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Designing an intelligent ontological system for traffic light control in isolated intersections

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Abstract

This paper models the traffic light control domain using a fuzzy ontology and applies it to control isolated intersections. Proposing an independent module for reusing traffic light control knowledge is one of the most important purposes of this paper. In this way, software independency increases and other software development activities, such as test and maintenance, are facilitated. The ontology has been developed manually and evaluated by experts. Moreover, the traffic data is extracted and classified from images of intersections using image processing algorithms and artificial neural networks. According to predefined XML schema, this information is transformed to XML instances and mapped onto the fuzzy ontology for firing suitable fuzzy rules using a fuzzy inference engine. The performance of the proposed system is compared with other similar approaches. The comparison shows that it has a much lower average delayed

time for each car in each cycle in all traffic conditions as compared with the other ones.



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Keywords

Fuzzy ontology; Intelligent agent; Intelligent Transportation System (ITS); Traffic Light Control (TLC); Isolated intersections; Image processing; Artificial neural network

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