Project Title: Design and Implement of Intelligent Control Strategies for Solving the Problem of Traffic Congestion Using Petri nets

Problem of Traffic Congestion Using Petri nets

Abstract—Once the high traffic density at a road reaches a given threshold, arise such questions as how to alleviate the traffic congestion and how to prevent new traffic jams from happening in its neighboring roadways. This proposal proposes a new control strategy to simulate and analyze a congestion zone in an urban traffic network by using a multimodal traffic flow simulation software package.

Basic of Traffic Light System Models

In a two-way grid network, each link is divided into two distinct zones as shown in Fig. 1. The downstream queue storage area where vehicles are organized into separate turning movements and the upstream reservoir where the turning movements are mixed. The downstream queue storage area consists of three divisions. One is for the right turn only, the other is for the left turn only and another is for the ahead movement.

Control Strategies For Urban Traffic Network System

According to the above vehicles movement bans, Long et al. [19] proposed four categories of control strategies: single-line control, multiline control, area control and diamond control. This control strategy can help the vehicles queueing on some of the links to restart and leave the jammed area. Therefore, ahead movement bans are applied on the upstream links in a backward direction of the blocked link, and turning movement bans are applied on the side links. Multiline control strategy is very similar to single-line one. This category of strategy not only locates movement bans of the upstream links in a backward direction but includes their side links by applying movement bans on the upstream links in the turning directions on the side links as well.

Figure 2. The percentage of vehicles travelling in the urban traffic network.

Figure 3. The average of travelling time for the three segments.

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References