



Literature Survey on Intelligent Traffic Surveillance System using Swarm Technology

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ABSTRACT

An increased population growth rate leads to create traffic congestions. This has been a serious problem faced by almost all areas worldwide, affecting an environmental, economic and ecological sectors. Conventional traffic system could not evaluate gigantic traffic concentration in very effective modus, also it is time consuming system where waiting time is identical for unlike masses. SWARM is based on adaptive, collective, decentralized, co-ordination, self-organization properties. It is a system in which all nodes or members of system interact with each other to bring about particular task in an intelligent, efficient and in decentralized fashion. It need not to be centralized. It is non-hackable system. Swarm is preeminent option to handle tasks which are intricate adequate to perform congestion avoidance, traffic flow improvement. Till now swarm technology was used in field of robotic, computer science, telecommunication. This paper briefly covers implementation of swarm technology in traffic signal with the help of distributed, adaptive, self-organization, multi-agent approach such that each signal will interact with one another. This paper is concentrating on different Biological algorithms which are used for implementation of the system.

Key words: Swarm, traffic management, self-organization, auto bypass, route generation

INTRODUCTION

Now a day, traffic is a huge problem in everyone's life because the numbers of vehicles are increases & the urbanization & population growth is also increases. Everyone should reach their destination in short time. In day today life, the number of accidents happens on a road are also increases more & more. So, it is very important to make intelligent traffic control system in the future to avoid the accidents & to control the traffic on the road. So that, we make our system intelligent using swarm technology.

Swarm technology is a system which is based on the real time applications & the members of the group are communicating with each other to achieve specific task. Natural examples of swarm technology are ant colonies, schooling of fishes, etc. Swarm technology includes artificial intelligence of machine or software in which they make the human's day to day life much easier. Swarm is a system which performs a particular task using collective behaviour since from few years, swarm technology is been used for only robot implementation which performs the task using Nano bots.

In swarm technology, they take their own decisions to achieve dedicated task. The whole concept of this system is depends on 3 categories below:

- (a) Main Signal, (b) Sub Signal and (c) End Signal

We use signal to signal control in our project. Fixed length signals or fixed timers are used for implementation of currently available systems which are leading to traffic jam. In low traffic areas fixed length timers can be used whereas larger area junctions can lead to congestion. In our system we use variable timers to avoid such a problem of traffic jam. Adaptive timers will be set by using different types of algorithms which are based on the density of the traffic. For adapt the traffic signal plans we are developing various distributed algorithms. Also this system develop a realistic traffic signal development plans.

LITERATURE SURVEY

Swarm Intelligence Technology

Swarm intelligence is the decentralized, self organized system. It may be Natural or Artificial. Swarm intelligence is used in Telecommunication network. France and British Telecommunication use this technology for the Phone network. The term Swam to represent an aggregation of the animals or insects which works collectively to accomplish their day to day tasks in an intelligent and efficient manner [1]. This is helpful technology for applications in communication network routing. The swarm intelligent routing methods are providing the high reliability and less time consuming communication for the more number of system available in the network. The Swarm intelligent technology is basically based on some biological Algorithms: Ant Colony Swarm Algorithm, Honey Bees Swarm and schooling of fishes.

Ant Colony Swarm Algorithm

Ant worked in intelligent and efficient manner. Individual ants cannot perform the tasks like to find out the food from source and providing the shortest path for food from source to destination. This task can be performed by the ant colonies. In Ant agent colony algorithm individual ants are performing the task of searching food. If ant's finds food source it move to the destination and leaving the pheromone chemical to the path. The pheromone is volatile in nature. Ants are having the sensing capability to this chemical. By sensing to chemical other ants follows this track for food source and if they finds the other shortest path for source they follow the shorter path by leaving the pheromone to the path and after some time the longer path will disappeared because of volatile nature of chemical. The one path with the highest value of pheromone is considered to be the optimal solution of the problem [1].

Honey Bee Swarm Algorithm

A honey bee colony reacts flexibly and adaptively to countless changes in the forage pattern outside the hive and to change inside the hive through a decentralized and communication, control system. This is multi-agent system for the preparation of food foraging is having the same purpose which is used by ants.

A honey bee works with two mainly agents scouts and foragers. The scout bees searching for the food from the flower patch, when it finds the food source whose quality is better than that of predefined food source it move to dance floor and perform dance called Waggle dance, this dance is help for communication or transferring information about source to the other bees. After getting this information the Foragers bees are sent to the food source for collection of food. This algorithm uses the ad hoc networking model [3].

Adaptive System

An adaptive system is used for operating in real time. The fluctuations in the traffic volumes are adjusted easily through the adaptive system. In this the system adapts itself according to the change in the traffic and the environmental conditions, and then the action will take according to it. This shows the real time operating of the system.

Genetic Programming

A genetic programming parse tree is evaluated at every second, with the Boolean value of this tree resulting in either phase change [true] or no change [false]. The parse tree uses typical Boolean functions [AND, OR, NOT, >] as well as a number of terminals such as number of vehicles approaching a light, whether vehicles are backed up to a sensor downstream and how long the current light has been in operation.

METHODOLOGY

The system is working with the five different modules system implementation. As we concern Swarm Technology is used to solve the current traffic problems in such a way that the traffic signals will communicate with each other & this system will work in real time solution to the traffic signal system.

Density Based

The density of the traffic is measure using the laser sensor and accordingly timer signals are set, thus the traffic signal is organize .It carries the less traffic as compared to traditional traffic control system.

Priority Based

The highest priority vehicles will get the first serve as compared to the other vehicles. The priority of some vehicles are set according to the requirements e.g. Ambulance, Police vehicles etc. This will provide the continuous & un-interrupted routing.

Auto Bypass and Route Generation

Auto Bypassing is giving the solution if there is huge traffic in particular road or due to other processing the road is block then it provides another route information to user for bypass the route to reach the destination. Due to this the traffic gets diverted & user time is saved.

Wireless System

The each module of the system is work independently and they communicate with each other through the totally wireless network using zigbee. This is the effective method for control entire system

CONCLUSION

By using the advances in technologies and biological algorithm we need to implement the traffic surveillance system which helps to minimize the traffic problem .We implemented the system which works depending on the adaptive, density, priority conditions and they communicate wireless with each other and forming the control system. Here in this paper we have concentrate on the different biological algorithms which are used in our paper. We had deep study on the entire algorithm and had found that Honey bee & Ant colony algorithm are much preferable for better output.

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