

AN ADVANTAGEOUS AND BENEFICIAL METHOD TO AVOID ACCIDENTS AT TRAFFIC SIGNALS

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Abstract: Today, with the rising issues of accidents, discipline towards the traffic signal has been a serious issue. People just drive carelessly and recklessly and ignore the traffic signals. They do not follow the traffic signals which ultimately give rise to accidents. Some of the reasons for accidents at the traffic signals are caused when there are just 5-10 seconds left to finish the countdown and people drive with the flow. Also, when people are a bit closer to a signal and they see that the traffic signal is about to finish, they drive as fast as they can, and , the result is they hit with the people which had already been cross the road at the last 5 seconds of their signal. All these issues arise only due to lack of discipline and patience at the traffic signals. According to study [8], there were at least 4, 80,652 accidents in 2016, leading to 1, 50,785 deaths. The number suggests that at least 413 people died every day in 1,317 road accidents. Further breaking down the statistics, the data reveals that at least 17 deaths occurred in 55 road accidents every hour in the given time period. So, to overcome the issues of traffic accidents and to bring a discipline and patience among the people at the traffic signals, this research proposes a system by which we can avoid the traffic accidents and bring a specific discipline at the signals.

Index Terms - Accidents caused at traffic signals, discipline, and patience.

I. INTRODUCTION

Every day we travel from one part to other for one or the other reasons like for our jobs, business or for some personal work, etc. While travelling we come across traffic signals. But, at the traffic signals sometimes we view or sometimes we ourselves, come across some accidents. But why these accidents are caused even having the traffic signals? What can be the main reason behind these accidents at traffic signals? So, to study these issues we did a survey among the people by framing approximately 15-17 questions which recorded approximately 212 responses. From that survey we came to know some main reasons behind the accidents like crossing the road when the countdown of the traffic signal is about to finish i.e. at the last 5-10 seconds remaining. Also, when the people are a bit closer to a signal and they see that the traffic signal is about to finish, they drive as fast as they can, and , the result is they hit with the people which had already been cross the road at the last 5-10 seconds of their signal. Everybody is in hurry to cross the road. Anyone crosses the road whether it is red or green signal. Anyone stands on the zebra crossing when waiting for the signal. This clearly explains lack of discipline and patience at the traffic signals. To study more about these issues, we also went through some newspaper articles and some statistics depending upon the previous data which had been collected by the respective authority. By study [8], there were at least 4, 80,652 accidents in 2016, leading to 1, 50,785 deaths.

The number suggests that at least 413 people died every day in 1,317 road accidents. Further breaking down the statistics, the data reveals that at least 17 deaths occurred in 55 road accidents every hour in the given time period. Also, some statistics say that, one serious road accident in the country occurs every minute and 16 die on Indian roads every hour. From which most are caused at traffic signals. So, to overcome this issues this research proposes a system which can be implemented at the traffic signals to maintain the discipline, the decorum and the patience at the traffic signals. The accidents cause at the traffic signals by the above reasons mentioned but the string to all this issues is lack of discipline and patience among the people at the traffic signals. So, the main motto of this proposed system is bring an automatic discipline and patience among the people with the help of technology. If discipline occurs then automatically patience is developed among people and when both these qualities walk side by side, there can be surely a lock to these accidents causing at the traffic signals.

II. LITERATURE SURVEY

The increasing rise in the accidents today have grabbed everyone's attention, specially the rise of accidents and the indiscipline performed by some people at the traffic signals. Hossam M. Sherif [1] A vital application which plays an important role in life saving is automatic vehicle accident detection. The author explains of this research explains Real Time Traffic Accident Detection System (RTTADS) using Wireless Sensor Network (WSN) and Radio-Frequency Identification (RFID) Technologies. The author Maninder Singh (1), Amrit Kaur (2) [2] explains about the road traffic accidents and different techniques of data mining that can be implemented which reduce the traffic accidents, traffic blocks and congestion problems. The author Olejnik K [3] explains the behavior of the vehicle drivers at the intersections when the traffic signal light changes from green to yellow. When the vehicle drivers are a bit closer to a traffic signal but they see that the signal is going to become red, they are in just hurry to cross the road because they do not want to stop at that time. It results to huge intensity accident. So, from this research work, the author explains the analysis of these issues. The author R. Priya [4] grabs the similar issue of these accidents, traffic blocks and congestion at traffic signals and proposes a simple model of barriers at the traffic signals. This research explains the model with use of Arduino and other things required. Also it describes and explains the difference between the existing and the

proposed traffic signal system. The author Yun-xia Wang [5] studies and describes about the traffic intersections and traffic organization. Also it explains the importance and need of electric bicycle.

III. DATA SET COLLECTION

To understand the problems of traffic accidents and bring a specific and standard discipline among the people at the traffic signals, we conducted a survey among the people. There are various sites and lots of data which is available on internet or on any other medium, but to get the actual data and a proper feedback from the people’s side regarding this issues which are practically and daily faced by them, surveys were the best option. The questions we framed were not directly but indirectly asked about the issues to get the honest answers from people’s side. The survey form contained about 17 questions which collected about 212 entries which mainly had more entries from pune. The questions received approximately average honest reviews as there were more than half negative answers.

1	City	Age Group	Do you us	Type of ve	How Freq	Do you ha	Have you	If yes, ho	If yes, wh	Do you fol	If you are	If you are	If you are	Do you cr	Set your s	Rate the c	Suggestions (If any)
2																	
3	Pune	15-18	Yes	Two-Whe	Weekly	No	Yes	01-May	Due to otl	Yes	No	Sometime	Sometime	Sometime	7	5	
4	pune	19-25	Yes	Two-Whe	Weekly	No	Yes	01-May	Not follow	Yes	Yes	Wait on th	Drive till i	Yes	5	4	
5	pune	15-18	Yes	Two-Whe	Daily	No	Yes	01-May	Road conc	Yes	Yes	Drive at th	Sometime	Sometime	6	6	
6	pune	15-18	Yes	Two-Whe	Weekly	No	Yes	01-May	Not follow	Yes	Yes	Drive at th	Stop the v	Yes	5	4	
7	Pune	15-18	Yes	Two-Whe	Weekly	No	Yes	01-May	Due to otl	Yes	Yes	Wait on th	Sometime	Sometime	7	5	
8	Pune	19-25	Yes	Two-Whe	Daily	No	Yes	01-May	Not follow	Yes	No	Sometime	Stop the v	Sometime	5	5	
9	Pune	19-25	Yes	Two-Whe	Daily	No	No			Yes	No	Wait on th	Stop the v	No	8	8	
10	Latur	15-18	Yes	Two-Whe	Daily	No	Yes	01-May	Due to otl	Yes	Yes	Wait on th	Stop the v	No	9	9	no
11	Pune	19-25	Yes	Two-Whe	Daily	No	Yes	01-May	Due to otl	Yes	No	Wait on th	Stop the v	No	10	8	
12	Pune	19-25	Yes	Two-Whe	Daily	No	Yes	01-May	lost balai	Yes	No	Wait on th	Sometime	No	9	5	
13	Pune	19-25	Yes	Two-Whe	Daily	No	No			Yes	Yes	Sometime	Sometime	Sometime	5	6	Traffic management should be improve
14	Pune	19-25	Yes	Two-Whe	Monthly	No	No			Yes	Yes	Wait on th	Stop the v	Sometime	9	6	If a person hasn't gone through accident
15	Cavite	19-25	Yes	Two-Whe	Monthly	No	No	01-May	Due to otl	Sometime	Yes	Sometime	Stop the v	Sometime	7	3	
16	Pune	19-25	Yes	Two-Whe	Daily	No	No			Yes	Yes	Sometime	Sometime	Yes	9	5	
17	Pune	15-18	Yes	Two-Whe	Daily	No	No	None	None	Yes	No	Wait on th	Drive till i	No	7	3	Follow tragic rules strictly
18	Pune	15-18	Yes	Two-Whe	Daily	No	Yes	01-May	Due to otl	Yes	Yes	Sometime	Stop the v	No	8	6	
19	Pune	19-25	Yes	Two-Whe	Daily	No	Yes	06-Oct	Road conc	Yes	Yes	Wait on th	Sometime	No	6	6	
20	Pune	26-35	Yes	Two-Whe	Daily	No	No	None	None	Yes	Yes	Wait on th	Stop the v	Yes	6	7	
21	Pune	26-35	Yes	Two-Whe	Weekly	No	No	None	None	Yes	No	Wait on th	Stop the v	Sometime	9	7	
22	Pimnri chi	19-25	Yes	Two-Whe	Dailv	No	Yes	01-May	Due to otl	Yes	Yes	Sometime	Sometime	No	6	6	

FIG. 1: DATA SET OBTAINED

IV. DATA VISUALISATION

To explain the problems arising greatly at the traffic signals, we have done analysis and performed some operations on the data obtained by survey. As the data obtained was categorical, we have converted that data into numerical data by considering the answers obtained into numeric form. For every operation performed, we have considered the attribute data into some numeric forms and have explained it. The various operations performed are as follows:

1. Bar Chart:

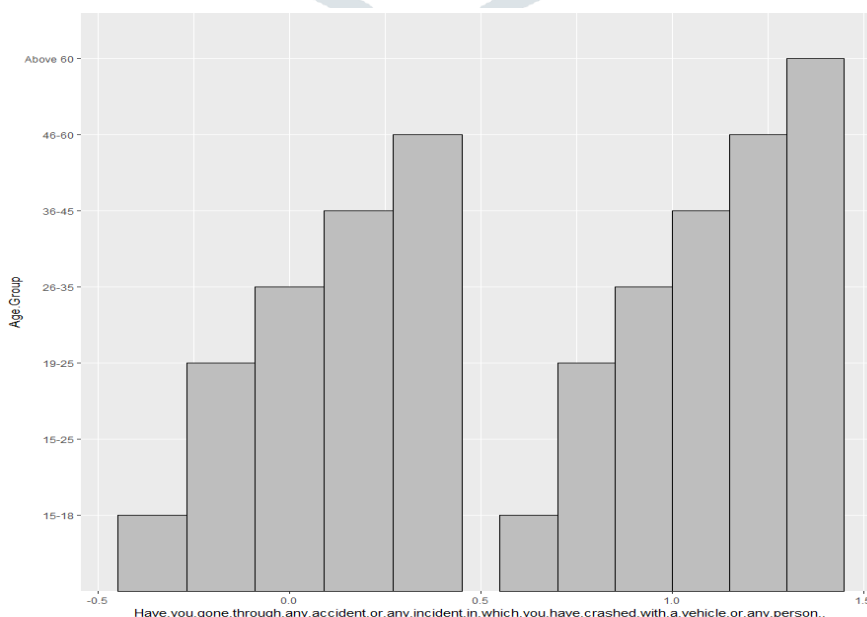


FIG. 2: ACCIDENT OR INCIDENT CAUSED VS. AGE GROUP

- Data consideration:

Q. Have you gone through any accident or incident in which you have crashed with a person?

1 - Yes

2 – No

- Explanation:

The above visual explains that most of the accidents take place in the age group of youngsters. There is rise in accidents mostly among the youngsters at the traffic signals which have many reasons for the accidents.

2. Histogram:

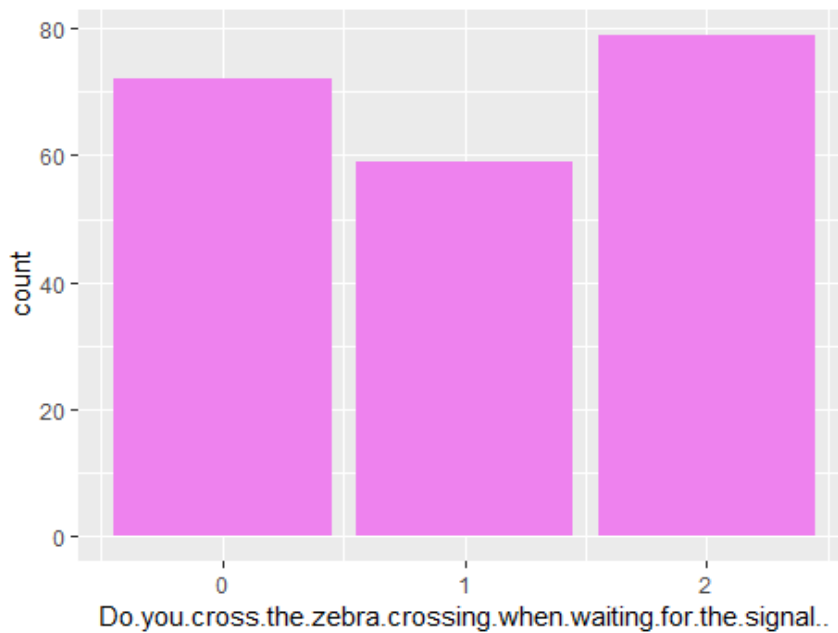


FIG. 3: COUNT FOR THE VEHICLES CROSSING ZEBRA CROSSING WHEN WAITING FOR SIGNAL

- Data consideration:

Do you cross the zebra crossing when waiting for the signal? :

0 – Yes

1 – No

2 – Sometimes

- Explanation:

It explains that people have the knowledge that they should wait behind the zebra – crossing when waiting for the signal but sometimes they don't wait behind the zebra-crossing which forces them to cross the signal in hurry and results into accidents. It also shows the lack of patience and discipline at the traffic signals.

3. Pie chart:

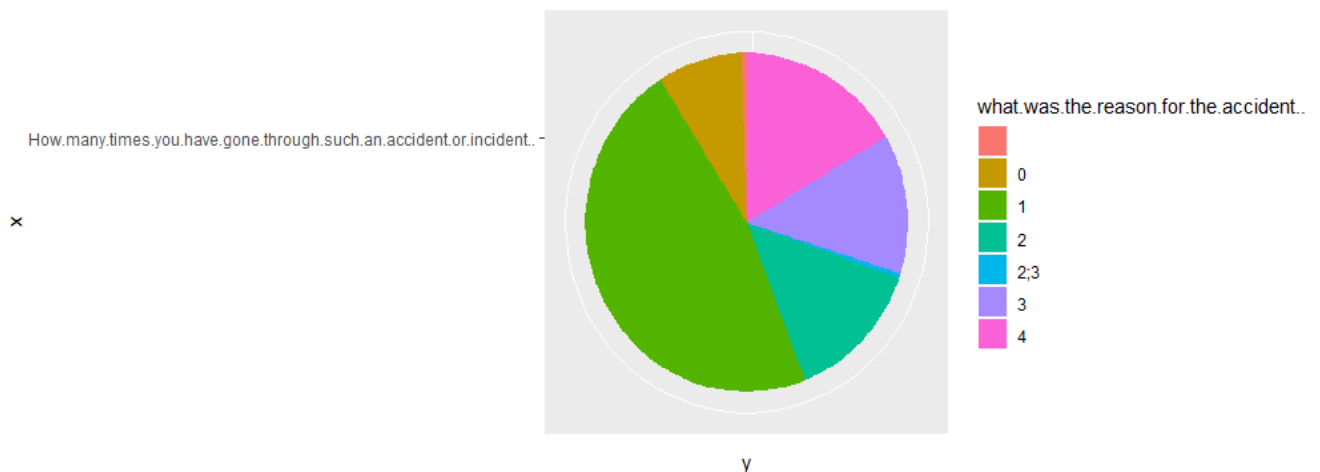


FIG. 4: . REASONS BEHIND THE ACCIDENT

- Data consideration:

Q. How many times you have gone through an accident or incident?

1-Yes

0-No

Q. What was the reason for the accident?

0-None

1-Not followed the traffic signal

2-Due to other driver’s mistake

3-Road condition was bad

- Explanation:

The numbers of accidents are increasing at the traffic signals due to various reasons. But the main reason for the accidents is non-follownace of traffic signal which raises the count.

4. Dot plot:

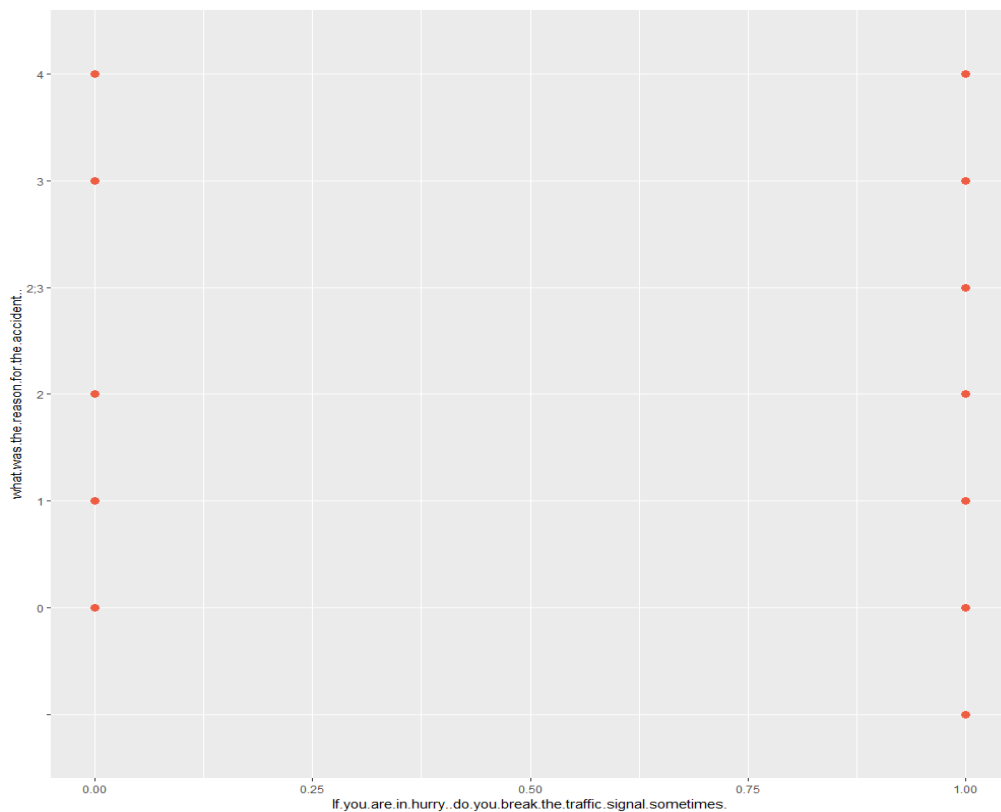


FIG. 5: BREAKING OF THE TRAFFIC SIGNAL SOMETIMES IN HURRY VS. REASON BEHIND THE ACCIDENT

- Data consideration:

Q. If you are in hurry, do you break the traffic signal sometimes?

0- No

1-Yes

Q. What was the reason behind the accident?

0-None

1-Not followed the traffic signal

2-Due to other driver’s mistake

3-Road condition was bad

4-Other

- Explanation:

It clearly explains that the people who were in hurry and have break the signal sometimes; they sometimes have gone through an accident. The vital reason for most of the accidents was not following the traffic signal. It was not always the reason behind the accidents, but according to the analysis, it shows and explains that most of the accidents were caused by not following the traffic signal and when they were in hurry.

5. Density plot:

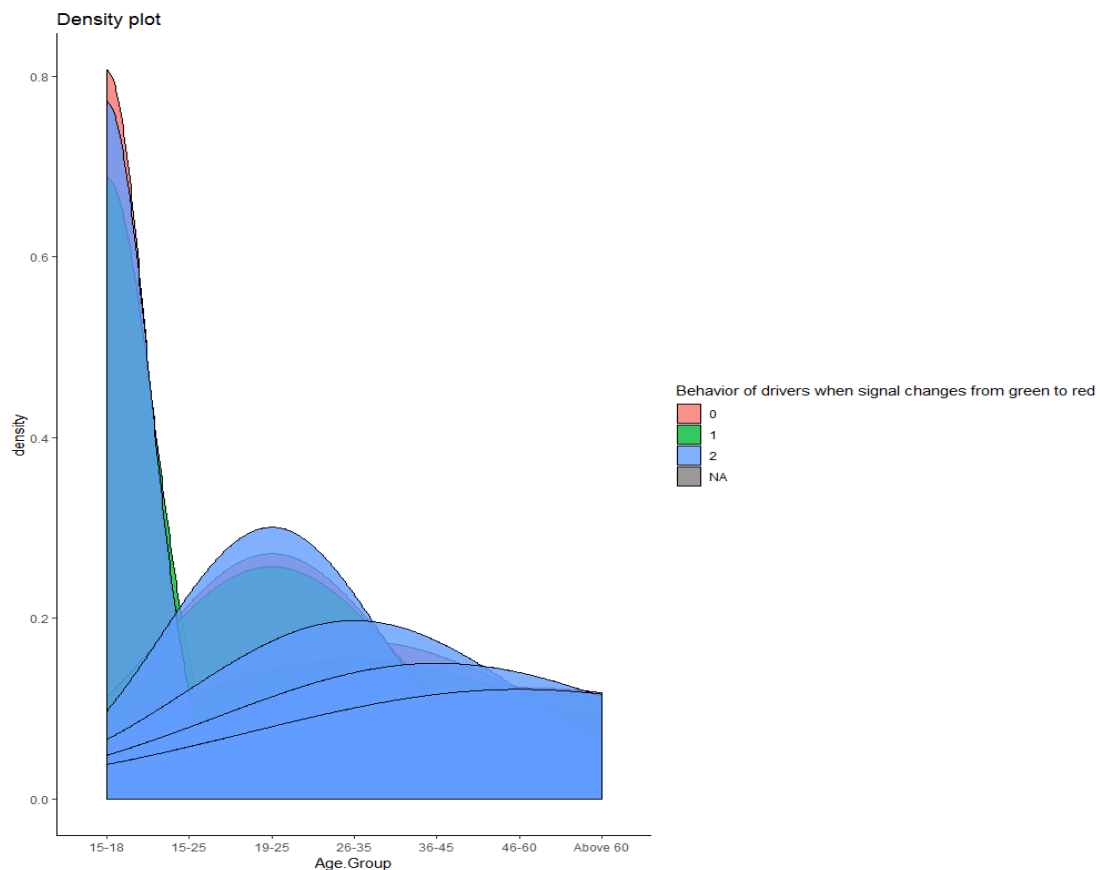


FIG. 6: BEHAVIOUR OF DRIVERS WHEN SIGNAL CHANGES FROM GREEN TO RED

- Data consideration:

Q. Behavior of the vehicle drivers when they see that the signal is going to become red?

0-Stop vehicle at the signal

1-Drive the vehicle till it becomes red

2-Sometimes drive when in hurry

- Explanation:

This density plot explains that when the people are driving and from a distance they see that the signal is going to become red they just in hurry; drive their vehicle to avoid to wait on the signal which can result to accidents. This condition is mostly in the youngsters. It is not just risky for the person driving the vehicle but also to other people. The blue colored shape shows that sometimes in hurry people perform this activity.

6. Lollipop chart:

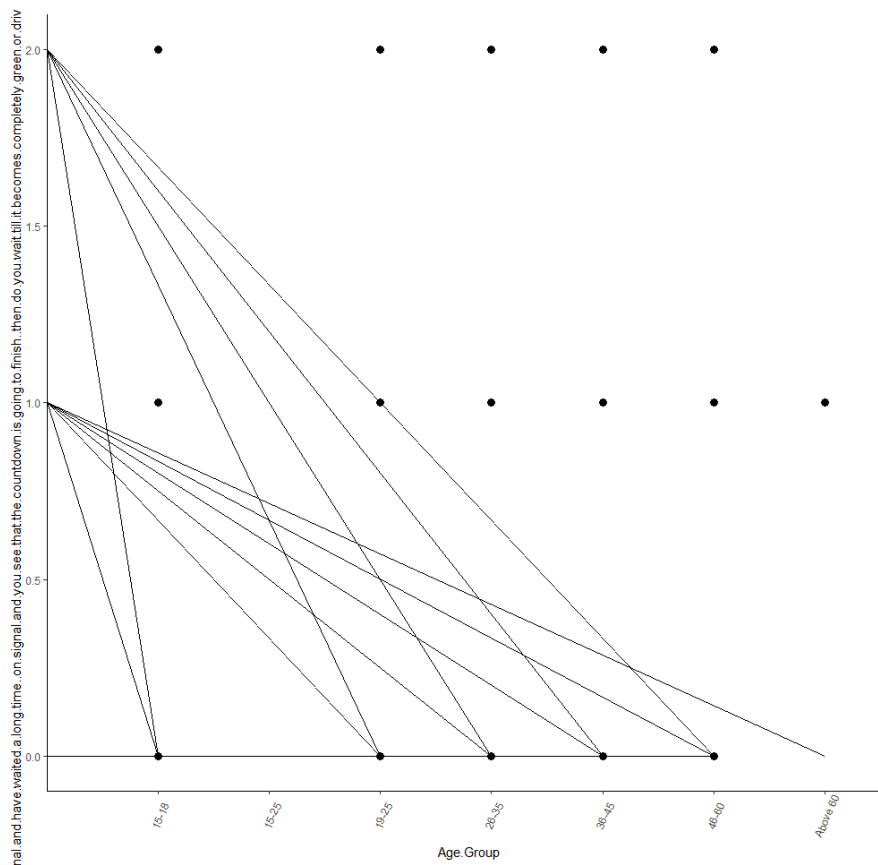


FIG. 7: AGE GROUP VS. BEHAVIOR OF VEHICLE DRIVERS WHEN SIGNAL CHANGES FROM RED TO GREEN

- Data consideration:

Q. Behavior of vehicle drivers when signal changes from red to green when waiting for the signal from a long time

0-Wait on signal till becomes red

1-Drive the vehicle at the last 5-10 sec left to finish

2-Sometimes drive when in hurry

- Explanation:

The lollipop chart explains us that when the vehicle drivers have waited for a long time and the signal is about to finish, they sometimes in hurry, drive their vehicle which causes the condition of accidents. It shows lack of patience at the traffic signal. It highlights mainly among the youngsters.

7. Line plot:

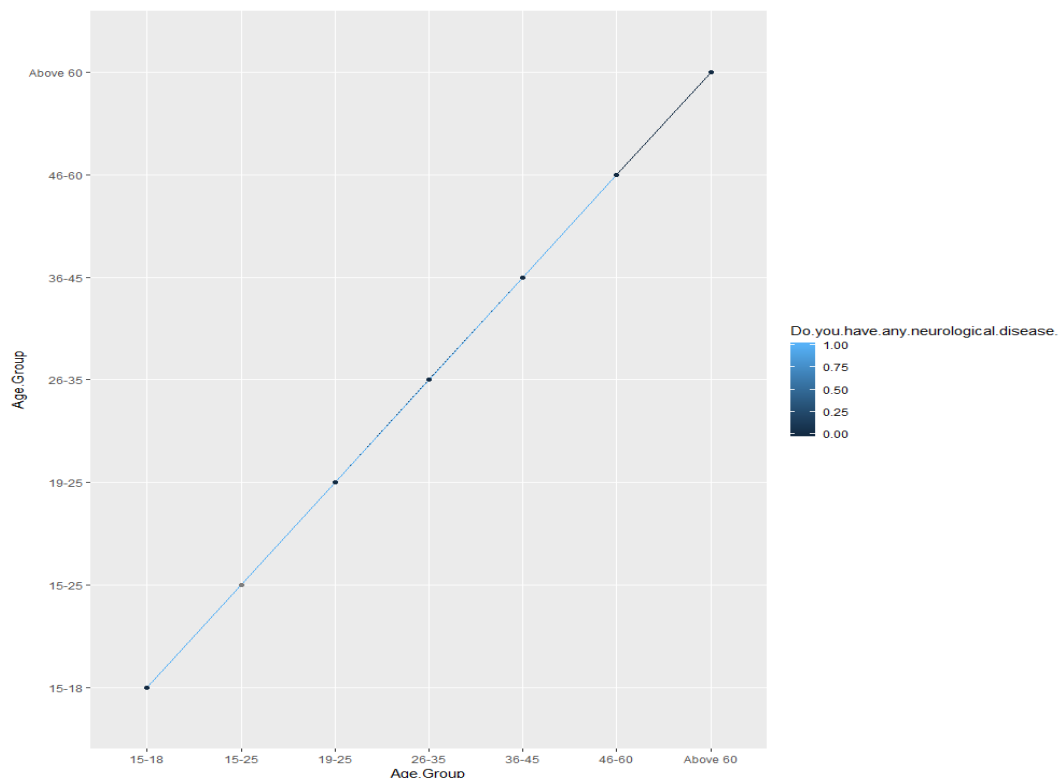


FIG. 8: AGE GROUP VS. CONDITIONS HAVING NEUROLOGICAL DISEASE

- Data consideration:

Q. Do you have any neurological disease? :

1-No

0-Yes

- Explanation:

The plot explains about conditions with the persons having neurological disease. The neurological disease can also play a vital role in the cause of accidents. The strong reflex actions at the time of accidents can sometimes avoid accidents but the persons having the neurological disease have less power of reflex actions which makes them difficult to avoid an accident at that particular moment. So, according to the analysis, these disease is seen more in age group above 60.

V. OBSERVATIONS

The above visuals explain us that the main reason behind the accidents is lack of discipline, patience, conditions in hurry to cross the signal and carelessness. The rise in accidents is seen more in the age group of 20 – 30 which is a serious issue. Also, with lack of discipline and patience, some other factors also involve in the rise of accidents. When people are waiting for a long time at a signal and when they see that the signal is about to finish and become green, they are just in hurry to cross the road. Also, when people are driving and they are a bit closer to a signal, but they see that the signal is about to finish and going to become red, to avoid stopping at the signal, they just drive faster than normal to cross the signal. In both conditions, there are 70-80 % chances of causing accidents. Both the conditions highlight the need of patience. The crossing or stopping at zebra-crossing during the red signal highlights the problem of discipline which can also lead to accidents.

VI. PROPOSED SYSTEM:

The proposed system works with two different possibilities:

Possibility I] If a vehicle touches or stands on the zebra crossing when the signal is red:

In this possibility, the system includes the wiring connected within the white marks of the zebra-crossing. The left and right ends of the zebra-crossing consist of four sensors each one connected at the corners of that respective zebra-crossing. The sensors are also connected with the traffic lights. The sensor senses the vehicle which comes in contact with the zebra-crossing when the signal is red. Also, it consists of two sirens honning with red lights each connected to the zebra-crossing and to the sensors. So, whenever a vehicle touches or gets in contact with the zebra-crossing, the sensors senses the vehicle and the siren sounds with the red lights. So, whenever a vehicle crosses or even touches the zebra – crossing purposely or by mistake, it will signal to those drivers to take the vehicle back. The siren will only stop when that vehicle will be taken back behind the zebra-crossing. This will help to maintain the discipline at the traffic signals and vehicles will be in a proper manner at the signals during the red signal.

Possibility II.] If the vehicle crosses the zebra crossing during the red signal:

There can be a possibility that some drivers can try to cross the road during the red signal even if the sirens horns with red lights. In such cases, the proposed system consists of a line which is at distance from the end line of that zebra-crossing. It consists of a string of sharp needle like structures which can puncture vehicle's tyre. This string of needle like structures opens up or swaps up when a vehicle crosses that end line of zebra-crossing during the red signal. So, if a vehicle tries to cross the zebra-crossing during the red signal, the sensors connected at the second end of the zebra-crossing will sense the vehicle and will send the request to that string of needle structures which will open up and which can stop that vehicle to cross the road. Because, if that vehicle crosses the road, the driver knows very well that it will surely puncture the tyre. So, there's no point in crossing the road. It will close only when that driver takes vehicle back at that time. During green signal it will be resting beneath that particular line. This type of system can bring a discipline and a little bit of fear among the people to cross the road during the red signal. If this kind of fear is created among the people, it will maintain a standard and specific discipline among the people and through this discipline patience can automatically be generated among the people which can avoid many of the accidents occurring today. Sometimes, it is said that fear should be completely removed from our minds, but when it comes regarding the safety and the lives of the people, for the good sake of people, for the wellness of people, there should be some kind of fear among the people which can decrease the risk taking incidents and save their lives at the traffic signals. The incidents of crossing the roads during the last 5-10 seconds remaining to finish the signal can be cured by this system.

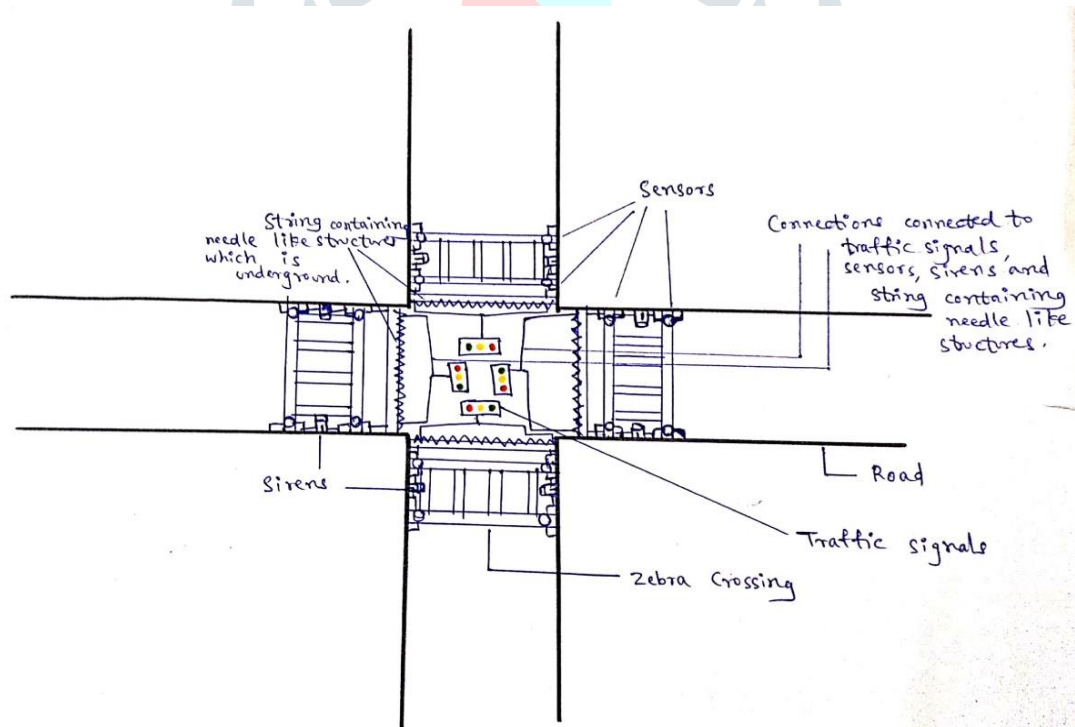


FIG. 9: DIAGRAM OF THE PROPOSED SYSTEM

VII. CONCLUSION:

The lack of discipline and patience is the main reason behind the accidents at the traffic signals. It can be stopped and avoid by proposing this system at the traffic signals. If this system is practically implemented, this system can be a problem or hectic and a certain kind of head-ache for the people to deal with this system for some days, but as they will get use- to it, it can definitely maintain a certain kind of discipline and develop patience among the people at the traffic signals which can avoid many accidents.

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