



US005357436A

United States Patent [19]

Chiu

[11] **Patent Number:** 5,357,436[45] **Date of Patent:** Oct. 18, 1994[54] **FUZZY LOGIC TRAFFIC SIGNAL CONTROL SYSTEM**[75] **Inventor:** Stephen L. Chiu, Thousand Oaks, Calif.[73] **Assignee:** Rockwell International Corporation, Seal Beach, Calif.[21] **Appl. No.:** 964,319[22] **Filed:** Oct. 21, 1992[51] **Int. Cl.:** G06F 15/48[52] **U.S. Cl.:** 364/436; 340/916[58] **Field of Search:** 364/436; 340/40, 916, 340/917, 918[56] **References Cited
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[57] **ABSTRACT**

A traffic signal network is controlled by an adaptive, fuzzy logic based, distributed system of microprocessors. The system can control multiple intersections in a network of two-way streets. Traffic signal timing at each intersection is defined by signal control parameters such as cycle time, phase split, and offset time. Local traffic flow data is input to each microprocessor and characterized by membership functions. Fuzzy logic decision rules are applied to the characterized data and used to adjust the signal control parameters at each intersection as a function of the local traffic conditions and the signal parameters in effect at neighboring intersections. Cycle time is adjusted to maintain a good degree of saturation, and phase split is adjusted to achieve similar degrees of saturation on competing approaches. The offset time at each intersection is coordinated with the neighboring intersections and adjusted gradually to optimize traffic flow in the dominant direction. The amount of change in the control parameters during each cycle may be limited to a small fraction of the current parameters to ensure smooth transition. Microprocessor controllers can be installed individually and incrementally into an area and coexist with current signal controllers, and control parameters, membership functions, and decision rules may be modified and extended as necessary.

15 Claims, 2 Drawing Sheets

