Traffic Signal Design and Simulation for Vulnerable Road Users Safety and Bus Preemption

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Abstract

Mostly, pedestrian-car accidents occurred at a signalized interaction is because pedestrians cannot across the intersection safely within the green light. From the viewpoint of pedestrian, there might have two reasons. The first one is pedestrians cannot speed up to across the intersection, such as the elders. The other reason is pedestrians do not sense that the signal phase is going to change and their right-of-way is going to lose. Developing signal logic to protect pedestrian, who is crossing an intersection is the first purpose of this study. Another purpose of this study is improving the reliability and reduce delay of public transportation service. Therefore, bus preemption is also considered in the designed signal logic. In this study, the traffic data of the intersection of Chong-Qing North Road and Min-Zu West Road, Taipei, Taiwan, is employed to calibrate and validate the signal logic by simulation. VISSIM 5.20, which is a microscopic traffic simulation software, is employed to simulate the signal logic. From the simulated results, the signal logic presented in this study can protect pedestrians crossing the intersection successfully. The design of bus preemption can reduce the average delay. However, the pedestrian safety and bus preemptive signal will influence the average delay of cars largely. Thus, whether applying the pedestrian safety and bus preemption signal logic to an isolated intersection or not should be evaluated carefully.

Keyword：vulnerable road user, bus preemption, signal design.