Melissa Farinaz Mozifian

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SUMMARY

Graduate student at Waterloo Autonomous Vehicles Laboratory.

EDUCATION

MASc Mechanical and Mechantronics Engineering   May 2016 - Present
University of Waterloo   Waterloo, Canada

> **Core Modules**: Statistical Learning, Machine Learning, Autonomous Mobile Robots, Deep Learning Reading Course. Research Focus: Computer vision and machine learning for robotics and autonomous vehicles

B.Sc. (Honours) Computer Science   September 2010 – June 2014
University of St Andrews   St Andrews, UK

> First Class Honours Degree.
> **Core Modules**: Data Encoding, Software Engineering, Operating Systems, Artificial Intelligence, Component Technology, Computational Complexity, Multimedia, Human Computer Interaction, Logic & Software Verification, Constraint Programming, Distributed Systems and Computer Graphics.

EXPERIENCE

Teaching Assistant   September 2017 – Dec 2017
University of Waterloo   Waterloo, Canada

> Worked as a teaching assistant for the *Autonomous Mobile Robots* course (ME 597), covering topics on robot motion planning, localization and mapping, and path planning using ROS.

Teaching Assistant   January 2017 – May 2017
University of Waterloo   Waterloo, Canada

> Worked as a teaching assistant for the *Programming for Performance* course (ECE 459) teaching programming GPUs with OpenCL.

Software Engineer   September 2015 – April 2016
Toshiba Medical Visualization Systems Ltd   Edinburgh, UK

> Worked as part of the Image Analysis team developing image analysis algorithms. My project involved developing algorithms for diagnostic ultrasound and CT-scan imaging applications.

Graduate Software Engineer   October 2014 – September 2015
Toshiba Medical Visualization Systems Ltd   Edinburgh, UK

> Worked as an application developer delivering medical software. My role involved developing framework features and providing API and framework support. My main project involved developing 3D visualization software for medical image processing, segmentation and mesh generation.

Software Engineer Intern   June 2014 – August 2014
Toshiba Medical Visualization Systems Ltd   Edinburgh, UK

> Worked as part of the Image Analysis team, developing strategies for detecting malfunctions in Toshiba CT scanner hardware by applying software algorithms that analyze abnormalities in sensor data.

Computer Science Lab Demonstrator   February 2014 – April 2014
School of Computer Science, University of St Andrews   St Andrews, UK

> Worked as a lab demonstrator for a program called "Code First Girls", teaching coding to non-computer science female students with the goal to attract more women in tech.

Research Engineering Intern   May 2013 – August 2013
Adobe Systems, Inc   Edinburgh, UK

> Developed a plug-in prototype to evaluate the feasibility of extending Adobe Photoshop to support online collaborative photo editing using Adobe Creative Cloud.

Research Assistant   May 2012 – July 2012
School of Computer Science, University of St Andrews   St Andrews, UK

> Research Title: Secure SQL Queries Using Dependent Types
> Worked with Dr. Edwin Brady to develop a database library for an experimental programming language called Idris. Idris is a general purpose, purely functional language similar to Haskell. I was responsible for implementing an SQLite bridge for Idris to withstand SQL injection attacks.

AWARDS

Academic Prizes & Recognition

- University of Waterloo Graduate Research Studentship (GRS)
- University of Waterloo International Masters Student Award
- Dean's List, University of St Andrews
- Rector's Fund Scholarship Recipient - Was awarded the Scholarship offering a grant to establish a useful resource for students taking up internships.
- BCSWomen Lovelace Colloquium Finalist - Was awarded a travel grant to attend and present my bachelor's thesis project as a poster. This annual event is organized by the British Computer Society (BCS) and sponsored by Google and academic institutions.

Technical Interests
Deep Learning, Object Detection, Cognitive Robotics, Autonomous Systems, Artificial Intelligence, Machine Learning, Human Robotics Interaction, Affective Computing

Programming Languages
Python, C++, Java ,C, Matlab, JavaScript, ObjectiveC, PHP, Haskell

Programming Libraries
Tensorflow, OpenCV, ROS, Keras, VTK, OpenGL, iOS, NumPy, SciPy, Matplotlib, Scikit-learn, Nvidia CUDA, OpenCL

Academic And Personal Projects
Real-time 3D Object Detection for Autonomous Driving   Present

> Developing a fast and accurate 3D Object Detector for autonomous driving to be deployed on our autonomous vehicle, Autonomoose, integrated using ROS.

Quadrotor Dynamic Modelling using LSTMs

> Applied a deep recurrent neural network architecture to model quadrotor dynamics.

Neural Network based EKF Localization

Object-based localization method with neural networks using YOLO (real-time object detector) to localize objects in the camera frame. Using these detected objects as features, an Extended Kalman Filter was used to estimate the robot pose.

Pulse Detector iOS app   September 2015

Worked on an emotion detection iOS app. The existing alpha version performs an automated and non-contact pulse detection.

Affective Mirror (BSc Dissertation)   2013 - 2014

Developed a program to detect basic human emotions such as happiness, sadness, surprise and excitement from a subject's facial expression and physiological measure of pulse.

Junior Honors (Group) Project   2012 - 2013

Developed a virtual representation of St Andrews using the OpenSimulator software, with the aid of maps, terrain data and photographs. The virtual representation was augmented with real-world information and artificial intelligence such as path planning.

Academic Achievements

Theses

1. **Mozifian M** (2014): **"Affective Mirror: Automated Emotion Detection Through Photoplethysmography & Facial Expression Analysis."**, Undergraduate Thesis, University of St Andrews

Publications & Posters

1. Joint 3D Proposal Generation and Object Detection from View Aggregation (Submitted CVPR 2018).

2. Deep Learning a Quadrotor Dynamic Model for Multi-Step Prediction (Submitted ICRA 2018).

3. Affective Mirror: Automated Emotion Detection Through Photoplethysmography & Facial Expression Analysis, BCSWomen Lovelace Colloquium, Aberystwyth University, UK

Project Repository

Github, Website