Renran Tian, PhD

Assistant Research Professor
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RESEARCH INTERESTS

- Computational behavior analysis and performance modeling
- Digital human modeling
- Automated driving system
- Human factors and systems engineering in healthcare and patient safety
- Data mining and machine learning

EDUCATION

School of Industrial Engineering, Purdue University – West Lafayette, IN
PhD in Human Factors and Ergonomic, 08/2013
Department of Industrial and Systems Engineering, Mississippi State University, Mississippi State, MS
Master of Science in Industrial Engineering, 08/2007
Department of Precision Instruments and Mechanology, Tsinghua University – Beijing, China
Master of Science in Mechanical Engineering, 01/2005
Bachelor of Science in Machine Design, Manufacture and Automation, 07/2002

POSITIONS AND EMPLOYMENT

Transportation Active Safety Institute, Department of Electrical & Computer Engineering, Purdue School of Engineering & Technology, IUPUI, Indianapolis, IN
Assistant Research Professor, 08/2015 – Present
Postdoctoral Research Associate, 08/2013 – 07/2015
Visiting Research Associate, 08/2011 – 07/2013

PROFESSIONAL ACTIVITIES

Professional Society

Member (since 2014), IEEE (Institute of Electrical and Electronics Engineers)
Co-Chair (since 2015), Technical Activities Committee on Human Factors in Intelligent Transportation Systems (HFITS), IEEE Intelligent Transportation Systems Society
Full Member (since 2015), HFES (Human Factors and Ergonomics Society)
Member (since 2016), SAE International
Member (since 2017), TRB (Transportation Research Board)

International Conferences

Program Committee Member: IEEE International Conference on Vehicular Electronics and Safety, 2013 - 2017
Board Member: International Conference on Digital Human Modeling, 2015 - 2018
Associate Editor: IEEE International Conference on Intelligent Transportation Systems, 2014 - 2018
Associate Editor: IEEE Intelligent Vehicles Symposium, 2017 - 2018
Parallel Session Chair: Session of Advanced Applications of Intelligent Systems, International Conference on Human-Computer Interaction, 2015 - 2018
Special Session Co-Chair: Session of Human Factors for Intelligent Transportation Systems, 17th IEEE International Conference on Intelligent Transportation Systems, 2014

Reviewer

Human Factors

Applied Ergonomics
IEEE Transactions on Intelligent Transportation Systems
IEEE Transactions on Vehicular Technology
IET Intelligent Transport Systems
Traffic Injury Prevention
Accident Analysis & Prevention
Journal of Applied Statistics
Mathematical Problems in Engineering
Injury Prevention
IEEE International Conference on Vehicular Electronics and Safety
IEEE International Conference on Intelligent Transportation Systems
IEEE Intelligent Vehicles Symposium
HCI International Conference

PATENT

Title of Invention: Driver Visual Sensor Behavior Study Device
Inventors: Jialiang Le, Mike Rao, Lingxi Li, **Renran Tian**
US Grant: US9798941B2
Applied in: China (CN105987717A), Germany (DE102016104578A1), Russian (RU2016109093A)

MEDIA COVERAGE

1. Discovery Channel Daily Planet, episode of May 21, 2015, IUPUI TASI mannequin research
2. Inside Indiana Business, PBS August 16, 2013 & NBC August 18, 2013, Toyota Collaborates with IUPUI TASI for Pedestrian Active Safety Research

RESEARCH GRANTS

Awarded

01/15/2018~ 12/31/2018	Funding Source: APTIV Role: PI Title: Implementation of Advanced Driver Behavior Ground-Truth System for Driver Facing Camera Performance Evaluation	($250,000)
01/01/2018~ 12/31/2018	Funding Source: IUPUI RSFG (Research Support Funds Grant) Role: Co-PI, PI: Lingxi Li Title: Development of Driver Intention Models via Learning of Naturalistic Driving Videos	($34,866)
01/01/2018~ 12/31/2020	Funding Source: Ford University Research Program (URP) Role: Co-PI, PI: Yaobin Chen Title: In-Cabin Occupant Detection System Integration	($150,000)
08/01/2017~ 12/31/2017	Funding Source: Delphi Electronics & Safety Role: PI Title: Using Standard Driver Glance Behaviors to Evaluate Driver State Monitoring Tools, Phase II	($300,000)
06/01/2017~ 05/31/2020	Funding Source: Ford University Research Program (URP) Role: PI Title: Occupant Sensor System and Interior Use Cases for Autonomous Vehicle Safety	($150,000)
03/01/2017~ 02/28/2020	Funding Source: Toyota Motor Engineering & Manufacturing North American, Inc. Role: Co-PI (10%), PI: Stanley Chien Title: Development of Testing Methods for Vehicle Road Departure Warning/Assist Systems	($1.3 M)

03/01/2016~ Funding Source: Toyota Motor Engineering & Manufacturing North American, Inc. ($400,000)
02/28/2017 Role: Co-PI (10%), PI: Yaobin Chen
Title: Development of Test Scenarios and Method for Vehicle Road Departure Warning

10/01/2015~ Funding Source: Delphi Electronics & Safety ($806,000)
05/31/2017 Role: Co-PI (40%) and Project Manager, PI: Lingxi Li
Title: Using Standard Driver Glance Behaviors to Evaluate Driver State Monitoring Tools

08/01/2015~ Funding Source: Delphi Electronics & Safety ($216,000)
08/31/2017 Role: PI
Title: Performance Evaluation of Advanced Driver State Sensor

09/01/2015~ Funding Source: Samsung GRO (Global Research Outreach) Program ($100,000)
08/31/2016 Role: Co-PI (50%), Co-PI: Lauren Christopher
Title: Semantic Pedestrian Motion Behavior and Vehicle-Pedestrian Interaction using Naturalistic Driving Video

Under Review

04/01/2018~ Funding Source: APTIV ($150,000)
12/31/2017 Role: PI
Title: Manual and Autonomous Driving Drowsiness Modalities Study

04/01/2018~ Funding Source: NIH Bioengineering Research Partnerships (BRP) R01 (~$3.7 M)
03/31/2023 Role: Co-Investigator, PI: Jeffrey A. Kline
Title: Capnograph-based Detection of Acute Pulmonary Embolism

05/01/2018~ Funding Source: Ford Motor Company (~$100,000)
11/30/2018 Role: PI
Title: Development of Full-Spectrum In-Door Lighting Environment for Vehicular Visual Sensor Testing

06/01/2018~ Funding Source: JTRP (Joint Transportation Research Program), INDOT (~$100,000)
05/31/2019 Role: Co-PI, PI: Lingxi Li
Title: Highway End-of-Queue Alerting System Based on Probe Vehicle Data

TEACHING EXPERIENCES

Teaching Assistant (School of Industrial Engineering, Purdue University – West Lafayette)

1. IE 343 Engineering Economics, Fall 2009,
2. IE 558 Safety Engineering, Spring 2011

Graduate Students Mentored (Department of Electrical & Computer Engineering, IUPUI)

Keyu Ruan, Mingye Chen, Li Fu, Jake Schwartz, Rifat Mueid, Wasif Javaid, Wensen Niu, Frank Weller, Nathan Wheeler, Nivethitha AC, Akhil Nayabu, Gokul Das Jayachandra Das, Qiwen Deng

PUBLICATIONS

Journal Papers

1. Sherony, R., **Tian, R.**, Fu, L., Chien, S., Chen, Y., Sherony, R., and Takahashi, H., "Pedestrian/Bicyclist Limb Motion Analysis from 110-Car TASI Video Data for Autonomous Emergency Braking Testing Surrogate Development," SAE International Journal of Transportation Safety, vol. 4, no. 1, April 2016, pp.113-120
2. **Tian, R.,** Lee, B.C., Yucel, G., Abel, S.R., Hultgren, K.E., and Duffy, V.G., "Evaluating bar coding-aided medication administration through identification of nursing work deficiencies", Human Factors and Ergonomics in Manufacturing & Service Industry, vol. 24, no. 4, July/August 2014, pp. 468 – 478.
3. **Tian, R.,** Li, L., Rajput, V. S., Witt, G. J., Duffy, V. G., and Chen, Y., "Study on the display positions for the haptic rotary device-based integrated in-vehicle infotainment interface", IEEE Transactions on Intelligent Transportation Systems, vol. 15, no. 3, June 2014, pp: 1234 – 1245.

4. **Tian, R.,** Li, L., Chen, M., Chen, Y., and Witt, G. J., "Studying the effects of driver distraction and traffic density on the probability of crash and near-crash events in naturalistic driving environment". IEEE Trans. on Intelligent Transportation Systems, vol. 14, no. 3, May 2013, pp: 1547 – 1555.
5. Wu, T., **Tian, R.,** and Duffy, V. G., "Performing ergonomics analyses through virtual interactive design: validity and reliability assessment", Human Factors and Ergonomics in Manufacturing & Service Industry, vol. 22, no. 3, May/June 2012, pp. 256 – 268.
6. **Tian, R.,** and Duffy, V. G., "Computerized task risk assessment using digital human modeling based job risk classification model", Computers & Industrial Engineering, vol. 61, no. 4, November 2011, pp. 1044 – 1052.
7. Wang, S., Zheng, L., Zhang, Z., **Tian, R.,** "Solving the Scheduling Problem of Hump Locomotive with Ant Colony Optimization", China Railway Science, vol. 28, no. 3, 2007, pp. 104 – 109.
8. Wang, S., Zheng, L., Zhang, Z., Li, Z., **Tian, R.**, "Web-based and Template-based Document Flow Management System", Application Research of Computers, vol. 24, no. 6, 2007, pp. 289 – 291.
9. **Tian, R.,** Zheng, L., Hu, C., Li, Z., & Ye, B., "Project template management for distributed project management and information reuse", Machine design and manufacture, vol. 2, 2005, pp. 119-121.
10. Jiang, X., Zheng, L., Liang, Y., **Tian, R.**, Li, T., "Create Object Oriental Database Based on SQLSERVER [J]," Computer Engineering and Applications, vol. 2, 2004, pp. 55 – 60.

Book Chapters

11. **Tian, R.,** Zhao, X., and Duffy, V. G., (2010). "Effect of Emotional Intelligence on Healthcare IT Acceptance". In V. Duffy (Ed.), Advances in Human Factors and Ergonomics in Healthcare (pp. 69-75). Boca Raton: CRC Press.
12. **Tian, R.,** Lee, B. C., Park, J., and Duffy, V. G., (2010). "Sociotechnical Model of Inpatient Nursing Work System for Understanding Healthcare IT Innovation Diffusion". In V. Duffy (Ed.), Advances in Human Factors and Ergonomics in Healthcare (pp. 875-884). Boca Raton: CRC Press.

Conference Proceedings and Presentations

13. Yi, Q., **Tian, R.**, and Chen, K., "A Universal 3D Gait Planning based on Comprehensive Motion Constraints", In Proceedings of HCI International, Vancouver, Canada, July, 2017
14. **Tian, R.**, and Chen, Y., "Understanding the Performance and Limitations of Advanced Driver State Monitoring System through Naturalistic Driving Experiments", in the 4th Workshop on Naturalistic Driving Data Analytics, IEEE International Conference on Intelligent Vehicles Symposium, Redondo Beach, California, USA, June, 2017
15. Fu, L., **Tian, R.**, Li, L., Chen, Y., and Sherony, R., "Bicycle Speed Analysis for Assessment of Bicyclist Pre-Collision System", in 25th Enhanced Safety Vehicles (ESV) Conference, Detroit, Michigan, June, 2017
16. Mueid, R., Christopher, L., and Tian, R., "Vehicle-pedestrian dynamic interaction through tractography of relative movements and articulated pedestrian pose estimation", in IEEE Applied Imagery Pattern Recognition Workshop (AIPR), Washington DC, October, 2016
17. **Tian, R.**, Ruan, K., Li, L., Le, J., and Rao, M., "Towards Standardized Performance Evaluation of Camera-based Driver State Sensing Technologies," In SAE 2016 World Congress & Exhibition, Detroit, Michigan, USA, April, 2016
18. **Tian, R.**, Fu, L., Chien, S., Chen, Y., Sherony, R., and Takahashi, H., "Pedestrian/Bicyclist Limb Motion Analysis from 110-Car TASI Video Data for Autonomous Emergency Braking Testing Surrogate Development," In SAE 2016 World Congress & Exhibition, Detroit, Michigan, USA, April, 2016
19. **Tian, R.**, Li, L., Yang, K., Jiang, F., Chen, Y., and Sherony, R., "Single-Variable Scenario Analysis of Vehicle Pedestrian Potential Crash based on Video Analysis Results of Large-Scale Naturalistic Driving Data," In Proceedings of HCI International, Los Angeles, U.S., August, 2015.
20. **Tian, R.**, and Chen, Y., "TASI 110-Car Naturalistic Driving Study: Implications to Vehicle-Pedestrian Crash Testing Scenarios and Pedestrian Crash Dummy Development," In the 2nd Workshop on Naturalistic Driving Data Analytics, IEEE International Conference on Intelligent Vehicles Symposium, Coex, Seoul, Korea, June, 2015.
21. **Tian, R.,** Wang, J., Li, L., Chen, Y., "Connecting Road Environment Features and Driver Glance Behavior in the Macro Level: Surrounding Vehicle Patterns, Traffic Density, and Driver Eye-Glance Behaviors", in 17th International IEEE Conference on Intelligent Transportation Systems, Qingdao, China, October, 2014.
22. **Tian, R.,** Li, L., Yang, K., Chien, S., Chen, Y., and Sherony, R., "Estimation of the vehicle-pedestrian encounter/conflict risk on the road based on tasi 110-car naturalistic driving data collection", in IEEE International Conference on Intelligent Vehicles Symposium, Dearborn, MI, June 2014, pp: 623 – 629.
23. **Tian, R.,** Du, E. Y., Yang, K., Jiang, P., Jiang, F., Chen, Y., Sherony, R., and Takahashi, H., "Pilot study on pedestrian step frequency in naturalistic driving environment", in IEEE International Conference on Intelligent Vehicles Symposium, Gold Coast, QLD, Australia, June, 2013, pp. 23 – 26.
24. E. Y. Du, K. Yang, F. Jiang, P. Jiang, **R. Tian,** M. Luzetski, Y. Chen, R. Sherony, and H. Takahashi, "Pedestrian Behavior Analysis Using 110-car Naturalistic Driving Data in USA," Enhanced Safety Vehicles (ESV), Seoul, Republic of Korea, May, 2013.

25. **Tian, R.,** Duffy, V. G., Birk, C., Abel, S. R., and Hultgren, K., "The Performance of BCMA-Aided Healthcare Service: Implementation Factors and Results," In Proceedings of HCI International, San Diego, U.S., July, 2009.
26. **Tian, R.,** and Duffy, V. G., "Performing dynamic ergonomics analysis through virtual interactive design," In Proceedings of the 2nd International Conference on Applied Human Factors and Ergonomics, Las Vegas, U.S., July, 2008.
27. **Tian, R.,** Duffy, V.G., and McGinley, J., "Effecting validity of ergonomics analysis during virtual interactive design," In Proceedings of HCI International, Beijing, China, July, 2007.