



Real-Time Traffic Signal: A Solution To Reduce negative Impact Of Road Traffic Congestion On Human Health

Swati N. Divatankar¹, Dr. U.N. Hivarkar² and Dr. A.D. Shaligram³

¹Department of Electronic Science, R & D Centre, Modern College of Arts, Commerce and Science, Pune, Maharashtra, India

²Department of Electronic Science, R & D Centre, Modern College of Arts, Commerce and Science, Pune, Maharashtra, India

³Department of Electronic Science, SavitribaiPhule Pune University, Pune, Maharashtra, India
swatu.div@gmail.com

ABSTRACT:

Road traffic congestion has become one of the most important challenges in metropolitan areas as a result of population growth, increased demand for vehicles and a lack of transportation facilities. It has negative consequences for the environment, the country's economy as well as human physical and mental health. Traffic congestion causes severe air pollution and noise pollution, which aggravates the entire environment. Millions of people around the world are directly affected by traffic congestion every day. Due to an exponential expansion in population and vehicle, the current traffic structure is unable to meet traffic demand. There is a need of real-time traffic light system in which signals will operate automatically based on the density of the vehicles. The need of a real-time traffic light system for reducing the detrimental effects of road traffic congestion are highlighted in this research paper.

Keywords: traffic congestion, real-time traffic light system, density of the vehicles

1. INTRODUCTION:

In metropolitan areas, traffic congestion is a big issue now a day. Traffic congestion is caused by a variety of circumstances. As the population of the country grows, the number of vehicles on the road increases. Because of the excessive use of the roads, the quality of the roadways deteriorates, resulting in traffic congestion. Also, it is caused by public transportation's inability to provide services efficiently. Poorly maintained roads, a lack of lane discipline, and ineffective road traffic control systems all contribute to traffic congestion [1]. According to TomTom Traffic Index (2019), Bengaluru (Karnataka) is the most congested city in the world. In the top 10 congested cities of the world, Mumbai, Pune, New Delhi were also ranked [W1]. Traffic congestion causes a delay in travelling, unpredictable traveling time, wastage of fuels which increases the cost of travelling which directly effects on the economy of the country. The environment is also affected by traffic congestion as it produces air pollution and noise pollution, due to which the physical and mental health of human is badly affected.

The present traffic control system has synchronized traffic signals and insufficient green signal time. Real-time traffic signals will help to control the traffic congestion at the road intersection. In this

paper, the impact of road traffic congestion on human health is highlighted, also the need of real-time traffic signal system to reduce the impacts of traffic congestion is discussed.

2. OBJECTIVES OF THE STUDY:

- To study the impact of road traffic congestion on human health
- To discuss the need of real-time traffic signal system which will reduce impacts of road traffic congestion on human health

3. DATA COLLECTION:

The secondary data of this research paper is collected from research journals, newspaper articles and different websites.

4. IMPACT OF ROAD TRAFFIC CONGESTION ON HUMAN HEALTH:

Traffic congestion causes air pollution and noise pollution which affects badly on the human body as shown in Fig 1. Due to congestion, people spend extra time on the road, which directly affects the health of the individual. The dramatic increase in traffic and the ensuing congestion not only reduces mobility, but can also raise pollution emissions such as carbon monoxide (CO), carbon dioxide (CO₂), volatile organic compounds (VOCs) or hydrocarbons (HCs), nitrogen oxides (NO_x), as well as other vehicle-related pollution. Various epidemiological studies have looked into the effects of motor vehicle emissions and found increased risks of non-allergic respiratory morbidity, cardiovascular morbidity, cancer, allergic illnesses, poor pregnancy and birth outcomes, and reduced male fertility for drivers, commuters [2]. Other symptoms observed due to traffic congestion are respiratory complications, neuralgia-related issues, psychological distress, hearing difficulties, unpredicted perspiration, weariness, suffocation, dust allergies, vision problems, digestive issues, dehydration, etc.

Due to high traffic, a rise in the average temperature of the atmosphere and noise pollution was recorded in several places [3-4]. The noise from the vehicle, as well as the operator's horns, produces an extremely unpleasant atmosphere. Traffic congestion affects not just the individuals who are stuck in the traffic but also people who live nearby area. Noise pollution due to traffic congestion causes irritation, problem in sleeping, trouble in hearing, etc. [5].

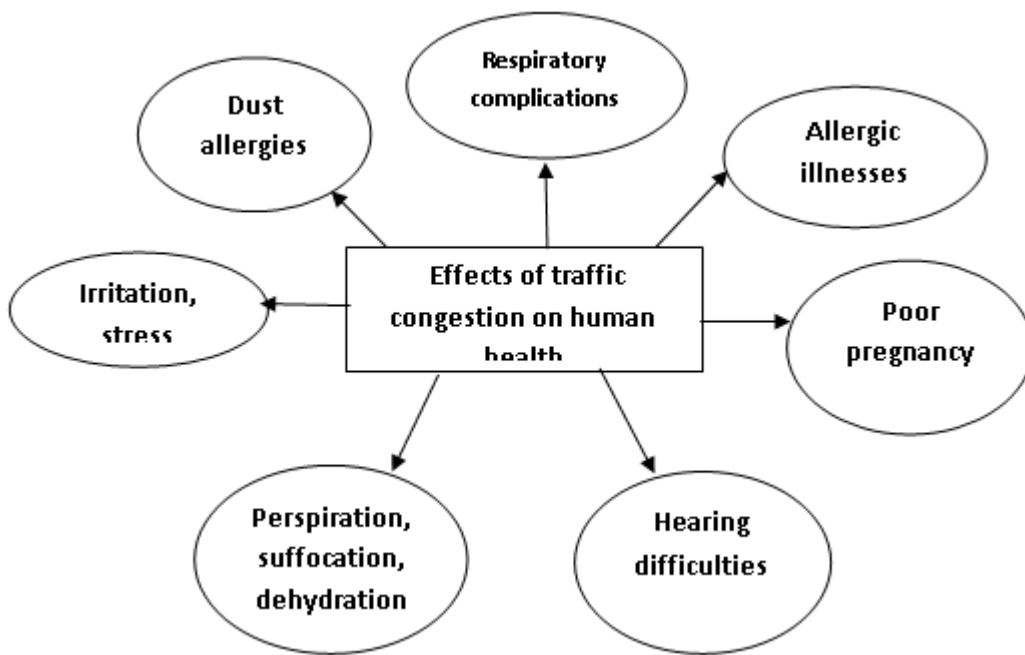


Fig 1: Impact of road traffic congestion on human health

Sometimes due to violations of traffic rules such as red light jumps, leads to a rise in the number of accidents caused by stressed and frustrated motorists. Because of traffic congestion, emergency vehicles such as ambulances, police cars, and fire trucks become stranded which may be dangerous.

5. NEED OF REAL-TIME TRAFFIC SIGNAL:

The most widely used traffic control technologies at road crossings are traffic light signals and navigation apps. Individual drivers can use navigation apps to select the least congested route, but these apps can't regulate traffic [6]. The most widely utilized traffic control system at a road junction in a developing country like India is a traffic light signal, which places no attention on the current traffic situation, resulting in ineffective traffic management systems. The traffic signal at the intersection has a fixed time setting, so each traffic lane must wait until the light turns green. Vehicles cannot pass in the allotted time if the road is busy and the go-ahead time is short. In other cases, the lane may have few vehicles and the go-ahead time may be lengthy [7]. It is important to establish an autonomous, real-time system for better road traffic management, which will help to mitigate traffic congestion difficulties to some extent.

6. CONCLUSION:

In conclusion, congestion cannot be completely eradicated due to population and vehicle growth but it can be minimized to reduce the impact of traffic congestion on human health which got a lot of attention in the study. At present, traffic lights are programmed for pre-defined time duration. Because of the increasing traffic congestion on the roads and the challenges associated with current approaches, a system that will control road traffic based on vehicle flow measurement/density is required for the smooth flow of traffic. That is traffic signals should adjust automatically based on traffic density. Using traffic signals in coordinated systems may benefit travelers by allowing for more efficient use of road capacity, shorter journey times, significantly fewer accidents, fewer and shorter periods of congestion, up to a 45 percent reduction in waits and stops in urban traffic, a 20% reduction in fuel consumption, and a reduction in air and noise pollution. If there will be a reduction in air and noise pollution, health and performance in the daily routine of the people will be improved.

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