Title: Investigating factors influencing pedestrian crosswalk usage behavior in Dhaka city using supervised machine learning techniques

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Abstract: Pedestrians are the most vulnerable road users and are over-represented in casualty statistics, particularly in low- and middle-income countries like Bangladesh. To ensure the safety of pedestrians, it is necessary to identify the factors underlying pedestrian behavior while crossing. Hence, this study aims to predict the pedestrian decision regarding crosswalks using supervised machine learning techniques namely, Classification and Regression Tree (CART), Random Forest (RF), and Extreme Gradient Boost (XGBoost). A questionnaire survey was conducted in twelve important locations of Dhaka, Bangladesh using 8 attributes related to crosswalk behavior. Analysis suggests RF model is the most effective in terms of prediction performances, specifically having a 96.00% F1 score and 95.83% MCC value. It has been found that unsuitability of crosswalk location, absence of guard rails on median, and inadequate lightning at night near crosswalks are the most important features for preferring to use crosswalks. The findings of the study will help policymakers and transport planners to plan accordingly in order to develop safe crosswalks.

Keywords: Pedestrian safety, Crosswalk, Machine learning, Developing country

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