Analysis of Traffic Light Violation on Nigerian Roads (A CASE STUDY of Sango T Junction, IBADAN, OYO STATE)

E. A. Irunokhai
Federal College of Wildlife Management, New Bussa, Niger State, Nigeria

J. O. Adigun
Federal College of Wildlife Management, New Bussa, Niger State, Nigeria

O. S. Dada
Federal University of Kashere, Gombe state, Nigeria

B. O. Irunokhai
Letechs Technology, Awotan, Apete Ibadan. Oyo state, Nigeria

J. O. Onihunwa
Federal College of Wildlife Management, New Bussa, Niger State, Nigeria

ABSTRACT
Traffic violation is an ever increasing rate of offence committed by road users in Nigeria. This study examined the rate of traffic light violations on road transportation at Sango metropolitan junction, Ibadan in Nigeria. In order to ascertain the rate and number of vehicles that violates the traffic light signal, the traffic situation was directly observed. The data obtained was analysed using descriptive statistics (means), means plots, T-test and ANOVA. Findings show that higher number of vehicles violates the traffic light signal in the evening peak period against the morning period and it was deduced from the findings that motor cyclist committed higher offence of violating the traffic light signal against the motorist within the slotted time understudied. Therefore, it is highly recommended that thorough orientation and re-orientation program should be frequently organized for motorist and motorcyclist within the city. Moreover, the traffic law officers should be properly aided and sanitized to improve the discharge of their duties.

Keywords
Traffic, Violation, Road, Violators, Vehicles.

1. INTRODUCTION
Traffic is the movement of either vehicles or pedestrians on the road or in an area [1]. Human being are characterized by movement, the human feet are limited to distance it can cover within a time frame. To cover many distances considering favourable time factor, different transportation means were invented by men and this include by road, rail, water and air. Transportation is concerned with movement of people or goods for some particular purpose, which is one of the basic systems and services that are necessary for a country [2]. These has tremendously brought ease of life to the world at large and contributed to the development of the world. Considering transportation by road, many types of vehicles have been invented; some for luxury while others for cargo but all ply the same road. For every technological discovery there are principles and laws protecting the good use to avoid fatality. Rules and regulations are paramount in all aspects of life that range from way one wishes to live to how others should accommodate one's life style. All human being need to enjoy their rights to access and use public infrastructure [3]. People have been observed not to always adhere to laws and principles of the land and this come across every fields of life. This has not exempted the transportation system and traffic violation has been a phenomenon that requires urgent attention. Traffic offence is a violation of traffic regulations, such as breaking the speed limit and stop sign infractions [3]. Increase in traffic congestion is one of the major reasons for traffic violation. Road commuters tend to violate traffic rules when there is traffic congestion. As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage [4]. The residents are compelled to undergo physical stress and suffer financial losses in terms of man-hours lost on working days [5]. To bypass the physical and emotional stress of traffic jams, impatient commuters tend to look for means of boycotting the traffic congestion to an extent of violating the lay down traffic laws. Violating this law has led to many unprecedented accidents, loss of valuable properties and lives. The number of accidents on the roads is due to the rule violations such as breaking traffic signals, over-speeding, driving on wrong sides and to avoid such traffic violations, traffic police has to be present on the road and has to continuously check if some vehicle is violating the rule [6]. In Nigeria, road safety laws violators violate mostly the use of seatbelts, exceeding expected speed limits, reckless driving, use of vehicles with unauthorized plate number, jettisoning the use of fire extinguisher, overtaking at ill points, overloading, phoning while on wheal and failure to comply with traffic lights and signs [7][8]. Traffic violations includes as excessive speeding frequent and unsafe lane changes, failure to signal, lane blocking, tailgating, disregard for traffic control, driving against traffic, aggressive use of horns, use of provocative gestures, non-use of seat belt and verbal abuse, creation of multiple lanes that narrows into a junction and on off road space[9]. Motorists often commit a combination of these offences which endanger other person's life and properties because most of the drivers have no regard for other road users and use the vehicle to express their anger and frustration [10]. Traffic violations have been observed to be a rampant offence for both private vehicle owners and commercial drivers. Commercial vehicles seem to break traffic regulations when the traffic rate is high and this is

assumed to happen to reduce the unproductive time wastage on the road and been able to pick up more passengers to maximize profit. In Nigeria most of the commercial vehicles (cars, buses, motorcycles and tricycles) are not owned by the drivers and there has been a daily amount agreed between the drivers and the vehicle owners that must be delivered and traffic congestion seems to hinder the targeted amount, this at time makes drivers to be involve in traffic violation such as over speeding, passing the wrong traffic lane and breaking other traffic signs.

1.1 Significance of the Study

This study has great importance to various departments of road traffic/ safety agencies, traffic department of the Nigeria Police and orientation agencies as it provides fundamental insight of the traffic situation within the case study area and the rate of traffic light signal violation.

1.2 Research hypothesis

H_01: There is no significance difference between motorcycle and vehicle road violators

H_02: There is no significance difference between road traffic violators in specific time intervals

2. LITERATURE REVIEW

Researchers has understudy the aspect of vehicle traffic and traffic violations, Research conducted in the African continent, shows that about 60% of drivers do not use seat belt when driving, 50% in Nigeria and about 99% of drivers in Kenya preferred driving without the use of seat belt while the level of adoption of seat belt by rear passengers is very low in these countries and child restrains are highly over looked [11]. Research conducted on Assessment of Road Traffic Violations in Port Harcourt Metropolis, Nigeria discovered drivers in the city frequently engage in risky driving behaviours as the drivers ply the road hence violating the traffic rules and regulation. Commercial drivers are most involved in traffic violation since the drivers are constantly in a hurry to pick and drop their passengers, hence park indiscriminately on the roads. The knowledge of drivers in the metropolis on traffic signs and rules was found to be inadequate. Most drivers'' especially commercial drivers only know how to move vehicles but lack the knowledge on traffic signs. The common types of traffic violation in the city include speed violation, confrontational driving, driving against traffic, wrongful overtaking, tailgating emergency vehicle, unauthorized parking by private drivers, forming multiple lanes, illegal parking and loading of passengers, reckless driving, dangerous overtaking, lack of fire extinguisher, making phone calls while driving, failure to obey traffic light and signs, overloading amongst others [10]. The Oklahoma Department of Public Safety crash file and the hospital in-patient data discharge file from the Oklahoma State Department of Health showed that non users of seatbelts tended to be young and male. He also found that gender is a significant predictor of seatbelt use [12]. In general, women and older drivers tend to commit violations less frequently

compared to men and young drivers. On the other hand, women and older drivers seem to make more errors compared to men and young drivers [13], [14]. A strong correlation between drivers' behaviour and their lifestyle and culture suggested [15]. For example, the lifestyle of young drivers has proven to be relevant to their crash risk. Traffic violations represent a driving style of accumulated bad driving habits over years of driving. There are many things that leads to traffic violation and one of them is distraction, distraction, as a form of reckless driving, can be from inside or outside the vehicle[17]. "Driver distraction is the diversion of attention away from activities critical for safe driving toward a competing activity"[18]. Distraction could be an activity that is relevant or irrelevant to driving; it can be from objects (e.g., mobile phones), events (e.g., crash scenes), passengers, animals, internal stimuli (e.g., sneezing) or other road users (e.g., pedestrians) [19]. The use of mobile phone while driving is the most common and serious type of distraction [20].

The presence of Police was suggested to be an effective deterrent (for some drivers) more than any other road safety countermeasure[22]. Police presence has a "halo effect" on drivers reducing the number of traffic violations, crashes and casualties [23]. However, drivers were found to develop deceptive behaviours towards enforcement by changing their behaviour (e.g., speed) in the vicinity of Police or cameras and then resuming their normal behaviour in order to avoid being caught and fined ([2],[24],[25]. It was also discovered that drivers drive against the traffic routes. Driving against the traffic lights has been identified as the major factor resulting to crashes of vehicles in the urban centres of the United States It is one of the most frequently violated traffic law in the world today [11]. This research is centred on the traffic violation in the area of breaking traffic light laws.

3. METHODOLOGY

In order to ascertain the rate and number of vehicles that violates the traffic light signal, the traffic situation was directly observed and direct manual counting was carried out. Both motor vehicles (Buses, Cars, Lorries) and motorcycles were included in the direct observation done during peak and off peak traffic periods (7:30 a.m. – 8:30a.m.; 8:30 a.m. – 9:30a.m.; 9:30 a.m. – 10:30a.m.; 4:00 p.m. – 5:00p.m. and 5:00 p.m. – 6:00p.m.). The procedures and processes involved were directly supervised by the traffic unit of the Nigerian police.

The T-junction located at Sango, Ibadan the capital of Oyo state in Nigeria was purposively selected for the study. Sango, Ibadan has a geographical coordinates 7° 25' 39'' North, 3° 52' 49'' East. The pictorial representation of the located is shown in fig.1. The selected T-junction is a very busy one as it connects up to three metropolitan cities of the state including the Nigeria Premier University of Ibadan and the Polytechnic of Ibadan. The T-junction connects Sango to Mokola, UI/Agbowo and Elewure/Mokola road axis. The traffic situation of this area was observed during the earlier stated periods.
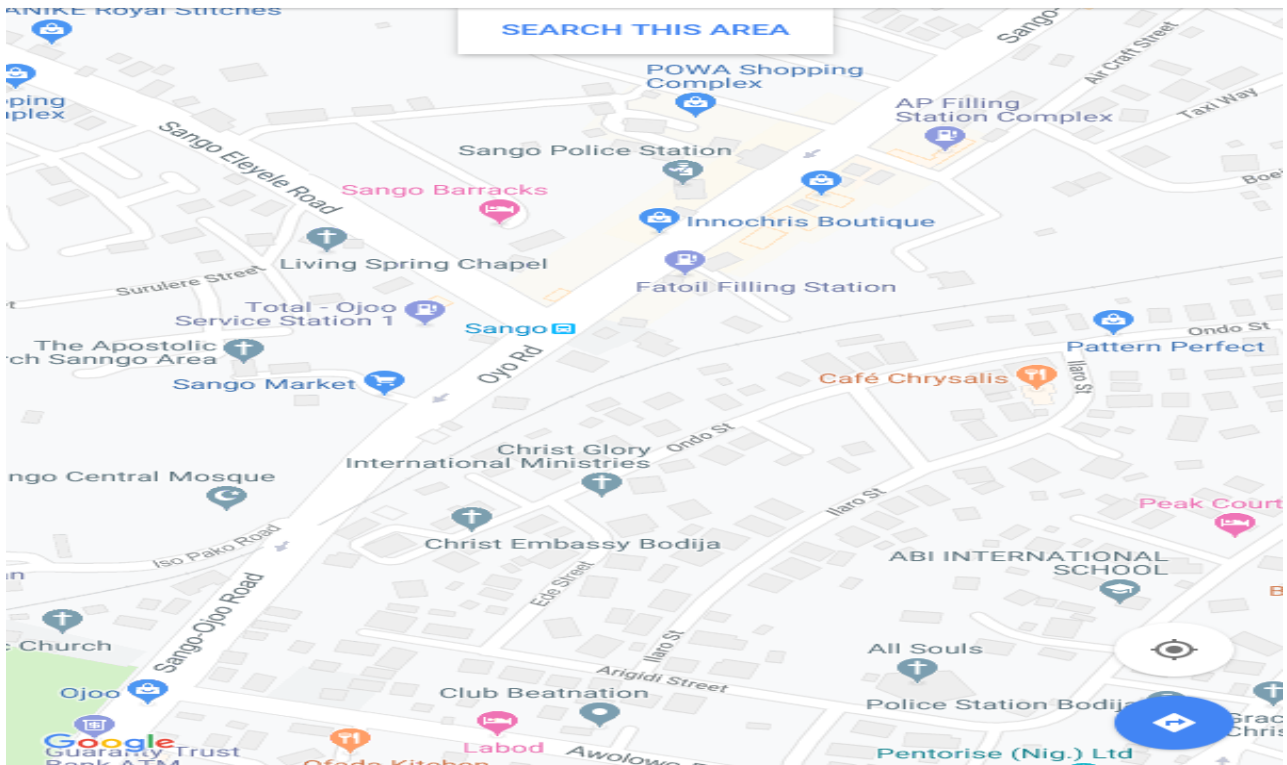
Figure 1: Map of Sango T-junction (*Source: Google map*)

4. RESULTS AND DISCUSSION

The data obtained was analysed using descriptive statistics (means), means plots, T-test and ANOVA.

Table 1: Motorcycle / Vehicle violators differences

Variables	Mean	Df	Mean difference	p-value
Total Motor Cycle violators	87.97	29	67.733	0.00
Total Vehicle violators	20.23			

The result of the analysis shows that the motorcycle violators were significantly more than the vehicle violators ($\mu > 0$ and $p < 0.05$) hence conclusion is reached that motorcyclists violate traffic rules more than the vehicle users.

Table 2: Motorcycle violators in the morning and evening

Variables	Mean	Df	Mean difference	p-value
Morning motorcycle violators	78.76	28	30.683	0.055
Evening motorcycle violators	109.44			

The result of the analysis shows that the motorcyclists' violators in the evening were more than the ones in the morning, however the violation mean difference was not shown to be significant ($\mu > 0$ and $p > 0.05$) hence conclusion cannot be reached that motorcyclists violate traffic rules more in the evening than in the morning.

Table 3: Vehicle violators in the morning and evening

Variables	Mean	Df	Mean difference	p-value
Morning vehicle violators	19.81	28	1.413	0.850
Evening vehicle violators	21.22			

The result of the analysis shows that the vehicle users' violators in the evening were more than the ones in the morning, however the violation mean difference was not shown to be significant ($\mu > 0$ and $p > 0.05$) hence conclusion cannot be reached that vehicle users violate traffic rules more in the evening than in the morning.

**Table 4: Total violators in the morning and evening**

Variables	Mean	df	Mean difference	p-value
Morning violators	98.57	28	32.095	0.115
Evening violators	130.67			

The result of the analysis shows that the road users' violators in the evening were more than the ones in the morning, however the violation mean difference was not shown to be significant ($\mu > 0$ and $p > 0.05$) hence conclusion cannot be reached that all road users violate traffic rules more in the evening than in the morning.
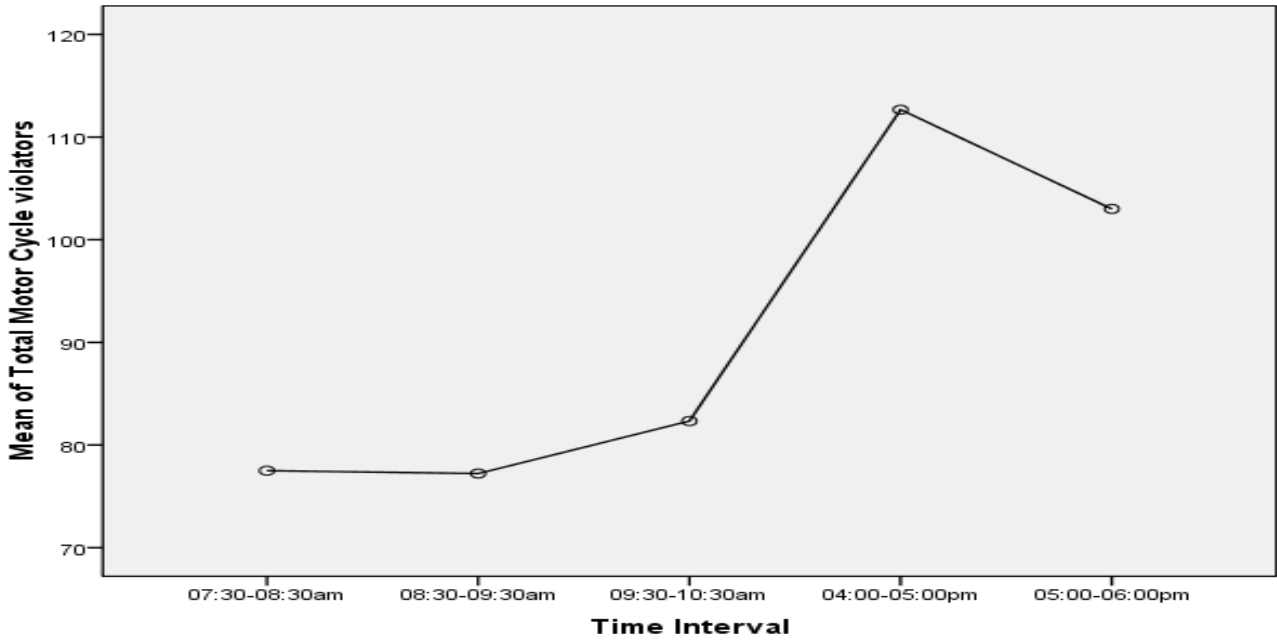
Fig 2: Means plot of total motorcycle violators across all time zones selected

Fig. 2 shows that more motorcyclists violate traffic rules between 4:00p.m. and 5:00p.m. while least violation of traffic rules by motorcyclists occurs between 8:30a.m. and 9:30a.m.
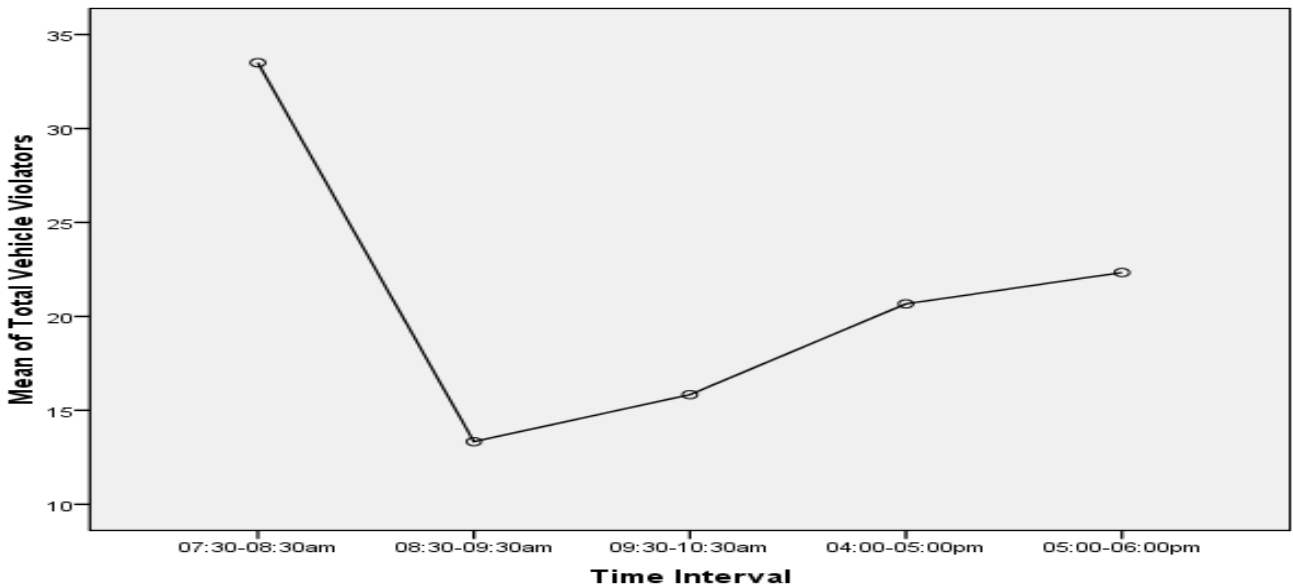
Fig. 3: Means plot of total vehicle violators across all time zones selected

Fig. 3 shows that more vehicle users violate traffic rules between 7:30a.m. and 8:30a.m. while least violation of traffic rules by vehicle users occur between 8:30a.m. and 8:30a.m.
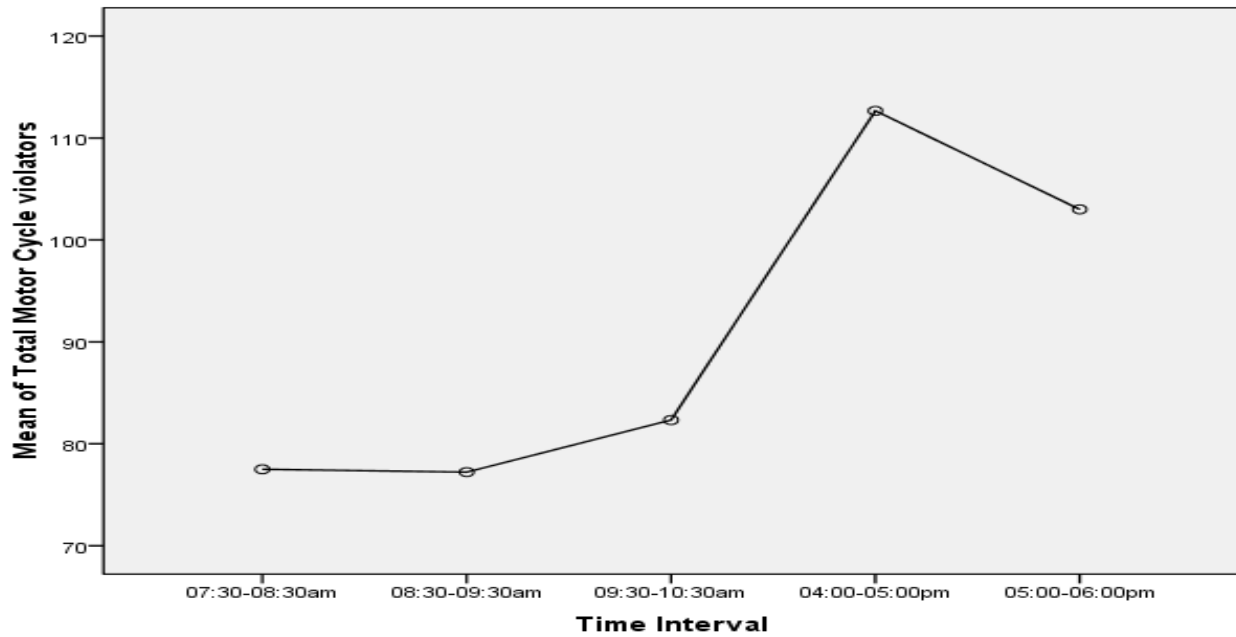
Fig 4: Means plot of total violators across all time zones selected

Table 5: Total violators across the time zones selected

		Sum of Squares	df	Mean Square	F	p-value
Total Motor Cycle violators	Between Groups	6225.244	4	1556.311	.946	0.454
	Within Groups	41133.722	25	1645.349		
	Total	47358.967	29			
Total Vehicle Violators	Between Groups	1615.033	4	403.758	1.251	0.315
	Within Groups	8068.333	25	322.733		
	Total	9683.367	29			
Total Violators	Between Groups	8123.744	4	2030.936	.758	0.562
	Within Groups	66967.056	25	2678.682		
	Total	75090.800	29			

Fig. 4 shows that more users violate traffic rules between 4:00p.m. and 5:00p.m. while least violation of traffic rules by all road users occur between 8:30a.m. and 9:30a.m.

Even though the various road users violate traffic rules more at some time interval and less at other time interval, however, there is need to test the level of significance of the differences between violation at the specific time interval. This is presented in table 5.

The result of the analysis presented in table 5 shows that motorcyclists, vehicle users and the total violators across all time interval selected (07:30-08:30am; 08:30-09:30am; 09:30-10:30am; 04:00-05:00pm and 05:00-06:00pm) were not significantly different from each other (p > 0.05) hence conclusion cannot absolutely be reached that road users' (motorcyclists and vehicle users) violation of traffic rules is a function of specific timing.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The obtained results show that drivers violate traffic light signal more in the evening than in the morning and this happen during the early morning peak period and in the evening peak period when people are rushing down to work and while coming home respectively. Also motor cyclist violates the traffic light much more than the motor vehicle drivers and this could be attributed to the level of their population, literacy factor, impatience and unethical approach while riding and this has led to many accidents and fatal injuries, making many commuters relinquished conveying with them. This further showed that there is significant violation of traffic light signal in this area (Sango) which has led to some incidental events and this calls for appropriate measures to be taking by relevant authorities to curb the rate of traffic violation menace.

5.2 Recommendation

Looking in-depth of the analysed result, the following points are recommended:

1. Proper orientation and re-orientation program for road users on traffic light signals should be done

2. Proper sanitization should be done for all law enforcement agencies on proper ethnics in carrying out their duties especially for those on emergency call

6. ACKNOWLEDGMENTS

7. REFERENCES

[1] Eric Aghiomesi Irunokhai, Afolayan A. Obiniyi, S.E. Abdullah (2018). Vehicle Traffic Control System Using Modified Smart Optimized Round Robin Scheduling Algorithm, American Journal of Engineering Research (AJER), 7(5):364-369.

[2] Oke, P.K.A, Ojo, O.T. (2015). Development of High-Way Infrastructure Prediction Model for Nigeria Roads. International Journal of Civil and Environmental Research. 2(1):10-19.

[3] Owolabi, Abdulkahim Adewale, Anujeounye, Nnaemeka Christian(MRS), Onochie, Christopher C, Eshameh Beatrice. F.(2014). Design and Development traffic offence system(BTOS).West African Journal of industrial & Academic Research. 12(1): 21-29.

[4] Lutfun Nahar Nipa (2015). Development of a Traffic Control System by using Microcontroller based Barricade. Communications on Applied Electronics. 2(4): 10-13.

[5] K.Vidhya, A.Bazila Banu (2014), Density Based Traffic Signal System, International Journal of Innovative Research in Science, Engineering and Technology 3(3):2218-2223.

[6] G.G.Chiddarwar.(2017). Automatic Traffic Rule Violation Detection and Number Plate Recognition. International Journal of Science Technology & Engineering, 3(9):559-563.

[7] Federal Road Safety Corps 2012. Operational Guidelines.

[8] Al-Eideh B.M. 2016. Statistical Analytical Study of Traffic Accidents and Violations in the State of Kuwait and Its Social and Economic Impact on the Kuwaiti Society. American Journal of Applied Mathematics and Statistics, 4(2), 24-36.

[9] Anyanwu, J.O., Okoroji, L.I. and Dike D.N. 2016. Assessment of the Impact of Section 9 of the Nigerian Road Traffic Act 2004 on the Rate of Accidents/Road Crashes in Nigeria. Global Journal of Social Sciences Studies, 2(1):39-50.

[10] Peltzer K. 2008. The road „kill" factor. HSRC Review, 6(4): 31–32.

[11] G.C. Emenike, D.N. Akpu(2017). Assessment of Road Traffic Violations in Port Harcourt Metropolis, Nigeria, International Journal of New Technology and Research,3(4):55-62.

[12] Åberg, L. & Rimmoe, P. A. 1998. Dimensions of aberrant driver behaviour. Ergonomics, 41, 39-56.

[13] Bener, A. 2005. The neglected epidemic: Road traffic ac cidents in a developing country, State of Qatar. International Journal of Injury Control and Safety Promo tion, 12, 45-47.

[14] Baker, D. R., Clarke, S. R., Brandt, E. N., Jr. (2000) An Analysis of Factors Associated with Seat Belt Use: Prevention Opportunities for the Medical Community, J. Okla. State Med. Assoc., Vol. 93, pp. 496–500.

[15] Bener, A. & Crundall, D. 2005. Road traffic accidents in the United Arab Emirates compared to Western countries. Advances in Transportation Studies an internat ional Journal Section A, 6, 5- 12.

[16] Møller, M. 2004. An explorative study of the relationship between lifestyle and driving behaviour among young drivers. Accident Analysis & Prevention, 36, 1081 -1088. [17]De Winter, J. C. F. & Dodou, D. 2010. The Driver Behaviour Questionnaire as a predictor of accidents: A meta- analysis. Journal of Safety Research, 41, 463- 470.

[17] Lee, J. D., Young, K. L. & Regan, M. A. 2008. Defining Driver Distraction. Driver Distraction. CRC Press

[18] Regan, M. A. & Hallett, C. 2011. Chapter 20 - Driver Di straction: Definition, Mechanisms, Effects, and Mitigation. In: BRYAN, E. P. (ed.) Handbook of Traffic Psychology. San Diego: Academic Press.

[19] Regan, M. 2006. Preventing traffic accidents by mobile p hone users. The Medical journal of Australia, 185, 4-18

[20] Porter, B. E. 2011. Chapter 31 - Enforcement. In: BRYA N, E. P. (ed.) Handbook of Traffic Psychology. San Diego: Academic Press.

[21] Xie, C.Q. & Parker, D. 2002. A social psychological approach to driving violations in two Chinese cities. Transportation Research Part F Traffic Psychology and B ehaviour, 5, 293-308.

[22] Elliott, M. A. & Broughton, J. 2005. How methods and le vels of policing affect road casualty rates, Crowthorne, B erkshire, England, Transport Research Laboratory.

[23] AlRukaibi, F., Ali, M. & Aljassar, A. 2006b. Traffic Safe ty Attitudes and Driving Behavior of University Students: Case Study in Kuwait. Journal of the Transport ation Research Board, 1969, 65-71.

[24] Stanojevic, P., Jovanovic, D. & Lajunen, T. 2013. Influe nce of traffic enforcement on the attitudes andbehavior of drivers. Accident Analaysis & Prevention, 53, 29-38.