XIAOMU LIU

6335 180th Pl NE Unit 505, Redmond, WA 98052 (312) 361-4761 xiaomuliu@gmail.com
Github: http://www.github.com/xiaomuliu Website: http://www.xiaomuliu.com

EXPERTISE

Mathematical and applied statistics: Frequentist and Bayesian inference, estimation theory, hypothesis testing, regression analysis, sampling theory, design of experiments
Machine learning: supervised and unsupervised learning algorithms, anomaly detection, probabilistic graphical models
Stochastic process: time series analysis, signal processing, image processing, state-space models
Optimization: linear and nonlinear programming
Computational statistics: Monte Carlo simulation

EXPERIENCE

Data Scientist Nov 2019 - Present
Amazon.com, Inc., Seattle, WA
Perform quantitative modeling and analysis for transportation network design and planning team. Deliver recommendations to a wide variety of stakeholders, including executive-level sponsors.

- Developing models for forecasting transportation network's ability to promise fast deliveries.
- Used queueing theory to analyze warehouse backlog issues.
- Conducted a quasi-experimental study on elasticity of demand to delivery promises displayed on the detail page of an item.

Data Scientist Sep 2017 - Nov 2019
Uptake Technologies Inc., Chicago, IL
Responsible for helping major industry customers optimize asset performance and reduce downtime through leveraging industrial Internet-of-things (IoT) data, including conducting proof of concept and bridging the gap to model production.

- *General Motors*: Led the work of developing data-driven solutions for improving effectiveness of the alarm system of stamping press lines. Productionized a model for detecting premature wear and tear.
- *Ryder*: Identified signal patterns of health status on a variety of operating modes from satellite transmitted truck sensor data. Prototyped a condition monitoring model for exhaust and cooling systems.
- *Ford*: Supported data insight generation for the performance of rivet gun robots by conducting statistical analysis; Designed experiments for comparing failure rate, maintenance effectiveness, and asset availability for two rivet feeding systems
- *Panduit*: Enhanced the functionalities of network monitoring system by adding anomaly detection for potential disconnection issues. Studied K-way association between environmental factors and intranet data transmission interruption.
- *Caterpillar*: Improved models for predicting component life and failures of spark plugs and compressor valves on gas compression engines.

Research Assistant Aug 2010 - Aug 2017
Medical Imaging Research Center, Illinois Institute of Technology, Chicago, IL
Predictive policing project in collaboration with the Chicago Police Department, founded by the National Institute of Justice.

- Built temporal models for predicting daily citywide violent crime count. Identified the most influential factors that lead to daily crime rate fluctuation.

- Developed a framework that predicts Chicago daily violent crime rates at the district level, including a mesh grid model for spatially adaptive crime density mapping which was further integrated in modeling stochastic point process.
- Applied probabilistic-graphical-model-based clustering to identify regions of common crime patterns. Proposed an approach that provides a way to extend the concepts of accuracy and reproducibility to clustering model selection.
- Conducted feature engineering utilizing geospatial data, designed and built street-level spatiotemporal models that predict crime incidents in a city block next day. .
- Designed experiments for location selection for surveillance camera placement. Drew causal inference for the attribution of the presence of surveillance camera in crime reduction.
- Participated in social network analysis research on assessing individual involvement in violent criminal activities.

Application of sparse Bayesian learning in computer-aided breast cancer diagnosis
- Applied relevance vector machine model to detecting microcalcifications in mammograms.

Application of Curvelet transform in tomography image reconstruction
- Compared two fast discrete curvlet transorm algorithms in terms of sparsity and complexity.

Software Engineer Contractor Jan 2014 - Aug 2016
Chicago Police Department, Chicago, IL
Deployed a real-time forecast dashboard incorporated in the internal web portal.

Teaching Assistant Jan 2011 - May 2012
Department of Electrical and Computer Engineering, Illinois Institute of Technology, Chicago, IL
Led lab sessions, prepared and graded assignments for several signal processing track courses.

Research Assistant May 2008 - Jun 2009
Bioinformatics Center, United Genes Group Ltd., Shanghai, China

Bioinformatics Analyst Intern July 2008 - Aug 2008
Biochip National Engineering Research Center, CapitalBio Technology Co., Ltd and Tsinghua University Joint laboratory, Beijing, China

EDUCATION

Ph.D. in Electrical Engineering, GPA 4.0, Illinois Institute of Technology, Chicago, IL Aug 2017
Thesis: Temporal and spatiotemporal models for short-term crime prediction
M.S. in Electrical Engineering, GPA 4.0, Illinois Institute of Technology, Chicago, IL Dec 2011
B.S. in Biomedical Engineering, Fudan University, Shanghai, China Jul 2009

ACTIVITIES AND HONORS

Amazon Machine Learning Conference reviewer, May 2020
Data science bootcamp curriculum designer, Flatiron School, May 2017 - Aug 2017
2018 Quarter 3 Most Valuable Employee Award (Top 3), Uptake, 2018
Highest Standards of Academic Achievement, Illinois Institute of Technology, Mar 2012

TECHNICAL SKILLS

Python, R, SQL, Matlab, C/C++, Linux, Spark, Bash Scripting, Markdown, Git, LaTeX