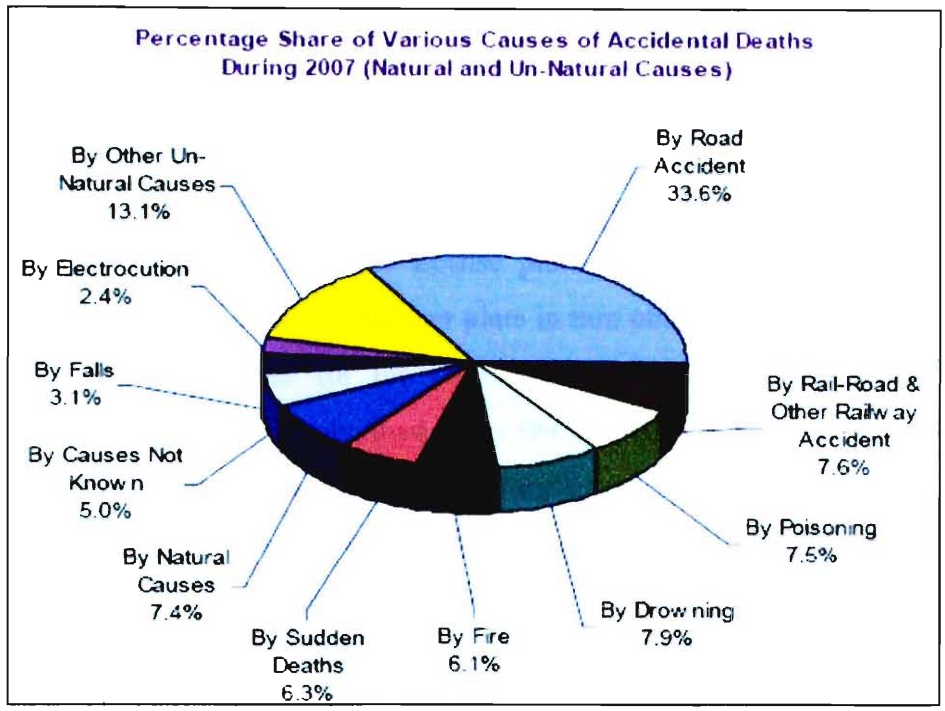
INTRODUCTION

1.1 NEED FOR SPEED TRAP

Automatic vehicle identification is an essential stage in intelligent traffic systems. Nowadays vehicles play a very big role in transportation. Also the use of vehicles has been increasing because of the growth in population and human needs in recent years. Therefore, control of vehicles is manifesting itself into a big problem and is much more difficult to solve. Automatic vehicle identification systems are used for the purpose of effective traffic control. License plate recognition (LPR) is a form of automatic vehicle identification. It is an image processing technology used to identify vehicles by only their license plates. Real time LPR plays a major role in automatic monitoring of traffic rules and maintaining law enforcement on public roads. An analysis carried out on the road accidents reasons out that driver's negligence and over speeding are the two major factors which lead to the road accidents, here are some of the statistics which give an account of the increase in the accidents,

1. Analysis carried on the basis of all India road accidents data shows that driver's fault accounts for 83.5 per cent accidents.
2. 'Road Accidents' in the country have increased by 8.3 in the year 2007 and 9.5 per cent in the last year.
3. According to World Road Statistics (2007), more than 95,000 people were killed in road accidents in India.
4. The World Bank estimates that the number of deaths from car accidents globally will rise to 2 million per year by 2020 from 1.2 million unless road laws are enforced effectively.
5. High speeds along with the absence of traffic coordination are estimated to be responsible for around 33.6% of deaths.

The above stated statistics are illustrated with a pie chart below



[FIG 1.1 PIE CHART SHOWING THE SHARE OF DEATHS BY ROAD ACCIDENTS]

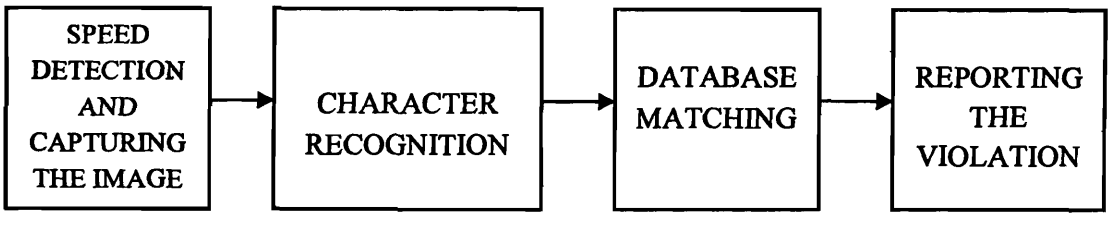
Percentage change in Population, Incidence and Rate of Accidental Deaths over the corresponding previous year during 2003 to 2007

Year	Percentage Change in Population over the Previous Year	Percentage Change in Accidental Deaths over the Previous Year	Percentage Change in Rate of Accidental Deaths over the previous Year
(1)	(2)	(3)	(4)
2003	1.7	-0.2	-1.9
2004	1.6	6.8	4.9
2005	1.6	6.1	4.7
2006	1.5	7.0	5.2
2007	1.5	8.3	6.8

[FIG 1.2 TABLE SHOWING THE PERCENTAGE CHANGE IN ACCIDENTAL DEATHS EVERY YEAR]

The SPEED TRAP is an automatic number plate recognition system which automatically detects any vehicle that is speeding over the pre-defined limit and captures the image of that vehicle and in turn the image is processed to obtain the license plate of the vehicle. The license plate is obtained using the character recognition techniques and the number plate in turn obtained is compared with the already existing database for the purpose of the vehicle identification. The owner's phone number is obtained from the database and the owner/driver is notified through a text message about the violation. The main advantage of this system is the instantaneous nature of the process, as and when the violations are detected, the drivers are notified within a very short time and thereby hindering any forthcoming mishaps. And the whole system is "automated" and doesn't need any human intervention which rules out the possibility of human errors.

1.2 OVERVIEW



[FIG 1.3 BLOCK DIAGRAM OF THE SPEED TRAP]

The "SPEED TRAP" consists of 4 different modules

1. Speed detection and capturing the picture:

This module aims at pinpointing the over speeding vehicle which in turn triggers the camera to take the picture of the license plate of over speeding vehicle. This is done using microcontroller and infrared sensors to determine the speed of vehicle and a camera to picture the license plate of the vehicle if it crosses a predefined speed limit. The acquired picture is then sent for processing.

2. Image processing and registration number extraction:

The basic principle employed here is "store-compare-decision making". The acquired image of the over speeding vehicle is extracted and is processed obtain the required feature. In our case it happens to be the number plate of the vehicle. The image pre processing is done using the known techniques of image enhancement, noise reduction. This image is then compared with the already available image database (RTO) to get the car details (registration number).

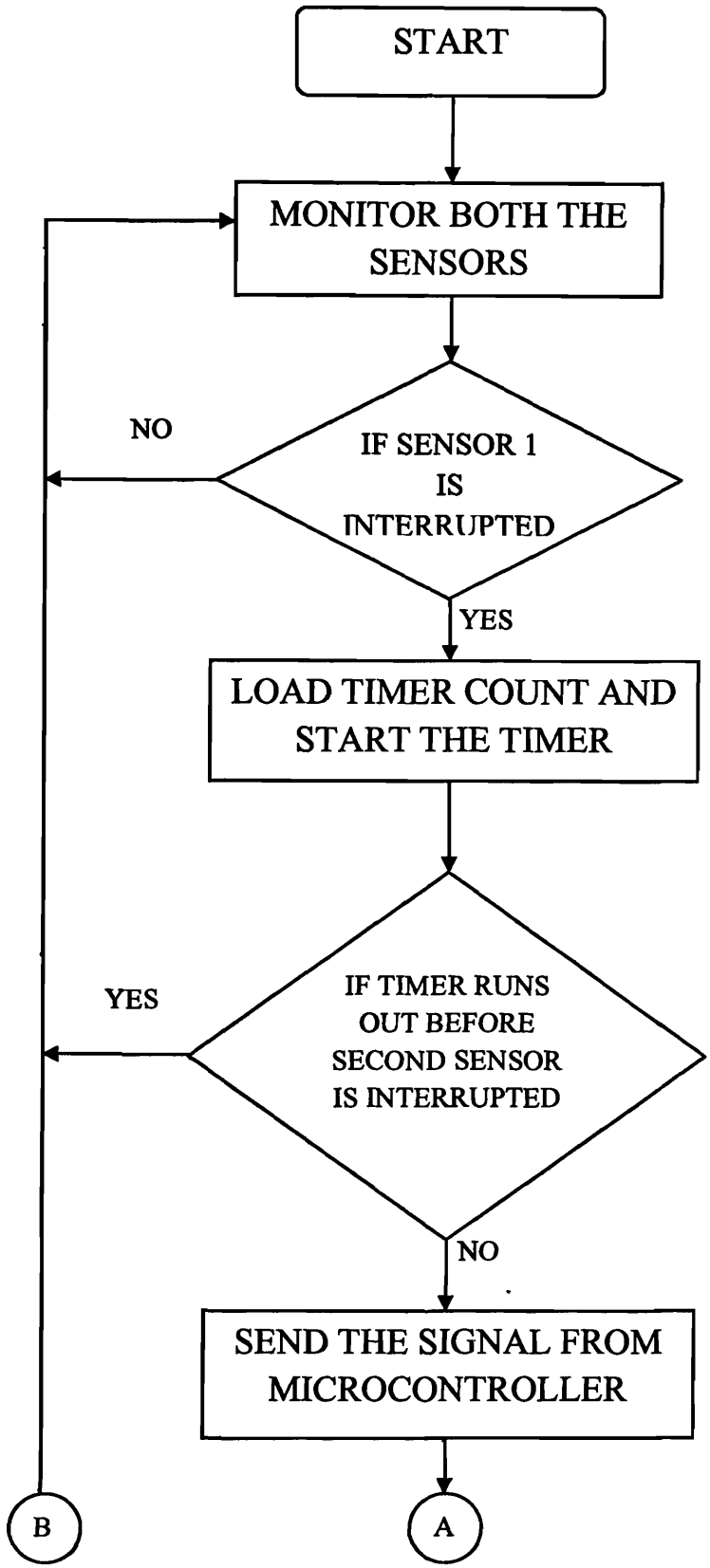
3. Extraction of the details of driver/owner and the car:

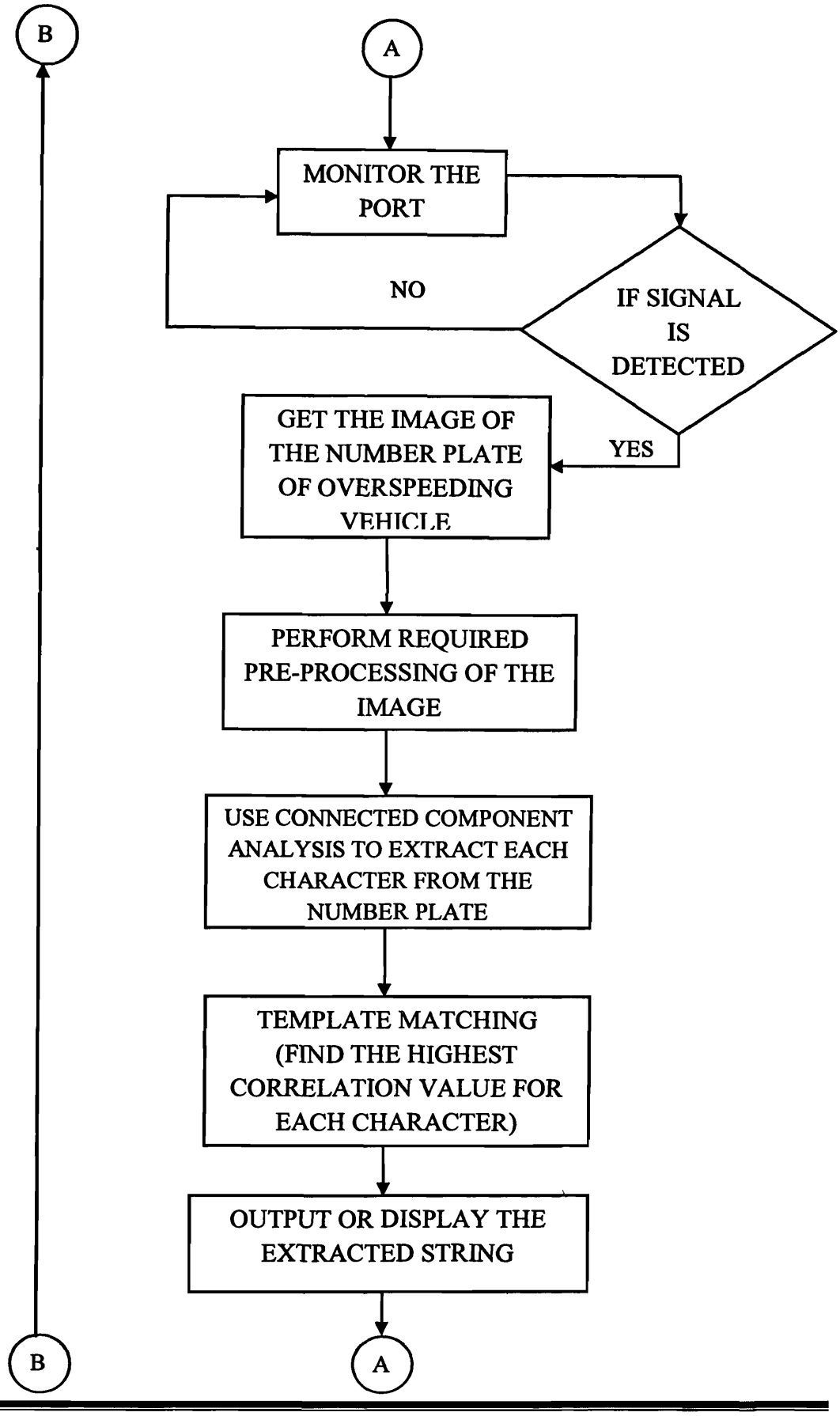
The car registration number itself acts as the primary key for extracting details of the driver/owner. This step involves extraction of details like address, phone no, email id, license no, insurance, chassis/engine number etc. This can be done using any of DBMS.

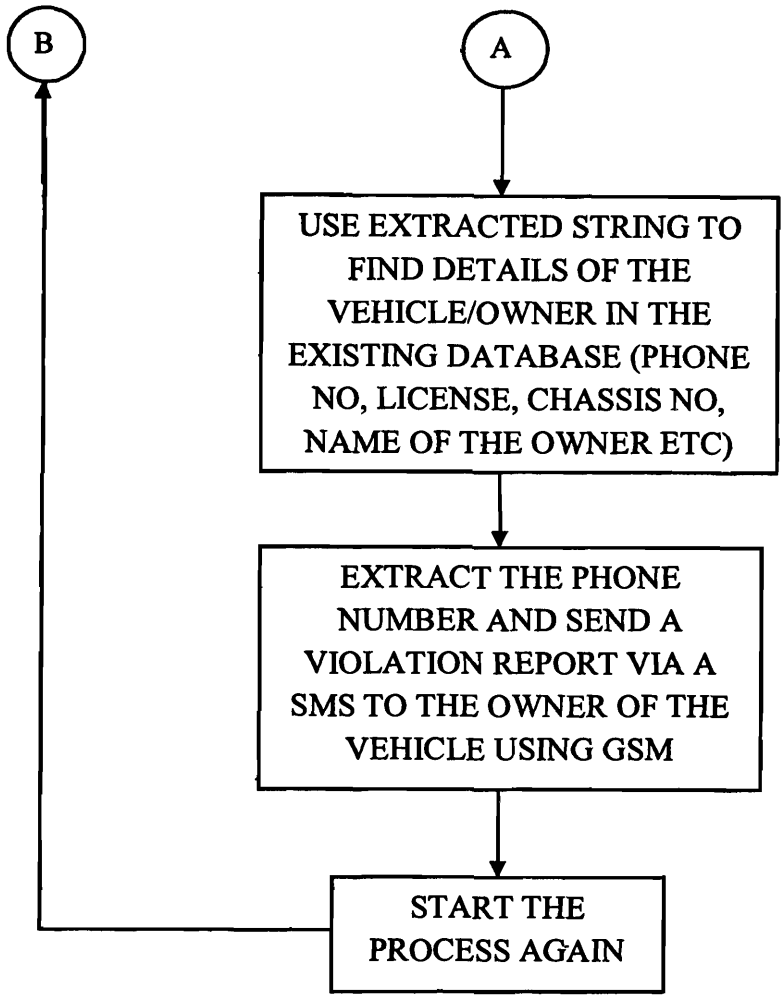
4. Reporting/Notification:

The violation of the traffic rule by the owner/driver is to be notified to the owner of the vehicle using different communication methods such as sending SMS, e-mail, posting the violation report to the address. Further course of action will be taken by the concerned authorities.

1.3 FLOWCHART




B
A
MONITOR THE PORT
NO
IF SIGNAL IS DETECTED
YES
GET THE IMAGE OF THE NUMBER PLATE OF OVERSPEEDING VEHICLE
PERFORM REQUIRED PRE-PROCESSING OF THE IMAGE
USE CONNECTED COMPONENT ANALYSIS TO EXTRACT EACH CHARACTER FROM THE NUMBER PLATE
TEMPLATE MATCHING (FIND THE HIGHEST CORRELATION VALUE FOR EACH CHARACTER)
OUTPUT OR DISPLAY THE EXTRACTED STRING
B
A



[FIG. 1.4 Flow chart for SPEED TRAP]