

Accepted Manuscript

A cellular automation model accounting for bicycle's group behavior

Tie-Qiao Tang, Ying-Xu Rui, Jian Zhang, Hua-Yan Shang

PII: S0378-4371(17)31164-0
DOI: <https://doi.org/10.1016/j.physa.2017.11.097>
Reference: PHYSA 18865

To appear in: *Physica A*

Received date: 5 September 2017

Revised date: 30 October 2017

Please cite this article as: T.-Q. Tang, Y.-X. Rui, J. Zhang, H.-Y. Shang, A cellular automation model accounting for bicycle's group behavior, *Physica A* (2017), <https://doi.org/10.1016/j.physa.2017.11.097>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A cellular automation model accounting for bicycle's group behavior

Tie-Qiao Tang^{a*}, Ying-Xu Rui^a, Jian Zhang^a, Hua-Yan Shang^b

a) School of Transportation Science and Engineering, Beijing Key Laboratory for Cooperative Vehicle Infrastructure Systems and Safety Control, Beihang University, Beijing 100191, China

b) Information College, Capital University of Economics and Business, Beijing 100070, China

Abstract: Recently, bicycle has become an important traffic tool in China, again. Due to the merits of bicycle, the group behavior widely exists in urban traffic system. However, little effort has been made to explore the impacts of the group behavior on bicycle flow. In this paper, we propose a CA (cellular automaton) model with group behavior to explore the complex traffic phenomena caused by shoulder group behavior and following group behavior on an open road. The numerical results illustrate that the proposed model can qualitatively describe the impacts of the two kinds of group behaviors on bicycle flow and that the effects are related to the mode and size of group behaviors. The results can help us to better understand the impacts of the bicycle's group behaviors on urban traffic system and effectively control the bicycle's group behavior.

Keywords: Bicycle, group behavior, cellular automaton model, simulation.

1. Introduction

Before sharing bicycle (SB) occurs in China, bicycle only carries 5.5% of traffic volume in urban traffic system; but after SB occurs, the proportion increases to 11.6%, and the usage times of private cars and motorcycles, and carbon emission and PM2.5 have significantly reduced [1]. Recently, SB has been a popular traffic tool because of its own merits (e.g., low price, small size, no emissions, etc.). The Chinese statistical

* corresponding author: Tie-Qiao Tang (T.Q. Tang); email: tieqiaotang@buaa.edu.cn

Download English Version:

<https://daneshyari.com/en/article/7376444>

Download Persian Version:

<https://daneshyari.com/article/7376444>

[Daneshyari.com](https://daneshyari.com)