An Analysis Of Various Approaches To TCS

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Abstract— **This paper deals with analysis of various approaches to Traffic Control System. The paper describes four approaches to manage traffic and control it .The main aim of this research work to trace out the path with heavy traffic and avoid using that path in order to reduce traffic jam and accidents.**

Keywords— **Traffic, Traffic control system, Traffic jam, Accidents.**

I. INTRODUCTION

This paper analyzes the Traffic Control System (TCS) based on Artificial Intelligence (AI).   This is a digital age thus, every system of the civilization have been transforming into the system of digitalization. Nowadays, digitalization interacts with the advanced computational, logical, discrete operational and various advanced methods. AI is one of these methods applied on TCS. Thus, the thesis studies Artificial Intelligence based Traffic Control System (AITCS). AITCS is the system to control the traffic by AI. The key objective of AITCS is to control the traffic efficiently, securely, optimally, economically and intelligently.

II. VARIOUS APPROACHES TO TCS

The various approaches to TCS are as follows

A. Probabilistic-Artificial Intelligence based Traffic Control Model

This model proposes an artificial intelligence based traffic control system. The proposed model is based on the discrete structure of traffic over the probability combination theory. The paths, vehicles, signals, cross paths and its correspondence are studied in this model. The conditional probability so defined in the solid parameters of traffic over the probability combination mapping.The formulation is given for controlling the traffic over the probability combination consolidated system. The traffic input-output conditional probability and its distribution so presented in this model. An algorithm is proposed in this model. This is illustrated by the flow chart also. Thus the proposed traffic control model provides an efficient, secure and optimum combination over the probability distribution. An Artificial Intelligence (AI) is a branch of computer science. This is inspired by the human brain. Thus, memory, learning, knowledge, recognition, computing, logic, computing, analyzing, developing,

understanding, explaining, etc. are some key characteristic of AI. Cycometrical understanding and its analysis is the noteworthy characteristic of human brain. The application of this special characteristic have been proming from ancient to current time. Cyraritational law, space technology, satellite theory etc. are the some popular application of this unique and ultimate characteristic. AI is inspired by all said majorly or minorly. AI is an option of human brain towards infinity.

This model is based on AI over probability. The objective of this model is to set a system for traffic management. In this era of information science, computer science, each and every part of civilization have been influencing or affecting. Traffic Management system (TMS) is one of the major challenge in modern civilization. This in not only challenging for developed countries but developing and semi- developing countries. Heavy load, narrow paths, traditional roads, conventional signals, classical controller, general classification of road, unplanned two-wheeler and four wheeler vehicle ratio, Unplanned traffic density, unplanned squares etc. AI based TMS Interacts these all. Here, the limitation of human brain is observed. Multifunctional and multidimensional management by human brain is challenging. Thus, AI based TMS is existed to provide the optimum decision over these challenges.

Basically, AI is a special type of machine learning where algorithms and its application are studied for achieving the option goal. There are minimal human intervention, minimum errors, maximum security, maximum efficiency etc. are the key points as success of AI based TMS. The proposed model achieves these goal efficiently. In addition, this model provides some other advantages as, smart signals, smart flow, automated enforcement and communication to set a scientific TMS. Traffic is represented in this model by probabilistic – time formulation. This is the key result of this model.

This model presents a formulation for an advanced TMS based on probability. An AI works over the probabilistic combination Conditional probability sets the traffic as per the distribution of vehicles over the paths. There are vehicle and signal probabilistic formulations for controlling the traffic as an AI mode.

B. Euclidean-Traffic Control System

This model presents a topological study of traffic. The traffic system is transformed into an artificial intelligence

system over the theory of limit and probability. Paths, vehicles, rules and speed of vehicles are studied over the probability distribution. Time distribution is defined discretely over the sequence of paths. The finiteness and infiniteness are carried over the problistic distribution for determining the rational solutions of the set traffic problem.

This model presents the traffic system graphically and the problem lies with the arrangement countably and uncountably both for determining the numeric solution of the traffic problem. The traffic density comprises with the path polynomial, and its limit sets the dimension to define the signal for finite and infinite number of vehicles existed in the traffic system. The whole traffic system is represented by the time constraints and its matrix representation provides the condition to its matrix representation provides the condition to control the traffic system, conversely or divergely. The probabilistic study of paths, vehicles, signals and its combination provides the distribution optimally to select the path, vehicle correspondence to establish an errorless system of traffic. Artificial intelligence (AI) is a type of human brain developed computationally for minimizing the interface of human and maximizing the success. This is a special type of machine learning with the extreme to compute, predict, solve, analyze, evaluate, programme, decision, flow, direction, map, design, search, explore, optimize etc.

To manage the traffic is one of the important application of AI from various scientific, social and computational applications. Nowadays, traffic problem is one of most challenging problem of the world. Limited roads but unlimited vehicles interacts to the traffic problem. In any traffic, path, signal, vehicles, time, controller and rules are the major elements. The co-ordinate in among these is referred as the management of traffic.

Basically, In traffic management system (TMS) provides the optimum decision for controlling the traffic. Thus, AI plays an important role to the said objective. Various computational tools are applied to developed TMS models to achieve the set objective. The proposed model is based on probabilistic distribution. Both, discrete and continues probability distribution are applied to develop this model. This model provides some advantages as, efficiency, security, errorless, optimum etc. Hence, the model is proposed with probabilistic formulation over the distribution discretely and continuously both.

C. Fuzzy-Artificial Intelligence based Traffic Control Model

Fuzzy-Probabilistic based Artificial Intelligence is presented in this paper to propose the traffic control model. Thus, this is referred as the fuzzy-artificial intelligence based traffic control model. Fuzzy is applied to classify the speed and metric over the vehicles and sensors. The cross path are defined by the conditional probability. The position of vehicles, speed of vehicles, cross path and sensors unit, are defined by the fuzzy grading and its fuzzy sets are applied for

operating the traffic. The fuzzy classification of traffic corresponds with the probabilistic fuzzy set. The fuzzy-probability structure is analyzed in this model for providing an efficient, secure and optimum traffic control system. Thus this model is set as an artificial intelligence based traffic control system. There is a substitution of human brain, as the Artificial Intelligence (AI). There is the limitation of human brain for the particular condition and place thus AI is indented to recover that limitations and provide the advanced and extended brain artificially equivalent to human brain. AI is a special branch of computer science. This is a type of machine learning. There are some advanced advantages such as, prediction, data analysis, computation, mapping, structure, optimization, comparison, input output link, linguistic and numeric decision, formulation, decision option etc.

AI is the compact set of algorithms with optimized and multidimensional flows. This provides the optimized decisions with minimized error. Thus, its application is noted in various domains, such as science, engineering, diagnosis, society, space, counseling etc. Traffic management system (TMS) is one of the noteworthy applications of AI. AI based TMS have been performing excellent in modern time. This mechanism deals with the traffic study and traffic simulations. To set the appropriate model of traffic, to simulate the traffic, to predict the traffic to decide time path etc. are some key objectives on of the AI based TMS.

The proposed model is based on compact theory of fuzzy set, fuzzy logic and conditioned probability. Sensor based signals is presented in this model are fuzzy probability distribution, path vehicles and signals are defined over the fuzzy classification and its optimization by discrete probability distribution. Hence, the new TMS is existed followed the rule of artificial intelligence. Algorithm and flow chart of the proposed model are also presented in this attempt. The proposed model is proved as efficient, secure and optimum model as per the modem norms of traffic.

D. Real Time Operational Traffic Control Model

A new traffic control model is proposed in this paper. This model is based on topological application. The real time-geodesic parallel theory is applied to propose this model. The chaos traffic is analyzed by differential geometry. The path of the traffic transformed into the curve and its analysis by curvature and tangent. The real time optimization comprises with the osculating circles, vehicle sequencing interacts with the helix, time complexity lies with the probability and signed operation deals with the Bertrand curves. Hence, this is presented as an optimized and compact model for controlling the traffic over the chaotic traffic environment. This is an efficient and secure traffic control model under the context of time – complexity and geodesic-parallel representation respectively. Modern world is facing several challenges in several domain. Uncontrolled population growth, uncontrolled traffic, uncontrolled vehicles etc. This is the study on traffic

2

problem and its solution. Traffic contains roads, vehicles, rules, signals, speed, security etc. Nowadays unlimited vehicles in limited roads. Uncontrolled population in the limited land is the origin of the traffic problem indirectly but directly the uncontrolled vehicles, un-optimized traffic control system and unfound the best-fit traffic control algorithm.

In a traffic system there are two key parameters to decide the significance of traffic, i.e. speed and efficiency. In future, traffic controlling will become a major problem by increasing population, vehicle but limited land, limited research.

Nowadays, science and its application is dominating in every problem of the society included traffic problem also.

III. CONCLUSION

The approaches explained above shows various techniques to control traffic and provide safety and security and avoid accidents.

ACKNOWLEDGEMENT

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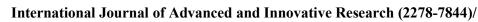
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