

**SYNOPSIS ON**

**SmartFlow: Integrated Emergency Vehicle Detection and Traffic Rule  
Monitoring System**

Submitted to the  
Department of Master of Computer Applications  
in partial fulfilment of the requirements  
for the Mini Project (MCAP1)

by

**Komal S Kallanagoudar**  
**1MS22MC016**

Under the guidance of

**Abhishek K L**  
**Assistant Professor**

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**Department of Master of Computer Applications**  
**RAMAIAH INSTITUTE OF TECHNOLOGY**

(Autonomous Institute, Affiliated to VTU)  
Accredited by National Board of Accreditation & NAAC with 'A+' Grade  
MSR Nagar, MSRIT Post, Bangalore-560054

# 1.Title

## SmartFlow: Integrated Emergency Vehicle Detection and Traffic Rule Monitoring System

## 2.Project Overview

SmartFlow is an innovative system designed to enhance road safety and traffic management by combining advanced technologies for emergency vehicle detection and real-time traffic rule monitoring. The project addresses the critical need for efficient emergency response and improved adherence to traffic regulations. Through the integration of cutting-edge sensors, computer vision, and artificial intelligence, SmartFlow aims to create a smarter and safer traffic environment.

### 2.1 Introduction

The proposed system utilizes the sensor data, communication and automated algorithms is to be developed to keep traffic flowing more smoothly. The aim is to optimally control the duration of green or red light for a specific traffic light at an intersection. When traffic is heavy in one direction, the green lights should stay on longer. The traffic light system has also been given an emergency mode, which gives ambulances priority to pass through traffic lights. And it is impotent to implement the Traffic Rule Violation Monitoring System because Road accidents are the ninth leading cause of death globally with over 12 lakh people dying on the roads each year across the globe. One of the major reasons for this would be traffic rule violations. And sending emergency alert through voice control system when driver is not well or facing some health issue in order to save the life of driver.

### Objectives :

- The traffic light system has also been given an emergency mode, which gives ambulances priority to pass through traffic lights.[2].
- Monitoring the vehicles who violate the traffic rules so that number of road accidents reduces and save many lives [3].
- By utilizing Li-Fi through streetlights, this system aims to provide drivers with an easy and reliable means of navigation, enhancing safety and convenience [4].
- A performance profile of drivers, is created and updated, will be based on physiological measurements collected in real-time from existing non-intrusive devices in the vehicles, during the operation on a certain service route [5].

## 2.2 Scope

- Target Audience involves Traffic Management Authorities, Law Enforcement Agencies, Emergency Services.
- Platform supported includes Traffic Signal Integration, IoT and Sensor Integration, Mobile Applications, Cloud-Based Infrastructure.

## 2.2 Features

Congestion control, Emergency vehicle Detection, Traffic rule violation monitoring system, Healthcare monitoring system

## 3. Project Architecture

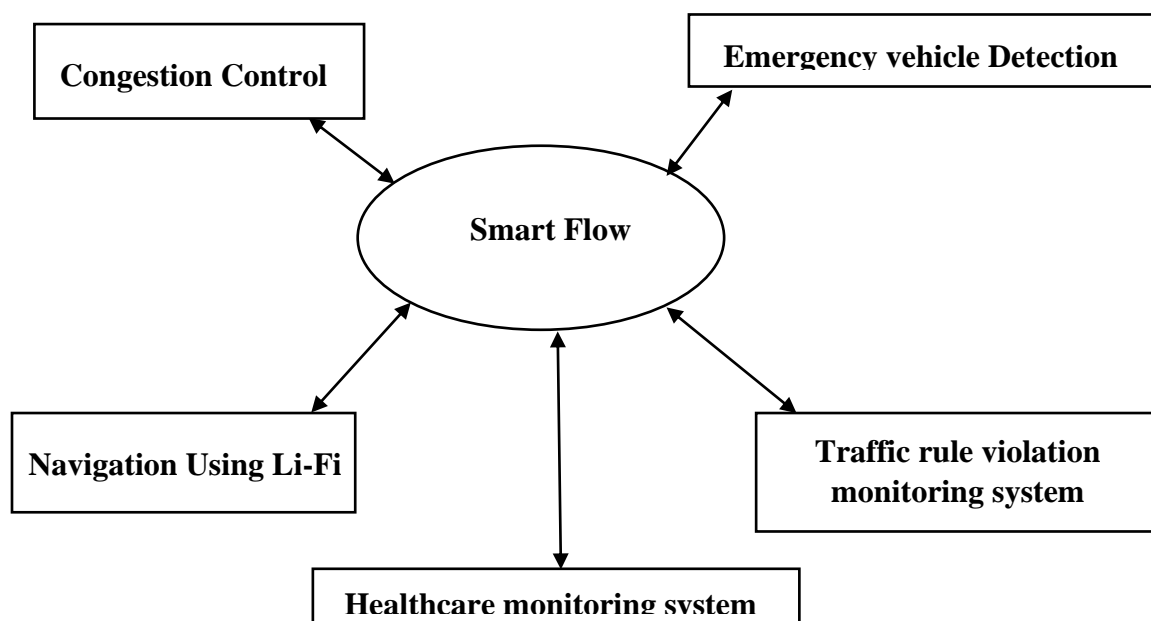
### 3.1 System component

- Arduino MEGA
- Ultrasonic sensors
- Traffic LED's
- LDR
- RFID Tags

### 3.2 Technologies Used

- Arduino Integrated Development Environment (IDE) and its Libraries.

### 3.2 Design Diagram:



## 4.Functionalities

- Congestion Control
- Emergency vehicle Detection
- Navigation Using Li-Fi
- Traffic rule violation monitoring system
- Voice Controlled Emergency Alert System

## References:

1. Sanjay Kumar Sahu, Atul Basant, Taman Vasudev, Kusagra Khati, Nikhil Lawrence published a paper on Traffic Management System using IoT (2021). Working on the basis of IoT and its embedded network and it is taking real time data as the input to track the traffic management system and giving output in terms of time assigned to traffic lights on the basis of density
2. Syed Arshad Basha, Deep Rakesh, Chirag, Mahesh, Prof. Satish Kumar published a journal on Smart Traffic Control using Arduino UNO and RF module. It is developed with integration of all hardware components Utilizing an IR sensor and RF technology, to effectively reduce the delay time for emergency vehicles.
3. Roopa Ravish, Shanta Rangaswamy, Kausthub Char worked on Intelligent Traffic Violation Detection paper published by IEEE in 2021 2nd Global Conference for Advancement in Technology (GCAT) Bangalore, India. Oct 1-3, 2021
4. Niharika Mishra, Riya Mandal, Monika Rai, Harjeet Kaur worked on Navigation System using Light Fidelity Proceedings of the 2nd International Conference on Trends in Electronics and Informatics (ICOEI 2018) IEEE Conference Record: # 42666; IEEE Xplore ISBN:978-1-5386-3570-4
5. Pedro Maximino, Rui S. Cruz, Miguel L. Pardal worked on Smart Healthcare Monitoring System For Healthy Driving in Public Transportation published paper in 2023 18th Iberian Conference on Information Systems and Technologies (CISTI) 20 – 23 June 2023, Aveiro, Portugal ISBN: 978-989-33-4792-8