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# A New Stochastic Cellular Automata Model for Traffic Flow Simulation with Drivers' Behavior Prediction

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## Abstract

In this work we introduce a novel, flexible and robust traffic flow cellular automata model. Our proposal includes two important stages that make possible the consideration of different profiles of drivers' behavior in a simple way. We first consider the motion expectation of vehicles that are in front of each driver. Secondly, we define how a specific vehicle decides to get around, considering the foreground traffic configuration. Our model uses stochastic rules for both situations, using the Probability Density Function of the Beta Distribution to model three drivers' behavior, adjusting different parameters of the Beta distribution for each one.

*Keywords:* Cellular automata, Traffic flow modeling, Drivers' behaviors, Stochastic model, Numerical simulation

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## 1 Highlights

A novel, flexible and robust traffic flow cellular automata model is presented. Drivers' behavior are easily treated by one specific Probability Density Function. The model reproduces results compatible with theoretical and measured data.

## 2 Introduction

Vehicles traffic is becoming one of the largest problems found in big cities and highways. While a large amount of resources has being spent and invested in this field, the number of vehicles is still expanding and traffic problems remain. In this sense, traffic flow models have been of

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