Applicability & Design Requirements of an Intelligent Pedestrian Crossing

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Abstract

Pedestrian crossing is one of the places where pedestrians and vehicles interact each other. This interaction often causes delays to both pedestrians and vehicles and increase possibility of accidents between vehicle-pedestrian and vehicle-vehicle. In order to manage these interactions, controlling mechanisms such as traffic signals are used. This research looks into the possibilities of making these interactions safe and less delay causing to both pedestrians and vehicles, by means of appropriate controlling mechanisms with the help of present technical capabilities. The objective of this research is to come up with a design guideline for an intelligent pedestrian crossing and to compare its effect on minimizing delays and reducing risk of accidents as compared to standard zebra or signalized pedestrian crossing. Only the isolated pedestrian crossings are considered for this study.

End purpose of the research is to identify the applicability of intelligent pedestrian crossings and to identify design requirements for an intelligent pedestrian crossing at places where it is needed. Design requirements are characterized based on four main parameters; vehicle flow, vehicle speed, pedestrian flow and safe stopping distance for vehicles. The proposed design requirements allow intelligent pedestrian crossing to decide to whom to give the priority based on traffic & pedestrian flow condition and the location of pedestrian crossing.

Main findings of the research include identification of different design requirements; signal operation strategies for different traffic conditions and analytical solutions to identify appropriate timing requirement of the traffic signal. Four different situations based on pedestrian flow and vehicle flow have been analysed. Intelligent pedestrian crossing will be suitable for all except the situation where both pedestrian and vehicle flows are high. It is proposed to vary amber time considering whether a vehicle can be safely stopped or whether it is allowed to pass through the pedestrian crossing. The decision is based on the approaching speed of the vehicle and its safe stopping distance. Red time and Green time could vary depending on the crossing ability (speed) of pedestrian and the crossing length.

Key words: Intelligent Pedestrian Crossing, Delays, Safety, Isolated

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