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Performance of adaptive-fuzzy technique in controlling vehicular traffic

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A vehicular traffic control system was designed with an inexpensive OOPIC micro controller. The information on vehicular traffic at the junction was simulated and fed to the microcontroller and was used as the primary input for the decision-making algorithms.

The adoptive algorithm first compares the number of vehicles in a chosen lane with those present in all other lanes at any given moment. The ratio between number of vehicles was calculated and the moment the ratio fell below a pre-defined threshold value, changes in traffic signal times were sought through a fuzzy sub-system. The algorithm ?learns? continuously and converges to the most acceptable switching time for each lane on a particular day at a particular time.

The pilot tests indicated that the system efficiency improves with time as it continues to learn from experience. It was observed that on average the system adapts itself to a new situation within two or three cycles. Even when the change in traffic pattern is small, 20%-30% efficiency improvement was seen in this system compared to a programmed time system. For a large change, the improvement was about 60%. In worse case scenario, (such as a failure of a sensor), the system behaves as a programmed time system.