

Yi-Chen Zhang

Contact Information

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Education

Ph.D., Department of Statistics and Probability Aug. 2013 - Jun. 2018
Michigan State University, East Lansing, MI
Advisor: Dr. Lyudmila Sakhanenko
Dissertation: Functional Data Analysis with Application to Traffic Flow Data

M.S., Graduate Institute of Statistics Sep. 2007 - Jun. 2009
National Central University, Taiwan
Advisor: Dr. Tsai-Hung Fan
Thesis: Bayesian Model Selection in Linear Mixed Effects Models with AR(1) Errors

B.S., Department of Mathematics Sep. 2003 - Jun. 2007
National Central University, Taiwan

Work Experience

Algorithm Engineer - APTIV - Global Technology Company Jul. 2018 - Present
Scene Perception Core Team Oct. 2020 - Present
BMW Fused Road Model (FRM) Team Sep. 2018 - Sep. 2020

- Mainly develop fusion algorithms for object track processing
- Fused track converter for ROS, Apsil, and AUTOSAR Adaptive variants
- Design FRM Mode Manager state machine and degradation mode
- Error handling for vision, object fusion, and vehicle state inputs
- Coverity Static Analysis including AUTOSAR and MISRA C++
- Develop unit test and component test for FRM component
- Sporadically acted as the scrum master for FRM

Autonomous Driving Behavior Team Jul. 2018 - Aug. 2018

- Develop a prediction and cost function based algorithm to perform cooperative social behavior
- Work in Otto code migration from urban to highway
- Give numerical methods of statistical lectures

Research Assistant Jan. 2016 - Dec. 2016
Computational Mathematics, Science and Engineering, Michigan State University
Supervisor: Dr. Yuying Xie and Dr. Mark Reimers

- Work in neuroimaging data, including movement correction, denoising, registration, and Fourier analysis

Research Assistant Aug. 2010 - Jul. 2013
Institute of Statistical Science, Academia Sinica
Supervisor: Dr. Jeng-Min Chiou

- Mainly research in functional data
- Functional clustering and classification
- Functional linear model and its prediction
- Missing value imputation and outlier detection for functional data
- Programming assistant (Chiou, J.-M., Annals of Applied Statistics, 2012)

- Corporal** Aug. 2009 - Aug. 2010
Military Service, Beigan Township, Lienchiang County, Taiwan
- Network Administrator** Jul. 2007 - Jun. 2009
Graduate Institute of Statistics, National Central University
 - Manage and maintain e-mail server based on FreeBSD operating system
 - Design an alumni website for graduate alumnus
 - Maintenance and elimination of common breakdown of the PCs in computer laboratory
- Network Administrator** Feb. 2005 - Jun. 2007
Mathematics Computation Laboratory, National Central University
 - Manage e-mail server and design some rules to block spam mail
 - Design a network sync upgrade system of more than 80 computers over 2 classrooms
 - Devise a web-based roll call and sign in system
- Network Assistant** Feb. 2004 - Jan. 2005
Mathematics Computation Laboratory, National Central University
 - Provide software support and computer consulting for freshmen
 - Supervise the network and do system analysis and trouble shooting

Teaching Experience

Year	Semester	Role	Course number with title
2018	Spring	TA	STT 231 Statistics for Scientists
2017	Fall	TA	STT 200 Statistical Methods
		GA	STT 873 Statistical Learning and Data Mining
		TA	STT 315 Introduction to Probability and Statistics for Business
2016	Fall	RA*	STT 442 Probability and Statistics II: Statistics
			STT 861 Theory of Probability and Statistics I
			STT 200 Statistical Methods
2015	Fall	TA	STT 200 Statistical Methods
		Instructor	STT 200 Statistical Methods
		TA	STT 224 Introduction to Probability and Statistics for Ecologists
2014	Fall	GA	STT 863 Statistical Methods I
			STT 886 Stochastic Processes and Applications
			STT 421 Statistics I
	Summer	GA	STT 430 Introduction to Probability and Statistics
			STT 351 Probability and Statistics for Engineering
2013	Spring	GA	STT 430 Introduction to Probability and Statistics
			STT 441 Probability and Statistics I: Probability
			STT 441 Probability and Statistics I: Probability

*: Sporadically acted as teaching substitute.

Publications

1. **Zhang, Y.-C.** (2020+). *Dynamical Highway Vehicle Lane Classification Using Vehicle Trails*. (In preparation)
2. **Zhang, Y.-C.** (2020). *Road Geometry Estimation Using Vehicle Trails: A Linear Mixed Model Approach*. (submitted to IEEE Transactions on Intelligent Transportation Systems)
3. **Zhang, Y.-C.** and Sakhanenko, L. (2019). *The Naive Bayes Classifier for Functional Data*. Statistics & Probability Letter **152**, 137-146.
4. Chiou, J.-M., **Zhang, Y.-C.**, Chen, W.-H., and Chang, C.-W. (2014). *A Functional Data Approach to Missing Value Imputation and Outlier Detection for Traffic Flow Rate Data*. Transportmetrica B: Transport Dynamics **2**, 106-129.
5. Fan, T.-H., Wang, Y.-F., and **Zhang, Y.-C.** (2014). *Bayesian Model Selection in Linear Mixed Effects Models with AR(1) Errors Using Mixture Priors*. Journal of Applied Statistics **41**, 1814-1829.

Referee Service

- Biometrics

Honors/Awards

- College of Natural Science Dissertation Continuation Fellowship Summer 2017, Michigan State University.
- College of Natural Science Dissertation Completion Fellowship Summer 2018, Michigan State University.

Computer Skills

- Advanced knowledge in C/C++.
- Experienced in using mathematics and statistics software including MATLAB and R.
- Ability to use C/C++ under R and MATLAB to carry out secondary development.
- Extensive experience of using Linux system with a focus on Ubuntu.
- Strong knowledge of Linux/Unix environment and commends.
- Knowledgeable to write shell scripts such as Perl to automate tasks.
- Understanding and experience to work with parallel computing API such as openMP and MPI.
- Experience with high performance cluster computer (HPCC) such as Torque and SLURM.
- Proficient in L^AT_EX for document preparation and TikZ for producing vector graphics.
- Fluent with version control tools such as git (gitlab and gerrit), Subversion (SVN), and Plastic SCM.
- Working knowledge of structure query language such as MySQL.
- Working knowledge of Robot Operating System (ROS).

Software Packages

- **Autologistic-Models:** An R package implemented in C++. The objective of this program is to reduce the estimating bias of parameters when fitting autologistic models.
- **Modified-Rainbow:** A modified version of rainbow package in R that uses the functional principal component instead of the robust principal component.
- **Parallel-Kernel:** The kernel density estimation implemented in C++ and paralleled via OpenMP.
- **MCEM:** An R package that realizes the Implementation of the Monte Carlo EM Algorithm, Richard A. Levine and George Casella (2001)
- All above packages are available on my GitHub.

Documents

- **TikZ:** A tutorial document about how to use basic TikZ commends. See TikZ basic and Doraemon for example