William Callaghan

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OVERVIEW

My research focuses on how input from humans and machine learning algorithms influence the reliability and accuracy of time-series data analysis, particularly in the medical domain. I am also interested in how we can model and analyze systems utilizing graphs.

EDUCATION

M.Math Candidate, Computer Science 2015 - Present
University of Waterloo, Waterloo, Ontario, Canada
Advisor: Edith Law

Honors Bachelor of Science, Computer Science, Microbiology & Immunology 2015
University of Western Ontario, London, Ontario, Canada
Thesis Supervisor: Mark Daley

WORK EXPERIENCE

Software Developer (Part-Time) January 2017 – August 2017
eSentire Inc., Cambridge, Ontario, Canada

- Provided development support to ongoing analytics projects.
- Network Scan Analytics Lead (May 2017 – August 2017)

Software Developer Intern, Data Analytics May 2016 – December 2016
eSentire Inc., Cambridge, Ontario, Canada

- Built an engine to perform complex queries on large data sets with mission critical response times.
- Created RESTful HTTP APIs to interact with various components of the analytics pipeline.
- Worked with Analytics Lead and other stakeholders to define ongoing projects and infrastructure.
- Technologies: Spark, Cassandra, Kafka, Alluxio, HDFS
- Languages: Python, Scala

Graduate Research Assistant 2015 - Present
University of Waterloo, Waterloo, Ontario, Canada

Teaching Assistant 2015 - Present
University of Waterloo, Waterloo, Ontario, Canada

Software Developer (Contract) May 2015 - September 2015
eSentire Inc., Cambridge, Ontario, Canada

- Worked on tools involved in real-time capture and analysis of raw network traffic.
- Core developer on Targeted Retrospective Analysis Platform, bringing prototype to product.
- Extended eSentire's Deep Packet Inspection tools.

QA Developer Intern May 2014 - August 2014
Pelmorex Media Inc., The Weather Network, Oakville, Ontario, Canada

- Developed web automation framework and tests for web products in Java, using Selenium.

Technology Manager May 2013 - August 2013
Engineering Outreach, University of Waterloo, Waterloo, Ontario, Canada
- Managed a group of 20+ people in establishing a technology camp curriculum for multiple age groups.
- Monitored daily technology camp operations.

TECHNICAL SKILLS

Programming Languages: Python, Java, C
Knowledge/Experience: Apache Spark, Relational & NoSQL Databases (Cassandra), Apache Kafka, RESTful API Development, Git, SBT, Jenkins, Docker, Web Development, Cloud Services (AWS)

RESEARCH

SELECTED PROJECTS

HeartBeat
Framework to combine machine and human intelligence for the scalable and accurate analysis of human clinical phonocardiograms.

Instance Selection Methods in Machine Learning for EEG Analysis
Researched, implemented and evaluated active learning and instance reduction strategies for EEG analysis (spindle detection and sleep stage classification) as a part of final projects for 'Human-In-The-Loop Systems' and 'On The Synergy Between Computer Science and Biology' courses at the University of Waterloo.

Modelling Influence in Social Networks
Researched and proposed a new model for learning the most influential agent in a social network. This was done as a final project for 'Advanced Topics in Artificial Intelligence: Trust and Online Social Networks' course at the University of Waterloo.

Using Kalman Filtering and Lasso Regularization to Generate Brain Networks
Researched and proposed a new method of constructing functional brain networks as diagnostic markers for neurological disease from fMRI data. This was the topic of my Bachelor's thesis at the University of Western Ontario.

WORKSHOP PAPERS

Resolvable vs. Irresolvable Ambiguity: A New Hybrid Framework for Dealing with Uncertain Ground Truth. Schaekermann, M., Law, E., Williams, A. C., & Callaghan, W. Workshop on Human-Centered Machine Learning at **CHI'16**. San Jose, CA.

The Big Picture: Preserving Context in the Decomposition of Complex Expert Tasks. Williams, A. C., Bradshaw, J., Schaekermann, M., Tse, T., Callaghan, W., & Law, E. Workshop on Microproductivity at **CHI'16**. San Jose, CA.

INVITED TALKS

Fighting Cybercrime: A Joint Task Force of Real Time Data and Human Analytics. Callaghan, W. **Databricks Spark Summit East Conference 2017.** Boston, MA.