# Lane Control using Laser and RFID Tech

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***Abstract:*** The aim of the paper is to develop a low-cost lane control system so that drivers can stay in the right lane and therefore prevent accidents. In general, we find that in many regions where roads do not have dividers, and some drivers do not stay in their respective lanes owing to the number of accidents that have occurred. The only way to keep these types of careless drivers in their lanes is to punish them if they cross the lane. We can employ image processing, but it is expensive, and the obtained image is occasionally warped by noise and not clear owing to varying climatic circumstances. To address this issue, we devised a solution in which cars that cross the lane are identified using a laser beam and RFID technology. The idea is simple: laser light is projected onto an LDR that is precisely on the road's lane of separation. When a vehicle crosses the lane, the laser beam is impeded, activating the RFID reader, which reads the data from the RFID tag affixed to the car. The received data is submitted to the server, and punishment is imposed as a result.

***Keywords*: Laser, Image Processing, RFID technology, LDR**

## I. INTRODUCTION

With the city seeing greater automobiles on its roads, compliance with street guidelines appears to be on the decline. A predominant violation that is affecting the easy go with the drift of visitors and ensuing in injuries is taking the incorrect facet of the street and crossing the medians. While the police say offenders even move medians and use the proper facet to keep away from automobiles ready earlier than them, such violations are greater at locations wherein there aren't any medians. Every year, over a lakh, die due to street crashes and consequently, the percentage of folks that get injured is sort of 3 to fourfold higher. It is the younger lives that might be snuffed out the maximum because of street injuries in India. In 2016, a mind-blowing 60% of those who misplaced their lives in street injuries have been withinside the age institution of 18-35 years. Tragically, the bulk of them has been the only income individuals in their families. To address this trouble of no medians and drivers crossing the medians we have got a concept wherein the automobiles that cross the lane may be detected the usage of a Laser beam and RFID Technology and challan may be issued to the driver. Traditional techniques use image processing however it will become very pricey and it can additionally be suffering from horrific climate situations like wind, rain, fog, etc. Thus won't be accurate. The picture obtained with the aid of using the digital digicam may be distorted with the aid of using noise and won't be clean and putting in excessive-definition cameras anywhere might be very pricey with an excessive preservation price delivered to it. In this project, the technique is cost-powerful and identifies automobiles without being distorted with the aid of horrific climate and noise because it makes use of radio waves coming from RFID systems.

## II. PROBLEM STATEMENT

To develop a system to detect the vehicles or drivers who drive recklessly onto the opposite lanes to overtake and speed causing accidents where there are no dividers on the road and to raise a challan or fine them. Also considering the cost-efficacy and accuracy.

## III. EXISTING SYSTEM

Existing systems use image processing, deep learning algorithms, and vehicle-mounted cameras to capture images, and then use various filtering techniques, such as Gaussian low-pass filtering and Bayer filtering to remove noise in the image, and then use various visual processing algorithms. However, if the camera is affected by severe weather conditions such as wind, rain, and fog, it will not work. Therefore, the accuracy may be incorrect. The image taken by the camera may be distorted and blurred due to noise, even if many filtering techniques are used, it may also be due to the shadow and overlap of Hough and the horizon, and then scan the lane in the lower-left corner, the edge point overlap of the lane does not follow the right track.

## IV. PROPOSED SYSTEM

Each vehicle will have an RFID tag attached underneath it, which holds the data like vehicle Number and the owner's name. Whenever a vehicle crosses its respective lane, with the help of a Laser detection system and RFID Reader, the data of the vehicle is read. And thus a challan or fine is raised on the vehicle.

## V. WORKING

The concept is to combine 3 simple various systems i.e.,

Laser detection, RFID Technology and sending data through ESP.

The Laser is projected onto an LDR in parallel above the Lane separation line on the roads. Every vehicle has an RFID tag attached at the bottom of the vehicle. This tag contains the data of the vehicle like the vehicle number and the owner's name. Whenever a vehicle crosses the separation line the LDR sends a signal that turns on the controller - STM32F103C8. This controller then activates the RC522 RFID Reader and the ESP8266. The RFID reader reads the data of the vehicle from the RFID tag attached to it. This data is then sent to the database/server by the ESP where the challan or a fine is raised on the vehicle.

This all happens in seconds. Also, it is cost-efficient. This system just works on a 9V battery and hence consumes less power.

## VI. HARDWARE SPECIFICATION

- STM32F103C8
- RC522 RFID Reader
- ESP8266
- Laser
- BC547 transistor
- Light Dependent Resistor(LDR)
- 9V Battery
- 2.2k resistor

## VII. FLOWCHART

- Firstly the laser is projected onto an LDR(Light Dependent Resistor) exactly on the lane of separation using a 9V Battery.
- Along with the laser circuit, the microcontroller STM32F103 is connected
- The controller gets the input voltage only when there is an obstruction on the lane. To save the power also.
- This controller will have the RFID reader RC522 and the ESP8266 connected to it.
- Whenever the obstruction of the laser occurs, the controller is activated and the RFID reader connected to it reads the details from the RFID Tag which is fitted to the vehicle.

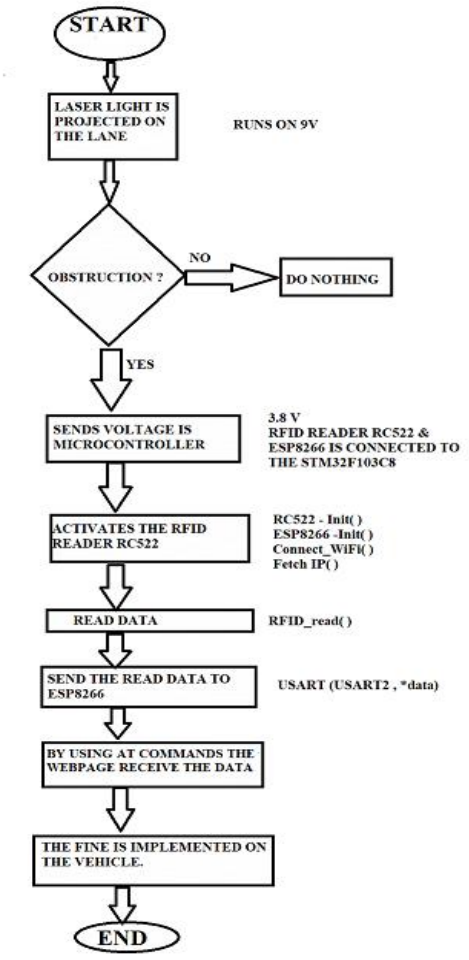


*Fig 1: Flowchart of the proposed system.*

## VIII. HOW IT IS BETTER THAN OTHER SYSTEMS?

- Cost-efficient - May take up to 700 INR to cover a long distance.
- Works on just a 9V battery. Since these are placed on roads we can fix small solar panels for them.
- We can include the Laser detection process in the microcontroller itself but for power consumption, we made it independent.
- Thus the microcontroller gets power only when there is an obstruction of the laser beam.
- Unlike image processing, this system cannot fail in any climatic conditions.

## IX. CONCLUSION

It is always seen that the drivers get into the opposite lane where there are no dividers to overtake or get going fast. This kind of attitude in drivers causes numerous accidents. The

main idea of the project is to control the drivers not to cross the Lane where there are no dividers by creating the fear of fines. With this idea of the project, we can inculcate fear in the driver's mind so as not to cross the Lane on the Roads. The cost of making this product is very effective i.e. will be less than INR 1000. So instead of using the Image Processing technique which is costly, we can implement this system. We can also use high range RFID readers like EM18 so that the efficiency of reading the data increases. By this technique, the number of accidents will decrease resulting in saving many lives. We can also cut the cost while maintaining the same efficiency.

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