Bin Cheng

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PARTICULARS

EDUCATION

Rutgers University	NJ, U.S.A
Ph.D. in Computer Engineering	*09/2012—12/2018*
Shanghai Jiao Tong University (SJTU)	Shanghai, China
M.S. in Control Theory and Engineering	*09/2009—06/2012*
East China University of Science and Technology (ECUST),	Shanghai, China
B.E. in Automation	*09/2005—07/2009*
Ranking: 3/102	

JOB INTERESTS

Data-driven statistical modeling and simulations

Machine/Deep learning applications, e.g. image semantic segmentation, object detection, NLP

TECHNICAL SKILLS

Programming Languages: Python, C/C++, Java, SQL, Perl, AWK

Data Engineering: platform(TensorFlow, Keras, Scikit-Learn), data processing(NLP, pandas)

WORK EXPERIENCE

Visiting Scholar, New York University, NY, U.S.A	01/2019 – present
Research Assistant, WINLAB, Rutgers University, NJ, U.S.A	09/2012–12/2018
Research Intern, Toyota InfoTechnology Center, CA, U.S.A	09/2017–03/2018,
Summer Research Intern, Toyota InfoTechnology Center, CA, U.S.A	2015, 2016

RESEARCH EXPERIENCE

Rationalize Product Reviews using NLP Engine, 06/2017 – 08/2018

❑ Proposed and implemented a neural network based NLP engine which can extract rationales from product reviews
❑ Trained and tested on Tensorflow with 260000 reviews, achieving over 92% accuracy

Deep Learning based Collaborative Perception for Automated Vehicles Leveraging Vehicle-to-Vehicle Sensor Data Sharing, 09/2017 – 03/2018

❑ Collected sensor data (Camera, GPS, etc.) with multiple vehicles in different driving scenarios
❑ Applied multiple deep learning networks for **semantic segmentation** on the collected dataset and studied their enhancements for vehicle camera data

❑ Studied a methodology that can fuse the sensor measurements and the outputs of the deep learning networks between vehicles via vehicle-to-vehicle communications to increase the automated driving system's confidence of detecting objects

Data-driven Wireless Signal Propagation Modeling and Simulator Development for Large-Scale Vehicular Networks, 01/2013 − 10/2017

❑ Designed and participated in several vehicular communication data collection campaigns with up to 400 DSRC devices
❑ Proposed and calibrated a signal propagation model based on RSSI measurements from field experiments with high density of DSRC devices
❑ Developed a vehicular network simulator for large-scale networks, which can reproduce the field experiment results with more than 88% accuracy
❑ *The proposed simulator has been used as the primary tool for the SAE standardization committee to evaluate the performance of the congestion algorithms in SAE standard J2945/1.*

Wireless Spectrum Sharing between Vehicular Communication Systems and Wi-Fi Systems, 05/2016 − 10/2017

❑ Evaluated different spectrum sharing algorithms that can enable the coexistence of vehicular communication systems and Wi-Fi systems in the 5.9 GHz band via ns-3 network simulations and identified the fundamental challenges of sharing the spectrum between two systems
❑ Proposed an enhanced algorithm which improves the coexistence performance of the two communication technologies
❑ *The results of this work have been included in the European standardization document, ETSI BRAN TR 103 319, and are selected by the German spectrum regulators as the technical data and reported to the European Conference of Postal and Telecommunications Administrations*

Design and Analyze DSRC Channel Congestion Control Approaches, 04/2014 − 09/2017

❑ Evaluated multiple representatives of Dedicated Short Range Communications (DSRC) channel congestion control approaches via ns-2 simulations
❑ Studied the performance of a mixed network where different congestion control approaches coexist in the same network
❑ Designed a coexistence mechanism to improve the fairness of different coexisted congestion control approaches
❑ *The results of this work have been included in European standardization document, ETSI TR 101 613 V1.1.1*

Wireless Networking for Emergency Response in Heterogeneous Wireless Networks, 11/2010 − 03/2012

❑ Evaluated the performance of existing algorithms of location service in scenarios with low event occurrence rate
❑ Proposed a trail-based search strategy that enables the source node to establish contacts with the mobile actor when an event of interest occurs

Real-time and Reliable Communication Protocol Design for Wireless Sensor and Actor Networks, 02/2010 − 10/2012

❑ Jointly considered data correlation and actor selection in data collection scenarios with multiple actors and modeled the problem as an integer linear optimization problem
❑ Proposed two heuristic algorithms to solve the proposed optimization problem and enhanced the data collection efficiency in scenarios with a large number of sensor nodes and multiple actors

Intelligent Robotic Car Design Based on Freescale MCU, 02/2007 − 09/2007

❑ Developed a status reporting module which can periodically report the running status of the robotic car to the remote control

❑ Implemented an enhanced bang-bang algorithm and the PID algorithm to control the car's speed and heading based on the camera inputs

PUBLICATIONS

1. **Bin Cheng**, Hongsheng Lu, Ali Rostami, Marco Gruteser, John B. Kenney, *Challenges of sharing the DSRC band in the U.S.,* ITS World Congress, 2018.

2. Ryan Yee, Ellick Chan, Carmine Senatore, **Bin Cheng**, Gaurav Bansal, *Collaborative Perception for Automated Vehicles Leveraging Vehicle-to-Vehicle Communications,* IEEE Intelligent Vehicles Symposium, 2018.

3. **Bin Cheng**, Hongsheng Lu, Ali Rostami, Marco Gruteser, John B Kenney, *Impact of 5.9 GHz Spectrum Sharing on DSRC Performance,* IEEE Vehicular Networking Conference (**VNC**), 2017.

4. Zhezhuang Xu, Guanglun Liu, Haotian Yan, **Bin Cheng**, Feilong Lin, *Trail-Based Search for Efficient Event Report to Mobile Actors in Wireless Sensor and Actor Networks,* Sensors 17 (11), 2468.

5. Ines Ugalde, **Bin Cheng**, Ali Rostami, Marco Gruteser, Syed Amaar Ahmad, *Repeatability of Vehicular Measurements on Public Roadways,* Proceedings of the 11th Workshop on Wireless Network Testbeds, Experimental evaluation & CHaracterization (**WiNTECH**), 2017.

6. Ali Rostami, **Bin Cheng**, Hongsheng Lu, Marco Gruteser, John B Kenney, *Reducing Unnecessary Pedestrian-to-Vehicle Transmissions Using a Contextual Policy,* Proceedings of the 2nd ACM International Workshop on Smart, Autonomous, and Connected Vehicular Systems and Services (**CarSys**), 2017.

7. **Bin Cheng**, *Spectrum Sharing of Wi-Fi and DSRC In The 5.9 GHz Band,* Proceedings of the 2017 Workshop on **MobiSys** 2017 Ph.D. Forum, 2017.

8. Ali Rostami, **Bin Cheng**, Hongsheng Lu, John B Kenney, Marco Gruteser, *Performance and channel load evaluation for contextual pedestrian-to-vehicle transmissions,* Proceedings of the First ACM International Workshop on Smart, Autonomous, and Connected Vehicular Systems and Services (**Carsys**), 2017.

9. **Bin Cheng**, Ali Rostami, Marco Gruteser, *Experience: Accurate Simulation of Dense Scenarios with Hundreds of Vehicular Transmitters,* ACM 22nd Annual International Conference on Mobile Computing and Networking (**MobiCom**), 2016. (32 out of 226 submissions, **acceptance ratio: 14%**)

10. **Bin Cheng**, Ali Rostami, Marco Gruteser, Hongsheng Lu, John B Kenney, Gaurav Bansal, *Evolution of Vehicular Congestion Control Without Degrading Legacy Vehicle Performance,* Proceedings of Workshop of Smart Vehicles at IEEE **WoWMoM**, 2016.

11. Ali Rostami, **Bin Cheng**, Gaurav Bansal, Katrin Sjoberg, Marco Gruteser, John B Kenney, *Stability Challenge and Enhancement for Vehicular Channel Congestion Control Approaches,* IEEE Transactions on Intelligent Transportation Systems (**TITS**), 2016.

12. Silvija Kokalj-Filipovic, Larry Greenstein, **Bin Cheng**, Marco Gruteser, *Methods for Extracting V2V Propagation Models from Imperfect RSSI Field Data,* Proceedings of IEEE 82nd Vehicular Technology Conference (**VTC**), 2015.

13. **Bin Cheng**, Ali Rostami, Marco Gruteser, John B Kenney, Gaurav Bansal, and Katrin Sjoberg, *Performance Evaluation of A Mixed Vehicular Network with CAM-DCC and LIMERIC Vehicles,* Proceedings of Workshop of Smart Vehicles at IEEE **WoWMoM**, 2015.

14. Gaurav Bansal, **Bin Cheng**, Ali Rostami, Katrin Sjoberg, John B.Kenney, Marco Gruteser, *Comparing LIMERIC and DCC approaches for VANET channel congestion control,* IEEE 6th International Symposium on Wireless Vehicular Communications (**WiVeC**), 2014.

15. **Bin Cheng**, Yi Guo, Zhezhuang Xu, Cailian Chen, Xinping Guan, *Follow the Trail: a Search Strategy in Event-driven Wireless Sensor and Actor Networks,* IEEE Global Communications Conference (**GLOBECOM**), 2011.

16. **Bin Cheng**, Zhezhuang Xu, Cailian Chen, Xinping Guan, *Spatial Correlated Data Collection in Wireless Sensor Networks With Multiple Sinks,* IEEE Conference on Computer Communications (**INFOCOM**) Workshop on Wireless Sensor, Actuator and Robot Networks, 2011.

17. Zhezhuang Xu, Cailian Chen, **Bin Cheng**, Xinping Guan, *Sharing Mobility Strategy Improves Location Service in Wireless Sensor and Actor Networks,* IEEE Communications Letters, 2011.

PATENTS

18. **Bin Cheng**, Gaurav Bansal, Ryan Matthew Yee, Ellick Ming Huen Chan, Carmine Senatore , *Sensor System For Multiple Perspective Sensor Data Sets,* 2018 (pending).

HONORS & AWARDS

- The Data Incubator Fellow, 2018
- Teaching Assistant and Graduate Assistant Professional Development Fund award, Rutgers University, 2017-2018.
- Mobisys Ph.D. Forum Travel Grant, ACM, 2017.
- RIM (Research In Motion) Scholarship, SJTU, 2011.
- Graduate Research Scholarship, SJTU, 2009–2012.
- Outstanding Graduate (**top 5%**), ECUST, 2009.
- Outstanding Student in Science and Engineering, ECUST, 2009.
- First-class Scholarship for Excellent Study Grades (**top 5%**), ECUST, 2008.
- Third Prize in China Undergraduate Mathematical Contest in Modeling, 2008
- Second Prize in National College Students Mechanical Innovative Design Competition, 2008
- Endress+Hauser Scholarship (**1 out of 105**), 2007.
- Second Prize in "Freescale Cup" National University Smart Car Racing Contest, 2007
- Best paper award for Undergraduate Students Research Program, ECUST
- Outstanding Student (**top 5%**), ECUST, 2006-2008

REFERENCES

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