Huifeng(Kent) Wu

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Education

University of Toronto Toronto, Canada

Bachelor of Science in Computer Science and Statistics *Sep 2017 – Nov 2021*

- GPA: Overall: 3.6/4.0 | STAT & CS Courses: 3.74/4.00 | 3rd & 4th Year Courses: 3.96/4.00
- Dean's List Scholar in the Faculty of Arts & Science for 2020-21 academic year
- Coursework(Graduate-level): Natural Language Computing(A+), Probabilistic Reasoning(A+), Neural Net and Deep Learning(A+), Statistical Computation(A+)
- Coursework(Undergraduate-level): Non-linear Optimization(A+), Machine Learning(A+), Theoretical Statistics(A+), Applied Statistics(A+), Algorithm Design & Analysis(A-), Probability(A-)

Publications

[1] **Kent Wu**, Suzy He, Geoff Fernie, and Atena Roshan Fekr. Deep Neural Network for Slip Detection on Ice Surface. Sensors, 20(23), 2020.

Research Experiences

Scenario Weights for Importance Measurement (SWIM) *May 2021 – Present*

University of Toronto, Statistical Sciences, Advisor: Silvana Pesenti *Toronto, Canada*

- **Background**: SWIM enables sensitivity analysis of models implemented in a Monte Carlo simulation framework, by stressing some model components (risk drivers) and monitoring the resulting impact on quantities of interest.
- In the accompanied R package, we validated and generalized sensitivity measures (eg. Wasserstein and Kolmogorov distance) and risk metrics (eg. correlation and cdf function) of stressed model components.
- Designed user-oriented features that allows manipulation of large-sacle stressed models.

Interactive User Interface for Enhancing Fire Safety *May 2021 – Aug 2021*

University of Toronto, Industrial Engineering, Advisor: Chi-Guhn Lee *Toronto, Canada*

- **Objective**: National Research Council of Canada (NRC) requested a decision-making tool to scope hazards and assist first responders who may face unknown hazards with unlabeled, generic freights at fire scenes.
- Proposed an interactive hazardous-material detection platform that displays detected materials and recommended emergency response guides.
- Integrated with a pre-developed machine learning framework to predict hazard category based on PPM time-series data, and encapsulated the platform into an executable desktop application.

Sim2Real Interface for Robotic Tasks *May 2021 – Aug 2021*

University of Toronto, Industrial Engineering, Advisor: Chi-Guhn Lee *Toronto, Canada*

- **Objective**: Transfer skills learned by reinforcement learning in simulated environment to our UArm Swift robotic arm to perform simple find and touch tasks.
- Extended the GARAT framework to learn action transformation policy by imitation learning (TRPO-GAIFO) based on collected target environment samples, then updating target policy to be deployed at target environment through DDPG + HER algorithms.

Slip Resistance Evaluation of Winter Footwear *Apr 2019 – Apr 2020*

Toronto Rehabilitation Institute, KITE Research, Advisors: Atena Roshan Fekr, Geoff Fernie *Toronto, Canada*

- Orchestrated end-to-end testing plans for over 200 footwear equipped with slip-resistant technologies, and published evidence-based ratings of the tested products based on their risks of slips and falls.
- Implemented automation processes and a user interface for Maximum Achievable Angle (MAA) testing protocol. Validated by historical data, and proved elimination of over 90% human errors and shortened 20 % test duration.
- Proposed a deep learning framework integrating the I3D architecture to interpret slips events for large-scale footwear experiments at Winterlab and eventually obtained reliable accuracy. Accepted as a journal paper at **Sensors 2020**.

Industrial Experiences

Engineer Intern *Jul 2020 – Sep 2020*
Fundway Technology, Institute of Transportation Brain *Guangzhou, China*

- Designed test scripts in Java for PostgreSQL databases, evaluating performance of data transition.
- Managed and validated traffic-checkpoint data in ArcGIS, monitoring road capacity, metric and events of interest.

Junior Statistician/ Developer *May 2020 – Aug 2020*
Kidney Health Education and Research Group *Toronto, Canada*

- Conducted ETL management for over 4,000 study variables inside patient databases (PROMs).
- Aggregated multi-sourced data for daily reporting in automation such that patient enrollment status, scores, symptoms, etc. are taken account. Troubleshot the system and improved the speed of execution to minutes.
- Performed supplementary data analysis for relevant studies on kidney transplantation in order for better treatments and pre-surgery education can be delivered.

Projects

Selected Coursework

- Generative Architectures for Music Generation. Encoder-decoder network using LSTM cells, and HMM variants.
- Text Classification With Neural Networks. Sensitivity analysis with text classification methods, SGC and NABoE.
- Covid-19 Applied Statistics Analysis. Deployed Bayesian inference to investigate the demographical impacts.
- Multi-game Android Application. Features Sliding Tiles, Tic-tac-toe and Sudoku in the gaming library.
- Questions Correctness in Online Assessment. Advanced the existing Item Response Theory with additional parameters to estimate student ability despite aberrant responses.

Selected Portfolio

- Python Poker Brain. Calculates multi-player poker hand odds and scenarios with a hexadecimal ranking system.
- Sampling, Approximation and Inference. Tutorial blog post on Monte Carlo methods and applications.

Honors and Awards

- **Undergraduate Summer Research Award** ($7500)(Top 25 students granted), Natural Sciences and Engineering Research Council, 2021.
- **Finalist Group (Top 4) on Undergraduate Engineering Research Day (UnERD)**, Environmental and Material category, 2021. Our Podium Presentation.
- **Presentation on Rate My Treads**: an innovative solution to testing winter footwear for slip resistance in different winter conditions, the Access Expo, 2019.
- **Selected Academic Presentations**
  - Fraud Detection Ensemble Learning. Rotman MMA Datathon (Honorable Mention), University of Toronto, 2020.
  - Smart Beta Investment Strategy. RiskLab Case Competition (Honorable Mention), University of Toronto, 2019.

Extracurricular Activities

Events Executive *Nov 2017 – Apr 2021*
Educating Chinese Children Hope Offered (ECCHO) *Toronto, Canada*

Club Representative *Oct 2017 – Apr 2018*
Innis Residence Council *Toronto, Canada*

Youth Program Instructor *Apr 2016 -- May 2017*
South Arm Community Centre *Richmond, Canada*

Skills

Certificates: GARP Financial Risk Manager Part I (Passed in Nov 2019)
Programming: Python, Matlab, R, Stata, HTML/CSS, SQL, Julia, Java, Android Development, MIPS Assembly
Tools: Git, TravisCI, VS Code, PyCharm, IntelliJ, Latex, Linux, Git, Slurm, Wordpress
Data Science: Pytorch, Tensorflow, Numpy, Pandas, Matplotlib, Sci-kit Learn, OpenCV, A/B testing
Languages: English, Mandarin, Cantonese