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An agent-based simulation study on the impact of emerging motorbikes swarms on the transportation system in Sri Lanka

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Transportation system in Sri Lanka is increasingly getting dependent on private modes rather than public modes. In particular, the motorbike has become the most popular mode of transportation among the middle income category of the society. This increasing trend is well reflected in the rush hour traffic as well as in the growing number of motorbike sales outlets appearing across the country. Our research is based on the question where would this end up if this trend continues. As many East Asian countries such as Vietnam, Indonesia and Thailand are currently suffering from the largely unorganized traffic resulted from motorbike swarms, we see the investigation of the possible impact of this growing tendency to use motorbikes in Sri Lanka on the transportation system as a critical issue that the policy makers should be concerned of. We propose to use computational methods to foresee the future by creating simulation models. For this endeavor, we propose the Agent-Based Modeling and Simulation methodology which is a computational method of studying macro level emerging patterns in a system such as traffic congestion by simulating the micro level interactions of individual entities such as individuals, motor bike riders, pedestrians, other vehicles are modeled as software agents. The primary data to construct the model as well as to calibrate its parameters are collected through a questionnaire distributed among motor bike riders as well as thorough literature review. The data being collected include the background of using motorbike as the primary mode of transportation, the issues in the public transportation system as well as the common driving patterns of individual motorcyclists. Once the model is constructed, the simulation results will be compared with the observations in the real environment to validate the model. The validated model will then be used to make predictions about the future and arrive at conclusions about the future traffic patterns. The implications of this study will be helpful to the policy makers to come up with better strategies to reduce the congestion.

Keywords: Agent-Based simulation, motorbike swarms model, traffic congestion