

Hossameldin Mohammed

DATA SCIENTIST/ENGINEER

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Experience

BITSAFS Lab, The University of British Columbia

Vancouver, BC, Canada

DATA SCIENTIST

Jan. 2017 - Present

- Compile and analyze big datasets of structured and unstructured data
- Develop computer vision algorithms for video data extraction
- Build Machine learning and econometric models and run simulations
- Create effective data visualizations
- Design and implement control experiments
- Collaborate producing research publications and conference presentations

Department of Computer Science, The University of British Columbia

Vancouver, BC, Canada

DATA ENGINEER

May 2019 - Sep 2020

- collaborate on the development of 'rudaux' software package that provides automation for managing statistics department courses that use JupyterHub and nbgrader along with a learning management system (canvas)

Master of Data Science Program, University of British Columbia

Vancouver, BC, Canada

TEACHING ASSISTANT

Jan. 2017 - Present

- Preparing tutorials, marking assignments, holding office hours and manage labs
- TA'ed courses: Descriptive Statistics and Probability for Data Science, Data Visualization I, Data Visualization II, Statistical Inference and Computation I, Data Science Workflows, Feature and Model Selection, Collaborative Software Development, Experimentation and Causal Inference, Privacy, Ethics, and Security, Spatial and Temporal Models, Web and Cloud Computing, Regression II, Business Applications of Machine Learning, Exploratory Data Analysis

SETS Intl.

Cairo, Egypt

SENIOR MODELLER

Nov. 2015 - Dec. 2016

- Prepare studies for proposed transportation projects. Gather, compile and Analyze data. Study the use and operation of transportation systems. Develop models or simulations

Engineering Consultants Group

Cairo, Egypt

TRANSPORTATION ENGINEER

Jan. 2014 - Nov. 2015

- Collaborating with a team of engineers and draftsmen to provide projects with civil engineering related tasks and control the quality of the deliverables. Besides participation in preparing proposals required documents and presentations

Cairo University

Cairo, Egypt

RESEARCH AND TEACHING ASSISTANT

Sep. 2012 - Dec. 2016

- working on research and industry projects, co-author research articles and technical reports, and working on a MSc thesis
- Preparing tutorials, marking assignments, holding office hours and manage labs

Education

University of British Columbia

Vancouver, BC, Canada

PHD IN TRANSPORTATION ENGINEERING

Jan. 2017 - Present

- Thesis: "Imitation learning agent-based microscopic simulation of bicycle traffic"
- Advisors: Dr. Tarek Sayed, and Dr. Alexander Bigazzi

Cairo University

Cairo, Egypt

MSC IN TRANSPORTATION ENGINEERING

Sep. 2012 - Dec. 2016

- Thesis: "A bi-level approach for calibrating a traffic simulation model of Greater Cairo Region"
- Advisors: Dr. Magdy Noureldin, and Dr. Hoda Talaat

Cairo University

Cairo, Egypt

BSC IN CIVIL ENGINEERING

Sep. 2007 - May 2012

- Overall Grade: Distinction with Honors

Skills

Programming	Python, JAVA, R, JavaScript, Julia, LaTeX
Data Engineering	SQL, NoSQL, Hadoop, Flask, Spark, Postgres RDMS, REST API, ETL processes
DevOps	AWS, Docker, Kubernetes, Terraform
Traffic Modeling	TransCAD, VISSIM, VISUM, Paramics, Synchro, DynusT, EMME, SimTraffic, Sidra
Languages	English, Arabic, Spanish

Projects

- Development of an agent-based bicycle traffic microsimulation (UBC)
- Development of BITSAFS cloud-based computer vision traffic analysis (UBC)
- Development of 'rudaux' software package. (UBC)
- Cyclists and Pedestrian counting system on Brooklyn Bridge using computer vision techniques, New York City, NY, USA (UBC)
- Development of an agent-based bicycle traffic microsimulation. (UBC)
- Conflict analysis of Pedestrian-vehicle interactions at multiple intersections in Edmonton, AB, Canada (UBC)
- Vehicle-bicycle yielding behaviour analysis at the intersection of Burrard bridge and Pacific street, Vancouver, BC, Canada (UBC)
- Conflict analysis of Pedestrian-vehicle-bicycle interactions at Burrard bridge and Pacific street intersection, Vancouver, BC, Canada (UBC)
- Towards Wise Cities: A Data-Driven Approach for Sustainable Mobility (SETS Intl.)
- Detailed Design and Tender Documents Preparation for Thumamah Road Corridor Western Section (SETS Intl.)
- Traffic Impact Study for Major Mixed Landuse Development in New Cairo (5.6 million m2 Land Area) (SETS Intl.)
- Traffic Management Program for the City of Arriyadh – KSA (SETS Intl.)
- Trip Generation Manual for Qatar (SETS Intl.)
- Truck Sampling and Measurement Techniques for Cairo Emission (SETS Intl.)
- The Grand Egyptian Museum (GEM) - Phase III (ECG)
- King Abdullah Economic City, Saudi Arabia (ECG)
- Mall of Arabia, 6th of October, Egypt (ECG)
- Master Planning and Infrastructure Design of Tathleeth Road, Tathleeth, Saudi Arabia (ECG)
- Master Planning and Infrastructure Design of Haqil, Haqil City, Saudi Arabia (ECG)
- Oman Public Prosecution Head Office, Muscat, Oman (ECG)
- Master Planning and Infrastructure Design of Bisha 4, Bisha, Saudi Arabia (ECG)
- Shah new Accommodation Complex, Abu Dhabi, United Arab Emirates (ECG)

Publications

- **Mohammed, H.**, Sayed, T., Bigazzi, A. Y. (2021) Pattern-Based Validation of Agent-Based Bicycle Microsimulation models. (forthcoming)
- **Mohammed, H.**, Sayed, T., Bigazzi, A. Y. (2021). Comparing Continuous and Discrete State-Action Spaces in Agent-Based Bicycle Microsimulation. (forthcoming)
- **Mohammed, H.**, Bigazzi, A. Y., Sayed, T. (2021). Long Short-Term Memory-Based Generative Variational Inference Approach for Unconstrained Bicycle Trajectories. (Accepted)

- **Mohammed, H.**, Sayed, T., Bigazzi, A. Y. (2020) Microscopic modeling of cyclists on off-street paths: A stochastic imitation learning approach, *Transportmetrica A: Transport Science*, DOI: 10.1080/23249935.2020.1870178s.
- **Mohammed, H.**, Bigazzi, A. Y., Sayed, T. (2019). Unconstrained Cyclist Trajectory Simulation for Agent-Based Models. 54th Annual Conference of the Canadian Transportation Research Forum, Vancouver, BC, Canada.
- **Mohammed, H.**, Sayed, T., Bigazzi, A. Y. (2019). Toward Agent-based Microsimulation of Cyclist Following Behavior: Estimation of Reward Function Parameters Using Inverse Reinforcement Learning (No. 19-03431).
- **Mohammed, H.**, Bigazzi, A. Y., Sayed, T. (2019). Characterization of bicycle following and overtaking maneuvers on cycling paths. *Transportation research part C: emerging technologies*, 98, 139-151.
- Abdelgawad, H., **Mohammed, H.** (2016). Towards Wise Cities: A Data-Driven Approach for Sustainable Mobility. *Smart Cities (A White Paper)*. SETS Intl.
- **Mohammed, H.** and H. Talaat. (2016). Calibration of Mesoscopic Traffic Simulation of Large Networks, Case Study: Greater Cairo Metropolitan Area, Cairo University.
- Abdelgawad, H., **Mohammed, H.**, Talaat, H. (2016). Truck Sampling and Measurement Techniques for Cairo Emission Model, SETS Intl.

Presentations

Artificial Intelligence-Based Generative Modeling

WORKSHOP - ARAB SOCIETY FOR COMPUTER AIDED ARCHITECTURAL DESIGN (ASCAAD) 2021

Cairo, Egypt

March 2021

Traffic Modeling and Simulation

GUEST LECTURE - UNIVERSITY OF BRITISH COLUMBIA

Vancouver, Canada

January 2021

Agent-Based Modeling

GUEST LECTURE - UNIVERSITY OF BRITISH COLUMBIA

Vancouver, Canada

January 2020

Data Science Workflow in R

GUEST LECTURE - UNIVERSITY OF BRITISH COLUMBIA

Vancouver, Canada

Sep. 2019

Extracurricular Activity

Co-operative Mobility Project

Redondela, Galicia, Spain

March 2014

- Finding new alternatives for sustainable transportation in the city of Redondela with the participation of 4 countries Spain, Macedonia, Belgium and Egypt
- Featured in Spanish media in 3 newspapers and an interview with Redondela city local Radio

Faculty Leadership and Development Center at Cairo University

Cairo, Egypt

Jan. 2013 - Dec. 2016

- Courses Attended: Conferences Organization, Effective Presentation Skills, Quality Assurance in Education, and Using Technology in Education

Honors & Awards

2021	Statistical Society of Canada , 1st place winner of the 2021 Case Studies in data analysis competition - Modeling COVID-19 disease dynamics in Canada	Vancouver, Canada
2020	University of British Columbia , President's Academic Excellence Initiative PhD Award	Vancouver, Canada
2017-2020	University of British Columbia , International Tuition Award	Vancouver, Canada
2012-2016	Cairo University , Master Degree Fellowship	Cairo, Egypt
2012	Cairo University , Graduation Prize for Distinguished Students	Cairo, Egypt
2007-2012	Cairo University , Fellowship for distinguished undergraduate students	Cairo, Egypt

Memberships

- Application in process for Professional Engineer designation with Engineers and Geo-scientists of British Columbia (EGBC)

- Member, Egyptian Syndicate of Engineers (MESE)