

PROCEEDINGS OF SPIE

International Conference on Frontiers of Traffic and Transportation Engineering (FTTE 2022)

Changxi Ma
Editor

17–19 June 2022
Lanzhou, China

Organized by
Global Scientific Research Association (China)

Co-Organized by
Gansu Provincial Association of Communications and Transportation (China)

Published by
SPIE

Volume 12340

Proceedings of SPIE 0277-786X, V. 12340

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

International Conference on Frontiers of Traffic and Transportation Engineering (FTTE 2022)
edited by Changxi Ma, Proc. of SPIE Vol. 12340, 1234001
© 2022 SPIE · 0277-786X · doi: 10.1117/12.2665529

Proc. of SPIE Vol. 12340 1234001-1

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *International Conference on Frontiers of Traffic and Transportation Engineering (FTTE 2022)*, edited by Changxi Ma, Proc. of SPIE 12340, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510657526
ISBN: 9781510657533 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

ix Conference Committee

INTELLIGENT TRANSPORTATION MODEL AND TRANSPORTATION NETWORK TECHNOLOGY

- 12340 02 **Construction and application of safety stock index based on MI-TVP-SV-VAR model**
[12340-20]
- 12340 03 **Optimization of seaport companies' D&A systems based on system dynamics and evaluation models** [12340-14]
- 12340 04 **Escort analysis in puzzle-based storage systems** [12340-39]
- 12340 05 **Research and development of intelligent module micro** [12340-11]
- 12340 06 **Environmental investment and operation strategy of sustainable supply chain considering resource reuse: based on Stackelberg game model** [12340-9]
- 12340 07 **Highway network design model with value-at-risk** [12340-2]
- 12340 08 **Avionics fault prediction and health management technology based on SJ-BIST** [12340-97]
- 12340 09 **Practice of the travel forecasting model of CCX-expressway accommodating tourism travel**
[12340-64]
- 12340 0A **Design and simulation of tunnel real-time monitoring system based on multivariate information fusion** [12340-93]
- 12340 0B **Prediction of new energy vehicles ownership with PCA-logistic model under peak carbon dioxide emissions and carbon neutrality** [12340-46]
- 12340 0C **A scheme for train communication information management in onboard-centered train control system** [12340-102]
- 12340 0D **Bus travel time prediction based on time-varying adaptive Kalman filter method** [12340-30]
- 12340 0E **OODA model study of port epidemic transmission process and emergency prevention and control** [12340-67]
- 12340 0F **Study on traffic accident characteristics of provincial trunk highway based on data mining**
[12340-105]

- 12340 OG **A study on the development strategy of rural roads in the 14th five-year plan based on the calculation model of replacing subsidies with awards [12340-31]**
- 12340 OH **Modeling and validation of typical scenarios of high-speed railway automatic train operation based on Alvis [12340-71]**
- 12340 OI **Prediction of the demand for senior crews of Chinese sea-going vessels based on the combined forecasting method [12340-113]**
- 12340 OJ **Discrete traffic network design model considering risk attitude of decision maker and users [12340-56]**
- 12340 OK **Research on the evaluation method of AEB car-to-car test based on traffic accident data in China [12340-34]**
- 12340 OL **Regional accident consequence simulation and risk assessment in the port area [12340-48]**
- 12340 OM **Research on supply and demand of senior crew in coastal area based on combination forecast [12340-18]**
- 12340 ON **Numerical analysis of passenger ship personnel emergency evacuation efficiency [12340-66]**
- 12340 OO **Travel purpose identification based on mobile phone signaling data and Bayesian network [12340-25]**
- 12340 OP **Traffic accident characteristics and association analysis of electric bicycles based on data mining [12340-112]**
- 12340 OQ **Cause analysis of ship collision accident based on Bayesian network [12340-62]**
- 12340 OR **Analysis of land trip generation rates driven by mobile phone signaling data [12340-77]**
- 12340 OS **Neural network prediction model for ultimate collision force in ship-bridge collision [12340-107]**
- 12340 OT **Data-driven study of transit and bicycle interchange [12340-98]**
- 12340 OU **Data acquisition system of Internet of Things based on Kohonen multi-protocol adaptation [12340-91]**
- 12340 OV **Evolutionary game of dual-channel supply chain cooperation of agricultural products [12340-101]**
- 12340 OW **Research on the interspersed model of straight collision points at signal intersections in the environment of the Internet of vehicles [12340-82]**
- 12340 OX **Prediction model of passenger transfer volume between scenic spots based on clustering and dynamic Bayesian network [12340-103]**
- 12340 OY **Simulation research and physical design of open circuit cable fault detection based on time domain reflection method [12340-83]**

INTELLIGENT TRANSPORTATION LOGISTICS AND ALGORITHM PREDICTION APPLICATION

- 12340 0Z **Intelligent logistics SaaS platform design** [12340-10]
- 12340 10 **Evaluation research on coupling and synergistic development of Beijing-Tianjin-Hebei express logistics industry and regional economy under circular economy: based on entropy method** [12340-79]
- 12340 11 **Research on recycling and utilization system of express package based on green logistics concept** [12340-108]
- 12340 12 **Study on the location of regional emergency logistics centre based on improved backtracking algorithm** [12340-7]
- 12340 13 **Research on intelligent logistics data governance and technology under the background of big data** [12340-8]
- 12340 14 **Design and implementation of intelligent logistics system for photovoltaic enterprises** [12340-4]
- 12340 15 **Study on optimization of rural passenger and cargo bus based on ant colony algorithm** [12340-84]
- 12340 16 **Research on smart logistics transportation capacity planning based on big data-taking enterprise A as an example** [12340-13]
- 12340 17 **Regional logistics enterprise performance management cost reduction and efficiency evaluation system** [12340-17]
- 12340 18 **The level of developments of green logistics in Guangdong Province** [12340-89]
- 12340 19 **Optimization analysis of inbound and outbound efficiency of four-way shuttle storage system** [12340-51]
- 12340 1A **Optimization of express boxes based on temperature retention** [12340-76]
- 12340 1B **The construction of urban common distribution information platform under the mode of express delivery + takeaway** [12340-73]
- 12340 1C **Research on market targeting of rail freight market: considering customers' preferences for freight service** [12340-24]
- 12340 1D **Research on risk control of ship cargo transportation safety** [12340-69]
- 12340 1E **Driver fatigue discrimination method based on visual features** [12340-119]
- 12340 1F **Research on quantitative calculation of risk of dangerous goods port enterprises** [12340-61]

- 12340 1G **Construction of evaluation index system for investment decision-making stage of automated container terminal** [12340-78]
- 12340 1H **Q-learning for the speed trajectory optimization of the freight train** [12340-58]
- 12340 1I **Analysis of technical operation time standard of train based on the weakening buffer algorithm and the CRITIC method** [12340-81]
- 12340 1J **Liner ship speed optimization based on the influence of emission control area in waterway transport system** [12340-53]
- 12340 1K **Evaluation of smart port development level based on entropy weight TOPSIS method** [12340-59]
- 12340 1L **Transportation network optimization of regional trunk logistics** [12340-90]
- 12340 1M **Study on topological characteristics of oil and gas storage and transportation system in port area** [12340-94]
- 12340 1N **COVID-19 epidemic prevention and control status and research progress of related technologies in Chinese ports** [12340-117]
- 12340 1O **Research on UAV terminal distribution information system based on integrated management and control** [12340-100]
- 12340 1P **Comparative study on infrastructure layout plan of container rail-water intermodal transport in China and abroad** [12340-16]
- 12340 1Q **Current situation of ro-ro transportation and safety management in Bohai Bay** [12340-35]
- 12340 1R **Distributed task architecture of UAV swarm based on potential field direction** [12340-99]
- 12340 1S **Contribution calculation of logistics industry to regional economic growth of Gansu Province** [12340-26]
- 12340 1T **Urban rail component operation quality detection system based on deep learning and bilateral threshold algorithm** [12340-114]
- 12340 1U **Application of shuttle vehicle in urban underground logistics system** [12340-104]
- 12340 1V **Transportation discussion: liner shipping alliance selection study** [12340-19]

RESEARCH ON HIGHWAY TRAFFIC PLANNING AND VEHICLE CONTROL

- 12340 1W **Intelligent location selection for source assembly points of RAIL-SEA EXPRESS RS** [12340-5]
- 12340 1X **Study on current situation: problems and causes of highway overloading control** [12340-86]

- 12340 1Y **Intelligent transportation system based on urban bus and cross-city passenger transport** [12340-65]
- 12340 1Z **Path planning of automatic valet parking under mixed traffic scenarios in parking lot** [12340-36]
- 12340 20 **Evaluation of financing scheme of railway construction project based on improved fuzzy AHP** [12340-55]
- 12340 21 **Study on maintenance time of airport pavement fog seal** [12340-22]
- 12340 22 **Analysis on influencing factors of illegal driving of rail drivers** [12340-68]
- 12340 23 **Automatic safety warning system for concomitant maintenance operations** [12340-96]
- 12340 24 **An intelligent life-cycle carbon emission measurement system for highway pavement construction** [12340-92]
- 12340 25 **Analysis of passenger flow characteristics in suburban section of urban rail transit** [12340-54]
- 12340 26 **Research and verification of power boosting technology for a vehicle diesel engine** [12340-15]
- 12340 27 **Study on parking space scale of tourism highway parking area based on queuing theory** [12340-70]
- 12340 28 **Design of distribution station under the background of urban rail transit** [12340-75]
- 12340 29 **Optimal control method of dynamic speed limit at tunnel entrance section based on multi-objective constraints** [12340-32]
- 12340 2A **Extraction and visualization of highway operation status indicators based on toll data** [12340-116]
- 12340 2B **Research on the classification characteristics of Chinese airports from the perspective of network** [12340-50]
- 12340 2C **The research on indirect incident detection in expressway under high traffic density** [12340-95]
- 12340 2D **Research on the scale and density of China's highway network** [12340-45]
- 12340 2E **Test and effectiveness evaluation of cooperative vehicle infrastructure system information interaction based on fuzzy comprehensive evaluation** [12340-41]
- 12340 2F **Study on the characteristics of rail corrugation for Chongqing subway line with large slope** [12340-21]
- 12340 2G **Emergency competence demands analysis of special equipment based on highway traffic incident emergency disposal in China** [12340-120]

- 12340 2H **Traffic assignment from cities along the Qingdao-Jinan Corridor to the Beijing-Shanghai high-speed railway and the Beijing-Shanghai second line** [12340-42]
- 12340 2I **Train timetable optimization of urban rail transit in rush hours based on the dynamic pricing strategy** [12340-38]
- 12340 2J **Research on operation scheme and capacity of airport runway under non-stop construction** [12340-40]
- 12340 2K **Research on pedestrian evacuation effect of three-dimensional ladder classroom with different exit layouts** [12340-118]
- 12340 2L **Performance study of vertical vibratory roller compaction of large thickness water stabilized layer** [12340-29]
- 12340 2M **Research on evaluation ideas and index construction of China's scenic byway** [12340-28]
- 12340 2N **Preparation and rheological properties of warm mix compound high viscosity modified bitumen** [12340-33]
- 12340 2O **New expressway emergency rescue system** [12340-87]
- 12340 2P **Research on the waterway transportation planning in Jilin Province, China** [12340-110]
- 12340 2Q **Traceability analysis of truck flows on highway congested sections** [12340-52]
- 12340 2R **Scenario-based requirements analysis for Chinese new train control system** [12340-109]
- 12340 2S **Research on the long tail distribution of pedestrian flow at signalized intersections** [12340-44]
- 12340 2T **Coordinated control strategy between entrance ramp of city expressway and upstream intersection** [12340-115]

Conference Committee

Conference General Chair

Changxi Ma, Lanzhou Jiaotong University (China)

Technical Program Committee Chair

Pak Kin Wong, University of Macau (China)

Local Committees

Hui Liu, Central South University (China)

Jian Rong, Beijing University of Technology (China)

Jinxing Shen, Hohai University (China)

Xu Wang, Shandong University (China)

Technical Program Committees

Jianping Sun, East China Jiaotong University (China)

Jie He, Southeast University (China)

Hongjun Cui, Hebei University of Technology (China)

Fuquan Pan, Qingdao University of Technology (China)

Feihu Ma, East China Jiaotong University (China)

Xiaoping Zhao, East China Jiaotong University (China)

Xiaobing Ding, Shanghai University of Engineering Science (China)

Jianhua Zhang, Jiangsu Normal University (China)

Yongming He, Northeast Forestry University (China)

Jungang Shi, East China Jiaotong University (China)

Hanchuan Pan, Shanghai University of Engineering Science (China)

Jiangchen Li, Nanjing University of Aeronautics and Astronautics
(China)

Zhenjun Zhu, Nanjing Forestry University (China)

Chen Xu, Shanghai Institute of Technology (China)

Jianfeng Xi, Jilin University (China)

Peiqun Lin, South China University of Technology (China)

Jian Rong, Beijing University of Technology (China)

Qingyu Luo, Jilin University (China)
Hongfei Jia, Jilin University (China)
Yaqin Qin, Kunming University of Science and Technology (China)
Yuanhua Jia, Beijing Jiaotong University (China)
Maosheng Li, Central South University (China)
Dewei Li, Beijing Jiaotong University (China)
Xiaolin Jia, Southwest University of Science and Technology (China)
Jianqing Wu, Shandong University (China)
Hui Liu, Central south University (China)
Hongtai Yang, Southwest Jiaotong University (China)
Jinxing Shen, Hohai University (China)
Jiangxia Yu, Xidian University (China)