Fuzzy traffic control and computer vision

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Abstract

The existing traffic light controllers function by using a fixed time cycle which might not be the optimal solution. In this paper we show how computer vision can be used to analyze camera feeds in real time and input data into a fuzzy logic controller that can provide a more flexible traffic light duration. In this way the amount of vehicles would correlate to the duration of the green light.

1. Introduction

Traffic congestion is a serious modern problem affecting economy and lives. Part of that problem is that the traffic light controllers cannot adapt to a new situation in traffic. To overcome their fixed nature in this paper we took at using neural networks to measure the congestion by counting the number of vehicles on the road and a fuzzy controller to decide upon the green light duration. We use a four lane intersection as an example in all our simulations.

- (neki jos detalj za neuralnu koju si pravio moze ovde da ide npr). –

Fuzzy logic was introduced in 1965 by Lotfi Zadeh [2]. It is a form of many-valued logic where a variable can hold a value in the interval [0, 1]. This has offered big flexibility in the fields of control theory and artificial intelligence. A linguistic variable can be desribed by a mathematical value using a fuzzy membership function.

We used linguistic variables representing the vehicle density on the road in both directions as the input and executed our fuzzy logic rules in order to get green light duration in seconds as the output.

2. Datase
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3. Neural Network
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4. Fuzzy Logic System
5. Simulations and Results
6. Conclusion

References:

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