

The traffic plugin of GAMA

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Abstract

Modeling traffic is about as old as car traffic itself. Among the existing modeling approaches, one of the most popular for traffic simulation is agent-based modeling. Agent-based models enable to describe each driver as an autonomous agent, making decisions based on its own aptitudes and local environment. With these models, each vehicle moves according to surrounding infrastructure and vehicles, accelerates and slows down according to its environment while maintaining a safe distance with other cars. These last few years have seen the number of traffic agent-based frameworks (MATSim, SUMO...) increase significantly. While these frameworks are appropriate for the study of normal traffic conditions, it is often complex to adapt them, in particular for non-computer scientists, to more specific application contexts such as the study of the impact of uncommon events (e.g. car accidents, evacuation following a technological disaster). In this context, we present the traffic plugin of the GAMA modeling and simulation platform, allowing the modeler to easily define new easily-tunable microscopic traffic simulations with a detailed representation of the driver's operational behaviors. In particular, it allows the integration of road infrastructures and traffic signals, change of lanes by driver agents and their tendency to follow norms [2]. Moreover, the tool allows for city-level simulations with tens of thousands of driver agents. In addition, its latest version offers the possibility to define vehicles occupying different numbers of lanes allowing to simulate mixed traffic with cars, motorbikes, bus, etc. In addition, this version improves the speed management of vehicles by using the classic IDM (intelligent driver model) model. The plugin was validated and uses in many applications cases in France and in Vietnam, in particular to simulate city evacuation in disaster contexts [1].

References

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