
4. Traffic Congestion and Possible Solutions: A Review

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Abstract:

As we can see, the traffic condition is the major problem in India due to the increase in the number of vehicles on road and urbanization. This leads to the congestion on road and problems for the people. Some areas of Faridabad are also suffering in terms of infrastructure as well as operational efficiencies like narrow roads, inactive traffic signals, etc. Considering the infrastructure and functions on the city road, this paper describes the congestion on roads of Faridabad and after that, some recommended solutions like the design of the road, plan for the regulation for road users. In this paper, an attempt made to show the traffic congestion at some intersection points in the city of Faridabad.

Keywords: Congestion, population growth, practical solutions, IoT

4.1 Introduction:

Traffic Congestion is a problem which is faced by the whole world due to many reasons. It causes the slower speed of vehicles, a lot of time wastage by increasing time of any trip, a lot of fuel wastage, increases pollutions and emergency services cannot pass quickly. This paper introduces guidance and conceptual framework on traffic congestion to manage and reduce it. Faridabad is one of the fastest-growing economic cities of India. The average income of people in this city is increasing then the numbers of privately owned vehicles is increasing. As the number of vehicles in Faridabad is increasing then growing middle-class families can now afford their vehicles like car, bike etc. Faridabad road condition has not kept up with the increase in vehicle numbers and this is one of the reasons for traffic congestion in Faridabad.

As per our survey, we saw that persons are suffering mentally due to stuck in a traffic jam and due to this they cannot reach their working place at a suitable time and this is the same condition for emergency vehicles because due to traffic congestion emergency vehicles cannot reach their proper place on time and not provide their proper services.

The main objective of the study to identify the impacts and actual cause behind the congestion and provide practical solutions for Faridabad to reduce congestion.

4.2 Literature Review:

Rongrong Tian, Xu Zhang suggested to use the TRANSYT traffic modelling software to find the optimal fixed-time signal plan and VISSIM micro-simulation software to affirm and evaluate the TRANSYT model and to help assess the optimal signal plan; build an adaptive frame signal plan and refined and evaluated the plan using VISSIM with VS-PLUS emulator. Through micro-simulation, it was shown that delay in the adaptive signal control was shortened noticeably than that in the fixed time control.

JianhuaGuo et al introduced a new method for area-wide traffic signal timing optimization under user equilibrium traffic. The optimization model was formulated as a multi-dimensional search problem aimed to achieve minimized product of the total travel time associated with an urban street network and the variance of travel time for the unit distance of travel.

A genetic algorithm was developed to derive the model solution. A simulation control protocol embedded in PARAMEDICS software tool capable of conducting area-wide micro simulation is adopted to design the logic frame and function module of the area-wide traffic signal control system. His results show that mobility improvements are achieved after applying the proposed model along with the genetic algorithm for area-wide signal timing optimization, assessed by extended capacity ratio, and reductions in through and turning movement delays, as well as average and variance of travel time for a unit distance of travel. Gustav Nilsson _ Giacomo Como focused on a class of dynamic feedback traffic signal control policies that are based on a generalized proportional allocation rule. There results in a differential inclusion for which there prove the existence and, in the special case of orthogonal phases, uniqueness of continuous solutions via a generalization of the reflection principle. Stability is then proved by interpreting the generalized proportional allocation controllers as minimizes of a certain entropy-like function that is then used as a Lyapunov function for the closed-loop system.

4.3 Methodology:

- a. This paper is generated based on data. The first step is to collect information about traffic congestion by self-survey and snapping the images. So, we go out and see the traffic congestion near our home. We will take the help of various websites to know the current traffic congestion in the area.
- b. We will try to know the conditions of the area by asking peoples about traffic congestion and the problems they face.
- c. Then, we will try to figure out ways to reduce traffic congestion in the area.

4.4 Study Area:

Faridabad is the largest city in Haryana, lies between 28.4211N 77. 3078E. According to Census 2011, the population of 1404653 with 1890.7/km² density. It is also one of the fastest-growing cities of India.

The route taken is one of the busiest because of the narrow roads and improper functioning of the traffic signals. It includes the Faridabad-Gurugram Road, Sanjay Gandhi Memorial Nagar, Badkhal, RTO Badkhal, market areas, business offices, etc. The study road is the way to significant centres within city areas.



Fig 4.1 Study Area

4.4.1 Impacts of Traffic Congestion:

- a. Due to traffic congestion, there is a lot of time waste.
- b. Due to time lost people drive fast that cause accident and its result in traffic congestion.
- c. Due to traffic congestion, there is a lot of fuel wastage.
- d. Due to traffic congestion pollution level increases day by day.
- e. Due to traffic congestion, emergency services cannot act properly this result in lack of emergency services on time.

4.4.2 Causes of Traffic Congestion in Faridabad:

- a. Traffic congestion is because of quickly increases in a large number of private vehicles on the road instead of government vehicles.
- b. Traffic congestion is due to some obstacles like when an accident occurs people make a group and result in a traffic jam.
- c. Traffic congestion is due to the slow speed of vehicles because the quality of roads is not good.
- d. Traffic congestion is due to smaller space to vehicles because some time people goes on roads and not provide proper space to vehicles.
- e. Because of people, they break traffic rules more and due to these accidents increase which increases traffic congestion.
- f. Sometimes traffic signals are not working properly because computer malfunctioning which causes traffic congestion.
- g. Due to less space of parking people usually park their vehicles in front of the buildings often encroaching roads.

4.4.3 Evidence of Congestion:



Fig 4.2 (Traffic congestion at S.G.M. Faridabad)



Fig 4.3 (Non-functioning of Traffic Lights at Faridabad-Gurugram road)

As we can see, the study area which we have taken, there is no functioning of traffic signals which usually creates the traffic-jam in this place.

This shows that the steps which can reduce traffic congestion are not implementing properly. The traffic congestion in this area is also due to the one -way and narrow roads and people are also not following the rules which create traffic congestion.

4.5 Solution of Traffic Congestions:

- a. Smart traffic signal implementation which can co-ordinate with traffic and respond with road capacity and big or small vehicles.
- b. We can use IoT Enabled Real-Time Traffic Management System for managing the traffic by using RFID sensors, IR sensors, and traffic lights.
- c. By using hydraulics footpath, in which we use hydraulic footpath which helps in remove traffic like when a vehicle deteriorates then the hydraulic footpath gives ways to other vehicles by taking footpath in the level of the road.
- d. City bus service should be started in that area so that people reduce the use of personal vehicles which causes traffic congestion.
- e. Proper Parking System Set up one or two multistory buildings and arrange a vacant place which will give the solution of random parking and parking congestion.
- f. Selective Transport Mode At the office hour time slow transport like a cycle, rickshaw should not be permitted in that area.

4.6 Conclusion:

From this review study, the current situation of roads, the paper presents some logical solutions which can be applied for reducing traffic congestion in Faridabad. The recommendations of solutions supportable by financial condition, less harassment to common people, safety from accident, reducing trip delay, and welfare for the city environment. The proper monitoring system, operational efficiency, etc. can reduce traffic congestion if applied properly. Keeping given population and time, Municipal Corporation of Faridabad should apply these solutions to maintain the traffic flow.

4.7 References:

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