Assessing a desirable intersection treatment using case based reasoning

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It has been realized that most of the intersection treatments are experiencing severe congestion and travel time delays during their life or even much earlier. The Highway Design Division of Road Development Authority has now identified that the current design approaches which are based on empirical models only considering the influence of major and minor traffic volumes should be improved to cater to today's traffic environment. Apart from the peak hour traffic volumes, local constraints due to terrain features, physical visibility, acquisition limitations, pedestrian volumes, cyclist volumes, driver and user behaviors etc. have a greater influence over the selection of an appropriate intersection treatment.

In this study, we tried to characterize the above constraints quantitatively and qualitatively by evaluating the impact of those constraints on intersections. This paper further presents an expert system using Case Based Reasoning (CBR) to decide on the most appropriate intersection treatment for a given intersection. The intersection treatment problem was decomposed into subtasks and generalized concepts were added for each subtask. This decomposition and generalization enabled the use of a standard decision tree based iterative retrieval strategy. We discuss how a prototype of this system was built to match the defined local constraints. Some Documented real situations were used to create the Case Base and a prototype was evaluated on several test cases. Results showed that generated solutions to be comparable to that of domain expert's solutions.

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