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Aim Understanding pedestrians' behaviour is a priority in the design of interventions to prevent vehicle-pedestrian conflicts. Observation of pedestrians can help describe and understand their choices, unintended errors and reactions to traffic circumstances. In this study, we developed a computer algorithm to conduct video-based automated analysis of pedestrian behaviour at an urban busy site in Bogota, Colombia.

Methods Data collection was planned to videotape pedestrians as they crossed a selected road. A goal was set to develop an open-source inexpensive algorithm that allowed for the automated recording of pedestrian and vehicle positions and speeds. The algorithm aimed to assess vehicles' and pedestrians' instantaneous speeds, distance of pedestrian from proximate approaching vehicles, and pedestrian crossing through non-designated areas. Results were compared against visual observations.

Results The developed algorithm was able to estimate, with up to 18% error, pedestrian traffic. The algorithm also recorded pedestrians' and vehicles' speed and pedestrian position in reference to moving vehicles throughout the crossing, with errors in distance of 0.3 m and a time resolution of 1/30 s. Over 24% of pedestrians crossed through non-designated areas. Pedestrians started the crossing on average at 5.5 m but as close as 0.3 m from moving vehicles, which approached pedestrians at an average speed of 16 km/h, but as fast as 45 km/h.

Conclusions Video-based automated analysis of road safety conditions are feasible and can be successfully used to assess pedestrian behaviour in urban settings.