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A Review Study on Automated Highway System for Moradabad City

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Abstract - *This paper reviews the Automated highway system for Moradabad City. It is a intelligent system that uses computers, sensors, artificial intelligence and communication technologies to provide safe travel to the driver. It provide safety against collision and reduce travel time and congestion between the vehciles. Due to the advancement of technologies the vehciles need to be partially or fully automated . Besides this a certain degree of infrasructure is also made automatic so that vehciles are coordinated with the infrastructure and move smoothly and safely along the road without involving any collision. We have taken the study of Moradabad (pilikothi chauwraha). Four differents routes are going in different directions carrying different traffic densities. we are analysing the traffic at different time intervals of four different roads and study about the traffic managements and problems and calculated the traffic volume in different routes and intersection.*

Key Words**: Artificial Intelligence, Automated Highway, Intelligent Vehciles, Safety, Collision, Congestion**.

1.INTRODUCTION

Automated highway system (AHS) concepts define a new relationship between vehicles and the highway infrastructure in which vehicles moving on lanes limited access roadway on which specially equipped vehicles are operated under completely automatic control. Automated highway system uses technologies in which driver loose the full control on the vehcile for gaining additional benefit of safety and efficiency. Routes are set manually by the driver and all trip decisions are made by the vehciles automatically and operation like steering and braking control are done automatically to provide safer and more convienent travel to the driver. Automated highway system use obstacle-detection and head on collision technologies for the safe-flow of the vehciles on the highway. Other technologies are used to recognize the external infrastructure conditions and provide highway cooperation to coordinate with the vehcile movement. Automated highway system reduces clear distance between the cars and allow more cars to occupy a given stretch of road. The aim of automated highway system is to provide safe, orderly and efficient movement of persons, goods, and to protect collisions where possible which enhances the quality of the local environment and to the adjacent roads. With the increase in traffic problems in big cities such as congestions, accidents, delays, fuel consumption etc, there arouse a need for a proper managed transportation system. Because traditional transport system is unable to face the increased demand of vehciles due to urbanization with a growing rate of 15-17% annually with thousands of new vehciles are running on the road every day. Automated highway system provides us a proper well-mannered managed transportation system which enables us to cope with the above defined problems. This is done using sensor that serve as the vehciles eyes determine lane position and the speed and location of their vehciles. Automated highway system vehciles often also have equipment to communicate with others vehciles.

2. LITERATURE REVIEW

Many studies had been done by the various researchers and vehicles developer on the topic of automated highway system. These studies indicate the benefits for the uses of automated highway system.

Agostino Nuzzoloa Describe some theoretical and operative aspects of Advanced Traveller Advisory Tool (ATAT) It should be able to assist users travelling on multimodal networks, suggesting the best paths according to their personal preferences. Such paths are individuated on the basis of the estimation of a perceived path utility formalised within the Random Utility Theory. It illustrates the user needs, the logical and the functional architecture of TVPTA; it also includes the transit modelling framework to provide personalized pre-trip information and the learning process to capture individual preferences. The second part describes an implementation example of TVPTA concepts in the metropolitan area. Author presented some results of a research aiming at developing an ATAT, able to give personalized information to the user by real-time data. It is based on a path choice modelling framework able to provide path alternatives on the basis of personal travel preferences defined according to a learning process. The theoretical framework is based on individual path choice models able to provide transit path alternatives on the basis of user personal travel preferences captured by a learning process

on user habits. Analyses carried out by the authors up to now tracking the choices made by a sample of students travelling in the metropolitan area highlight the benefits of providing individual information, as well as the approximations in providing travel advices through aggregate models. Experimental evidences also suggest part of the further developments of this research, including both initialisation and updating of model parameters. In fact, even if the use of Stated Preferences interviews designed on 2-alternative scenarios with a minimum number of 10 observations allows us to estimate initial model parameters for a satisfactory individual travel advice, the updating process of individual model parameters is quite slow and too many observations are needed to obtain statistically significant results. Such a result suggests studying different approaches for the parameter updating process, together with further advances in path choice modelling (e.g. investigation of other O/D pairs, user preferences and model forms) and in the TVPTA implementation (e.g. within augmented reality devices like Google glass or similar)[1].

BAUBLYS Describe transport system is analysed as a complex system with all the indications characteristic of this system, that allows determining on the application of methods of systematic and operational analysis in the course of research of national transport system and its elements. Classification of transport complex systems consists in distinct determination of these systems as management objects. Such classification has to be grounded by certain technological and theoretical indications to which as well should be attributed the indications of differentiation of system management issues determined by the time co-ordination with the hierarchy of management, which arises from the hierarchic structure of complex systems. Transport management and substantiated national transport system development, based on the principles of complex systems management theory, may reveal numerous qualitatively new ideas, which would essentially enable the enhancement of transport efficiency and realisation of big, still unused, its economic and technological progress reserves. The objective of complex transport systems management may be formulated as a planned and sustainable development – from the long-term forecasting to the operative management inclusively[2].

Chien Describe problem to the tracking of an arbitrary density profile. Using a macroscopic traffic model similar to that in they derive a controller that commands a desired velocity at each section of the highway such that the density of the entire highway conforms to a specified density profile. Their model is based on the behavior of human drivers. While it is possible to design control laws for automated vehicles so that they behave like those driven by people, this is not the only approach. The developed control law is based upon the inversion of the traffic flow dynamics, which requires a certain traffic flow controllability condition. This condition is violated when the density in any section of the highway becomes very small. The control action at a point in the highway requires information from the entire highway. This problem is alleviated by a dynamic version of the control law that solves the matrix inversion dynamically. No multiple lane or lane change commands are considered in this work[3].

Jose E. Florez Describe the system that solves multi-modal transportation problems in the context of a project for a big company. In this paper, we combine Linear Programming (LP) with automated planning techniques in order to obtain good quality solutions. The direct use of classical LP techniques is difficult in this domain, because of the non-linearity of the optimization function and constraints; and planning algorithms cannot deal with the entire problem due to the large number of resources involved. We propose a new hybrid algorithm, combining LP and planning to tackle the multi-modal transportation problem, exploiting the benefits of both kinds of techniques. In this author introduced TIMIPLAN that successfully solves big multi-modal transportation tasks. Multimodal transportation usually involves the combination of a large number of resources, together with temporal constraints, resource consumption, cost functions, etc. Clearly the bottleneck in this problem is the combinatorialexplosion which makes obtaining optimal solutions impossible in the time limit established by the company using only classical planning or only OR techniques. Given the problem's size, existing domain-independent planners cannot solve those in a reasonable time. Instead, we decompose the problem into two different subproblems. In the first one, we compute the assignment cost of resources (trucks and containers) to tasks (services)[4].

J.K. Hedrick Describes vehicle control issues that must be faced in designing a fully automated system . In particular, requirements for a control system architecture as well as issues of lateral and longitudinal "platoon" control are ad-dressed. Interest in AHS is clearly expanding at a rapid pace due to the ever-increasing problems of freeway congestion and the potential for a technological solution. The approach described is based on five years of research as part of the California PATH program. Past and ongoing research in the California PATH program has shown that significant advances have been made in the technology leading up to an automated highway system. This paper has described preliminary control system architecture, vehicle following algorithms, and lane keeping algorithms. Com- puter simulations and field tests have proven the feasibility of the desired approach. Current research is focusing on interactions between the various layers of the system architecture, as well as control problems associated with entry/exit, merging, and lane change maneuvers. In addition, continued investigations of altemative sensors and vehicle actuators are being conducted[5].

Khattak Develop a simulation comparing user choices when different market segments are given different sources of

information (ATIS with full compliance, radio reports, and observation). With the full compliance ATIS model, the average delay for all travelers under both under-saturated and oversaturated conditions decreases with an increase in market penetration of equipped travelers. However, no significant reduction in delay is observed when penetration level is around 50%. They find that the benefits of an ATIS under incident conditions are marginal; however, there are cases where active guidance can produce significant system benefits[6].

Maurizio Bruglier Promoting the use of public transportation and Intelligent Transport Systems, as well as improving transit accessibility for all citizens, may help in decreasing traffic congestion and air pollution in urban areas. The author focuses on the design and development of a real time mobility information system for the management of unexpected events, delays and service disruptions concerning public transportation in the city. representation of the city transit based on a time-expanded graph that considers the interconnections among all the stops of the rides offered during the day. The structure distinguishes the physical stations and the get on/get off stops of each ride, representing them with two different types of nodes. Such structure allows, with regard to the main focus of the project, to model a wide range of service disruptions, much more meaningful than those possible with approaches currently proposed by transit agencies. In this author presented a travel planner for the management of unexpected events, delays and service disruptions concerning public transportation. Such a tool allows to model a range of service disruptions, much wider than those possible with approaches currently proposed by transit agencies. For instance a user can ask for a trip not passing through a specific station that is temporarily closed. One potential impact of the service presented concerns the perception of the transit service by the users: if disruptions are easily and automatically dealt with, the perception of reliability and robustness greatly increments, and the uncertainty reduced, making the transit travel option more attractive[7].

Praveen Kumar Describe uses the geographical information system (GIS) allows large data to be effectively processed, stored, analyzed, logically associated, and graphical displayed. Thus, GIS-based ATIS provides a convenient and powerful tool for storage and graphical representation of information, which can be useful users. Further, by availing the powerful GIS functionalities, a user can conceive a problem and allow the appropriate software toassist him in the decision-making process regarding optimum route selection and trip planning. In this paper, the authors present a GIS-based ATIS for Hyderabad City, India. Development of this GIS-based ATIS has been carried under the ArcView GIS environment. This user-friendly system provides comprehensive information about Hyderabad City, such as road networks, hospitals, government and private offices, stadiums, bus and railway stations, and tourist places within the city limits. This system can be used effectively in bus stations, railway stations, airports, and tourist information centers, as well as in personal computers to provide information to travelers and to facilitate travel. Implementation of GIS in combination with other advanced communication computer technologies to traveler information systems enables the conspicuous dissemination of information pertaining to fixed route facilities, such as offices, educational institutions, health facilities, places of tourist interest, etc.; route planning and spatial and attribute information on other transportation facilities within the cities, including highways, airports, marine ports, and passenger rail systems[8].

Qu and Chen Describe the multi-modal transport problem as a Multicriteria Decision Making Process (MCDM). They propose a hybrid MCDM by combining a Feed-forward Artificial Neuronal Network with a Fuzzy Analytic Hierarchy Process. The case study is a network in which nodes represent terminals, and edges represent different transportation modes (road, ship and train). The model can deal with several cost functions and constraints, but they only define six nodes, while our maps can have thousands of nodes[9].

Wenjie Chen Present the most conventional ITS can only detect the vehicle in a fixed position, and their communication cables and power cables elevate the cost of construction and maintenance. Because of the advantages of the wireless sensor network (WSN) such as low power consumption, wireless distribution, and flexibility without cable restrictions., the usage of WSN in ITSs is expected to be able to overcome the above difficulties. This paper proposes an WSN-based transportation information collection and communication system. Hardware and software WSN modules are designed and prototyped. In this author introduces the WSN technology into the ITS area. It takes the advantage of low energy consumption, small size, non-cable and full-road coverage to improves the efficiency of ITS. In other side, WSN in the traffic system has some special properties: 1) intersection unit and roadside unit are not spread out onto a hostile or poisonous area. Author discusses the applications of WSN in the information collecting and transferring. Some deeper problems need a further research. For example, 1) the intersection units in the same city form a huge network, which can be used to transfer traffic information. What challenges will we meet in a large scale of network? 2) Vehicle unit can only transfer dynamic information of a vehicle up to now. If we write some solid information of this vehicle, such as vehicle type, license ID, it will become an electronic tag, which can be used in multiple applications in transportation system, such as ETC (electronic Toll Collection), Parking Management and so on. 3) After vehicle unit being installed on most vehicles, the traffic information can exchange among vehicles, that is, the roadside unit is not necessary[10].

3. DISCUSSION

The goals of safety and efficiency must kept at the fore- front of without overlooking the important of every sytem. Issue of cost equity and viability Engineers and policy makes will need to decide together what the best solution for the future of the automated highway system. Overlapping or reduntant vehciles and infrastructure intelligence would provide a higher level of safety reliability and system integration. Infrastructure control is more efficient for lane changing, merging and platoon management.

4. CONCLUSION

Automated highway are one of the most promiding technologies to reduce traffic accident and urban traffic congestion. New technology engineer and policy maker have some important decision to make that will effect the future of transportation. The potential to save lives is what makes this technology so exciting automated highway can also eliminate all accidents and also reduce delays, congestion, high density in urban areas. Automated highway system allows more benefits in terms of saafety, efficiency, affordability, and usability as compared to traditional transportation system in any city.

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