

TIANYU ZHANG

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RESEARCH INTERESTS

Machine Learning, Sensor Networks, Internet of Things, Transfer Learning

EDUCATION

- Ph. D.**, University of Alberta, Canada *September 2019 - Present*
Department of Computing Science *GPA: 4/4*
Advisor: Dr. Omid Ardakanian
- M. Sc.**, University of Alberta, Canada *September 2017 - August 2019*
Department of Computing Science *GPA: 4/4*
Thesis Title: Building Occupancy and Thermal Modelling in the Wild
Advisor: Dr. Omid Ardakanian
- Hon. B. Sc.**, University of Alberta, Canada *September 2013 - June 2017*
Major in Computing Science *GPA: 3.8/4*

HONORS AND AWARDS

- University of Alberta Departmental Outstanding Master Thesis Award Runner Up *April 2020*
University of Alberta Graduate Student Teaching Award *April 2020*
University of Alberta Mary Louise Imrie Graduate Student Award *April 2019*
North America ACM-ICPC Regional Contest Silver Medal *November 2017*
University of Alberta Graduate School Full Stipend Admission *September 2017*
University of Alberta Dean's Honor Roll *2015 - 2017*
University of Alberta First Class Standing *2015 - 2017*
North America ACM-ICPC Regional Contest Bronze Medal *November 2016*
7th place in the Alberta Collegiate Programming Contest *October 2016*
North America ACM-ICPC Regional Contest Bronze Medal *November 2015*

RESEARCH EXPERIENCES

Research Assistant, University of Alberta *April 2018 - Present*
Advisor: Dr. Omid Ardakanian

- Partially involved in **learning-based control of home batteries**: Built a reinforcement learning model using the actor-critic method to suggest the action of the battery and maximize the benefit of the battery.
- **Domain adaptation on occupancy estimation models**: Built a time-series occupancy estimation model and investigated the possibility of adapting the trained model to another similar environment to improve the estimation accuracy in the new environment.
- **ODToolkit**: Built an open-source platform for occupancy estimation.

PUBLICATIONS

T. Zhang, O. Ardakanian, “A Domain Adaptation Technique for Fine-Grained Occupancy Estimation in Commercial Buildings”, Proceedings of the International Conference on Internet of Things Design and Implementation. ACM, 2019: 148-159. *Acceptance Rate: 28%*

T. Zhang, A. Zishan, O. Ardakanian, “ODToolkit: Extensible Toolkit for Building Occupancy Detection”, Proceedings of the Tenth International Conference on Future Energy Systems. ACM, 2019: 35-46. *Acceptance Rate: 24%*

M. Hossain, **T. Zhang**, O. Ardakanian, “Evaluating the Feasibility of Reusing Well-Suited Thermal Models in the Residential Sector”, Proceedings of the first International Workshop on Urban Building Energy Sensing, Controls, Big Data Analysis, and Visualization. ACM, 2019.

M. Hossain, **T. Zhang**, O. Ardakanian, “Identifying Grey-box Thermal Models with Bayesian Neural Networks”, arXiv preprint. 2020.

T. Zhang, O. Ardakanian, “COBS: COMprehensive Building Simulator”, Proceedings of the seventh International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation. ACM, 2020.

TEACHING EXPERIENCES

Teaching Assistant, University of Alberta *September 2017 - Present*

CMPUT 379 - Operating System Concepts *Fall 2019, Winter 2020, Fall 2020*

CMPUT 272 - Formal Systems and Logic in Computing Science *Winter 2017*

CMPUT 366 - Intelligent Systems *Fall 2017*

Peer Mentor, University of Alberta *September 2015 - January 2016*

CMPUT 201 - Practical Programming Methodology

CMPUT 204 - Algorithms I

CMPUT 291 - Introduction to File and Database Management

EXTRA-CURRICULAR ACTIVITIES

Member of the Sustainable Computing Lab *Since 2017*

Member of the Golden Key International Honor Society *Since 2015*

Member of the University of Alberta ACM-ICPC Team *Since 2015*

Member of the University of Alberta Programming Club *Since 2014*

COMPUTER SKILLS

Programming: C/C++, Python, Java, PHP, HTML, CSS, Kotlin, Matlab, R, EPL, Bash

Applications/Frameworks: GitHub, MySQL, Google Cloud, Django

Data Analysis: Excel, Pandas, Numpy, SPSS, SAS

Others: Algorithms, Machine learning models, Mathematical modelling

SELECTED PROJECTS

Guitar Audio Recording Auto-transcription to Sheet Music

- We used LSTM, SVM, HMM and ANN to transcript guitar audio to sheet music. The task of transcribing an audio file of a music recording difficult and time consuming for a human being. This is because there are various amounts of possible pitches that can be played simultaneously depending on the instrument being played.

Mathematical Modelling for Hardy-Weinberg Principle

- We built a mathematical model to validate the Hardy-Weinberg principle formally. Moreover, we used the Hardy-Weinberg Principle to track the gene frequency of the bird species. We examined the gene frequency of the lek during the mating season. Also, we determined the type of effect that the certain traits act on the genotype during the sexual selection.

Error Detection and Cleaning in Tables

- Huge collection of data could be found on the Web, and most of them are in the form of tables. However, errors in the tables must be identified and fixed before applying other applications. In this project, we extended the current state-of-art Auto-Detect error detection method to detect more errors in any tables.

Ground Delay Program Analysis

- We analyzed the Ground Delay Program (GDP) by using Association Rule mining algorithms and Piecewise Linear Regression. We used association rule to find out the relation between weather and GDP parameters. We also discussed the GDP's sensitivity to weather by applying regression on weather information. The result from Apriori and FP-Growth shows that the thunderstorm is the most effective to the GDP advisory duration.

PROFESSIONAL TRAINING

Graduate Ethics Training Course
University of Alberta, Edmonton, Canada

December 2017

Graduate Teaching and Learning Program
University of Alberta, Edmonton, Canada

September 2017

LANGUAGES

Chinese (Mandarin): Native Language

English