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MODERN MEANS OF TRAFFIC CONTROL

Fuzzy set theory is an excellent mathematical tool to handle the uncertainty arising due to vagueness. Understanding human speech and recognizing handwritten characters are some common instances when fuzziness manifests. It was Lofti A. Zadeh who proposed fuzzy set theory in his seminal paper (Zadeh 1965). Since then a lot of theoretical development have taken place in this field. It is however, the Japanese who seem to have fully exploited the potential of fuzzy sets by commercializing the technology. More than 2000 patents have been acquired by the Japanese in application of the technique and the area of spans a wide spectrum, from consumer products and electronics instrument instruments to automobile and traffic monitoring system. In today's generation we are facing a lot of traffic problem due to increased number of vehicles. People are unable to reach their destination on time due to traffic. Sometimes it happens although there is no traffic on other side but people have to wait till the timer runs and light turns green. A lot of time wasted just due to this reason. To overcome the traffic problem fuzzy logic can be used. For this we require sensor which can sense no. of vehicles and rate at which vehicles are coming. Accordingly we can set the timer so that people have not to wait unnecessarily. sing fuzzy set theory time-management is done, based on inputs i.e. number of vehicles standing and rate at which vehicles are coming and timer is set accordingly. CCTV Cam- era: In this paper CCTV camera is basically used at chowks to give a clear vision of road [1]. FES is suitable approach to dynamic traffic signal control because of the nature of uncertainties on road traffic where the traffic distribution fluctuate non-uniformly. Fuzzy logic is a field started by Zadeh [2].

This is an attempt to mimic or reflect how human think, to model our sense of words when certain phenomenon as well as our common sense in decision making. The sensor collects data from environment which in turn is fed into fuzzy logic controller (FLC) for processing. The inference process in FLC is similar to the way traffic police handle the traffic flow at typical round about [3,4]. The back-propagation based allowed the system to learn and adapt to the dynamically changing environment and the FES was employed for decision making using IF-THEN Rules [5].

Neural network and fuzzy systems are dynamic parallel processing systems that estimate input output functions. They estimate a function without any mathematical model and learn from experience with sample data. Fuzzy sets are considered to be advantageous in the logical field and in handling higher order processing easily with the higher flexibility. Fuzzy logic and neural systems have very contrasting application requirements, for example, fuzzy systems are appropriate if sufficient process data are available, while neural systems are useful if process data is measurable. Fuzzy systems, however, exhibit both symbolic and numeric features. Therefore the integration of neural and fuzzy systems leads to a symbiotic relationship in which fuzzy systems provide a powerful framework for expert knowledge representation, while neural network provide learning capabilities and exceptional suitability for computationally efficient hardware implementations. The significance of this integration becomes even more apparent by considering their disparities.

Acoustic detector detects the vehicles on the basis of sound generated by the vehicles as it passes the sensor and communicate their counts wirelessly. Doppler Effect is the change in the wave frequency for an observer moving relative to its source. A radar signal is transmitted to a moving target which reflects a portion of the signal back to module. The above mentioned sensors are used to give input in Mamdani Fuzzy Inference System. The inputs are number of vehicles and rate of vehicles. The timer value which is output is obtained according to the predefined rules in fuzzy inference system.

This technique is implemented by using two sensors to give the input to the Fuzzy Inference System. The sensors used are: Acoustic detector, Doppler radar Microwave Sensors.

Acoustic detector: detects the vehicles on the basis of sound generated by the vehicles as it passes the sensor.

This sensor is mounted on the pole which is pointing down towards the traffic. It can collect counts for one or more lanes. Someone can communicate their counts wirelessly.

Doppler radar microwave sensors: is used for detecting distant objects and speed of movement and their position. This device directs high frequency, with detection and time delay of the return signal to detect vehicles, thereby calculate the distance to the detected vehicle. On a chowk, acoustic detector and Doppler Radar sensor is installed on a pole, 150 meters away from the traffic signal, which counts the no. of vehicles on the basis of sound generated by the vehicles and communicate wirelessly and. This serves as an input for fuzzy inference system. The timer for red light side1 &3 i.e. north & south of the road will depend upon the number of cars

on the other side 2&4 i.e. east and west. According to the set rules in Fuzzy inference system the timer is set accordingly. For the set timer the cars are allowed to move from side 1 & 3 i.e. north & south and during this time, sensor counts number of vehicles on side 2&4 i.e. east and west. As the light turns green on side 2&4, red light turns for a given time on this side 1&3 according to the input given from sensor.

This paper proposes the concept of intelligent management of traffic control without involving much change in existing design. As time is very precious so this system will help in saving a lot of time which is wasted unnecessarily due to traffic signal improper working.

This will not only save time but also the fuel burnt unnecessarily and thus saving environment and money of an individual. This will make the road transportation more convenient and easy.

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