SYNCHRONIZATION OF SIGNAL FOR GREAT EASTERN ROAD RAIPUR

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Abstract Based on analysis of data collated from Great Eastern ring road, conclusions are signal design and synchronization has been done for 12 intersections of eastern ring road to minimize delay. Earlier the total journey time was 22 minutes (1720 seconds) approximately. By the implementation of intelligent transportation system the Journey time is reduced by 10 minutes (600seconds) approximately. After the journey time is reduced by 600 seconds taking safe side the time required to travel will be 12 minutes (720 seconds) approximately. Due to synchronization of signals there will be reduce in fuel consumption and also people time will be reduced.

***Keyword*- Trafic , Traffic Sign, Raipur** ,

1.Introduction The current system of traffic light have been provides a fixed traffic control plan, which settings are based on prior traffic counts but may be manually changed. It is the most common form of signal control for now a days and result in inappropriate behavior in traffic which differs from that which the plan was based, such as the use of unnecessary phases when the traffic is light.

2.Literature review Morugu Srujan Kumar, Bhasker Valkati and Dr.R. Srinivasa Kumar (2015) in this study, three adjacent signal intersections were selected to evaluate, optimize and coordinate them. Traffic problems which exist in these intersections are congestion, delay, traffic jam due to heavy traffic volume. All the intersection details such as geometric features, Traffic volume survey by videography method, signal design is done by Webster method, traffic signal coordination is done by simple progressive method. Coordinating the signals showed better results compared to the present conditions.

H. S. Goliya & Nitin Kumar Jain (2012) in this paper an attempt has been made to study the various intersections, so as to minimize the delays at these intersections and consequently improve the level service. At each intersection the existing traffic data such as traffic volume has been estimated and then signal designed and optimized signal. Traffic signal can be synchronized so that a vehicle starting at one end of the Street and travelling at Preassigned speed can go to other end without stopping for red light. N. Naveen Kumar(feb-2016) Traffic management plays a vital role in the field of transportation engineering to reduce congestion and travel time to improve service volumes especially in urban areas. After traffic engineering survey, optimum cycle length and saturation flows, green time signal phase are designed and likewise red, amber phases based on Webster's method & IRC guidelines. In this road stretch, adjacent signals are coordinated and the coordinated signal time plans are also developed. This paper solves the traffic congestion causing delays, decrease the travel time and increases the travel speed of vehicles by design of coordinated traffic signals.

Ravi Arora1, Dr P.K. Gupta (MAY 2015) Chandigarh, a Union Territory of India was planned by Le Corbusier and the city also known for its beautiful roundabouts. But these roundabouts become place of slow moving traffic during peak hours. Thus there is a need to use traffic management techniques like coordination of traffic to not only avoid congestion at these roundabouts but also reduce traffic delay caused to traffic. It would be less time consuming for road users to cross these roundabouts, when moving from one roundabout to another.

Kishor Bambode, Vishal Gajghate (Feb 2014) This paper presents an intelligent transportation system for traffic flow prediction and control it through traffic signal optimization and coordination. It rely on pre timed control signal system or fixed cycle control signal system hence it is beneficial to optimize traffic signal and coordinated it by means of Intelligent transportation system. Synchro is use for signal timing optimization. Signal optimization is very effective techniques for improving intersection level of service and make it more efficient

3.Result and Discussion Traffic has been a civil issue in almost all major and minor cities of the world since the past decades. According to statistics of the Government of India , the number of vehicles on road has increased at an average rate of 10.16% per annum over the last five years. This has led to severely congested roads, deterioration of the roads (as they are unable to withstand the high demand), increasing cases of road rage, and worst of all, deaths due to inability of ambulances reaching medical centers as a result of heavy traffic congestion. Traffic management plays a vital role in combating the burgeoning vehicle density to enable safe and efficient use of roads. Intelligent Transportation System (ITS) refers to the use of technology to provide solutions to optimize the use of roads and other infrastructure. In Sync adaptive traffic control system uses artificial intelligence to manage traffic in the United States of America and is operational at 2,300 traffic signals across 31 states. In Sync uses existing traffic video camera and integrated digital sensors to detect the number of vehicles present at a signal and the amount of time that the vehicles have been waiting. A processor that is connected to the traffic controller cabinet changes the signal state based on the density. The system controls signal timings at individual junctions using Greedy algorithm (Local Optimizer) as well as coordinate signals along a series of junctions (Global Optimizer). Sydney Coordinated Adaptive Traffic System (SCATS) developed by the Roads and Traffic Authority of New South Wales, Australia controls more than 3,700 traffic lights. The system is based on inductive loops that are installed below the surface of the roads. These loops detect the presence of vehicles and transmit the data to a local computer. The local computer analyses this data and appropriately controls the traffic lights. Bengaluru Traffic Improvement Project (B-TRAC) is a program initiated by the Bengaluru City Traffic Police in 2010 to reduce traffic congestion in the city. The project included many features like redesigning the shape of junctions to enable efficient movement of vehicles, installation of surveillance cameras at all junctions and setting up a central Traffic Management Center

(TMC). The central monitoring facility receives live feed from the cameras which are used to identity and record traffic violations. Traffic management is an area that has been exposed to extensive research and many solutions using different technologies have been proposed to solve it. In , Radio Frequency (RF) communication is used in vehicle identification and to transmit the signal status to the vehicles at a junction. RF modules are installed at each toll gate and at each junction and is in the transmitting mode. Another RF module on board the vehicle listens to this transmission and replies with a bit pattern enabling vehicle identification. Each junction is uniquely identified by a road identifier. The road identifier is continuously transmitted by a module which is placed some distance away from the traffic signal. Vehicles that pass the module capture the road identifier and save it in the memory. When they reach the junction, the value saved in memory and the unique junction identifiers are compared. If the two match, the vehicle receives the traffic signal status transmitted by an RF transmitter.

Coordination of Traffic Signals for Providing Green Wave

Traffic signal coordination can be done by three ways-

1. Trial and Error method
2. Traffic Simulation method
3. Intelligent Transportation Systems (ITS)

3.1Trial and Error method

In this method the Vehicle speed is kept constant (for ex – 40kmph) and distance between the junctions is measured and time taken by the vehicle in travelling from one junction to another junction at constant speed is calculated . After finding the required data the signals are arranged in suitable way.

Advantages-

- Cost effective
- No skill required

Disadvantages-

- Less efficient
- Time consuming process

3.2Traffic Simulation method

Simulation of transportation systems is the mathematical modeling of transportation systems through the application of computer software.

- Some traffic simulation software are Sidra Intersection
- Sim traffic
- SUMO

Advantages-

- Efficient
- Time saving
- No complex calculations required

Disadvantages-

- Skill required for operation
- Only licensed holders can operate

3.3Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) is a system where centrally-controlled traffic signals and sensors regulate the flow of traffic through the city in response to demand. Intelligent Transportation Systems (ITS) is the application of computer, electronics, and communication technologies and management strategies in an integrated manner to provide traveler information to increase the safety and efficiency of the surface transportation systems. These systems involve vehicles, drivers, passengers, road operators, and managers all interacting with each other and the environment, and linking with the complex infrastructure systems to improve the safety and capacity of road systems. As reported by Commission for Global Road Safety(June 2006) , the global road deaths were between 750,000 to 880,000 in the year 1999 and estimated about 1.25 million deaths per year and the toll is increasing further. World health organization report (1999), showed that in the year 1990 road accidents as a cause of death or disability were the ninth most significant cause of death or disability and predicted that by 2020 this will move to sixth place. Without significant changes to the road transport systems these dreadful figures are likely to increase significantly.

Advantages-

- Most efficient method
- Operates on its own

Disadvantages-

- High installation cost High maintenance cost
- High installation cost High maintenance cost

4Conclusion Over last years, alternative technologies have emerged which seem able to overcome some of these problems. Collecting real-time traffic data by tracking vehicle position is one of them. Computer vision presents significant advantage over

other traditional vehicle measurement technologies. Computer vision systems are more flexible, less invasive, and more precise, more robust, easier to maintain, produce richer information, do not affect the integrity of the road and offer as an a added bonus, the possibility to transmit images for human supervision. Several video image processing systems for traffic density estimation are studied in this thesis and their advantages and disadvantages are discussed in detail. It has been identified that the existing methods are not suitable for Indian traffic conditions which is generally heterogeneous in nature. A new solution is proposed in this thesis which works very efficiently for Indian traffic and the experimental results demonstrates the same.

The study identified the following as contributing issues to the traffic problem:
1. Mixed traffic conditions
2. Encroachment resulting in reduction of capacity of roads
3. Lack of enforcement measures
4. Lack of engineering measures
5. Inefficient and inadequate mass transport system

The broad recommendations emerging out of the study included:

1. Planning should focus on reduction of the traffic load on existing road network through various travel demand management measures.
2. Emphasis should be placed on mass transport system
3. Concerted efforts are needed in removing encroachments, bottlenecks, improving traffic signal, road condition and geometrics at intersections.
4. Video image processing is recommended over other fixed sensors due to its high efficiency, easy installation and large experience base.
5. The proposed solution works well for Indian traffic conditions and can be quickly imported into any device

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