REZA ASAD

rasad@sfu.ca

github.com/reza-asad (604)-715-4975 ca.linkedin.com/in/rezaasad

Personal Information

Position: Machine Learning and Computer Vision Intern at Terramera.
Citizenship: Canadian.

Research Interests

Machine Learning, Generative Models, Unsupervised Translation Between Domains (Image/3D Model), Computer Vision, Computer Graphics.

Education

Simon Fraser University **Sept 2018 - Present**
Master's in Computer Science, Visual Computing.

University of British Columbia **Sept 2013 – Apr 2015**
Master's in Applied Mathematics (3 credits short).

University of Toronto **Sept 2010 – Apr 2013**
Honours Bachelor of Science with High Distinction in Mathematics.

Recent Academic Projects

Generating 3D Chairs, Geometric Modeling in Computer Graphics, SFU Mar - Apr 2018

- Trained a Multimodal Unsupervised Image-to-Image Translation (MUNIT) model for translating depth maps of chairs with no legs to chairs with legs.
- Fine-tuned and applied a 3D reconstruction model based on the paper "Learning Shape Priors for Single-View 3D Completion and Reconstruction" in order to create a plausible 3D chair given a single generated depth map.
- Implemented and trained a deep learning model to output plausibility scores for the generated 3D chairs. The model takes as input depth maps of left, right and top view of the generated 3D chair.

ICP Based SLAM in ROS, Visual Computing Lab, SFU Nov 2018

- Implemented a keyboard-based teleoperation system with safety checks to navigate the TurtleBot3 using 2D LiDAR data.
- Built a SLAM system using the ICP algorithm and Occupancy Grid Mapping to create a 2D map of the TurtleBot's environment.

Real-Time Object Detection Using SSD, Visual Computing Lab, SFU Oct 2018

- Detected cars, bicycles and humans in real time by implementing the SSD algorithm on top of a pretrained MobileNet in PyTorch.
- Improved the mean average precision by 8% after self-studying and implementing Feature Pyramid Networks for detecting smaller objects.

Research Experience

Machine Learning Course Project, SFU **Oct - Dec 2018**

- Won the best project award among 135 Machine Learning and NLP projects at SFU's 2018 AI Showcase organized by Greg Mori and Anoop Sarkar.
- Modified the loss function of the CycleGAN model in order to translate snowy and non-snowy satellite images while keeping cloud pixels intact. The modification improved the Fréchet Inception Distance for the generated images by 47% compared to CycleGAN.
- Extended the project for submission at IEEE ICIP 2019 in collaboration with professor Parvaneh Saeedi. The paper received acceptance on April 30th, 2019.

Graduate Research Assistant, UBC **2013 - 2015**

- Studied evolutionary dynamics through mathematical modeling and designed MATLAB simulations to better understand extensions of the Moran model to population variant dynamics.
- Examined a population variant extension of the Moran model and proved that for two equally fit populations the equilibrium state carries a constant without additional assumptions on the birth and death processes.

Undergraduate Research Assistant, The Fields Institute **Jun - Aug 2013**

- Examined extensions of the Goodwin model considering the effect of price on economic fluctuations. Investigated the instabilities associated with the original Goodwin model by studying its dynamical system in collaboration with professor Matheus Grasselli

Undergraduate Student Research Awards through NSERC, UofT **Jun - Dec 2012**

- Investigated several open problems in geometric analysis in collaboration with professor Almut Burchard. Solved an open problem proving the convergence of Steiner Symmetrizations along the Van der Corput Sequence.

Undergraduate Research Assistant, UofT **Jun - Aug 2010**

- Implemented MATLAB simulations to prove a collection of nonlinear Schrodinger equations do not have eigenvalue. Published the results in the Journal of Mathematical Physics in collaboration with professor Gideon Simpson.

Honors and Awards

- Best project award at the 2018 AI showcase organized by Greg Mori and Anoop Sarkar, Simon Fraser University, Fall 2018
- Undergraduate Student Research Awards (USRA) through Natural Sciences and Engineering Council of Canada (NSERC), University of Toronto, Summer 2012
- Innis College Exceptional Achievement Award, University of Toronto, 2011
- Later Life Learning OSOTF Award, University of Toronto, 2011
- Fairfax Financial Award, University of Toronto, 2010-2013

Publications

- Sorour Mohajerani, Reza Asad, Kumar Abhishek, Neha Sharma, Alysha van Duynhoven, Parvaneh Saeedi, "CloudMaskGAN: A Content-Aware Unpaired Image-to-Image Translation Algorithm for Remote Sensing Imagery", accepted to IEEE ICIP, 2019.
- R. Asad, G. Simpson, "Embedded Eigenvalues and the Nonlinear Schrödinger Equation", accepted to the Journal of Mathematical Physics, 2011.

Professional Experience

Machine Learning and Computer Vision Intern at Terramera, Vancouver May – present

- Implemented and trained a deep crowd counting model to count corn crops on drone field images. The model achieved an accuracy of 99.96% on test data compared to 93% offered by the competitor software. The model will be used in a new product built by Terramera's software engineers.

Data Scientist at Tamr, San Francisco Bay Area Oct 2016 – Jun 2018

- Built a classifier to categorize the manufacturing parts that General Electric purchases on a weekly basis (~17 million records). Developed custom pipelines using Tamr, Spark, Elasticsearch and PostgreSQL to automate the classification process. This resulted in GE saving $80 million dollars over 3 years according to fortune.com.
- Implemented an active learning framework to make the most out of the domain experts' time during the label acquisition phase of the classification project.
- Implemented the CURE clustering algorithm to identify Samsung's unique customers. The algorithm generated clusters over a sparse data of 5 million records representing customer information.
- Enriched Tamr's Github repository by writing several API clients in Python to allow other data scientists to easily communicate with Tamr's software.

Data Scientist at Albeado, San Francisco Bay Area Nov 2015 - Oct 2016

- Modified the algorithm in "Neighborhood Formation and Anomaly Detection in Bipartite Graphs" to develop a new neighborhood formation and outlier detection technique on a weighted bipartite graph of doctors and patients. The model was able to find fraudulent doctors in $O(n^2)$ as opposed to $O(n^3)$ in the original paper and landed Albeado's first customer, Flex LTD.
- Collaborated with Albeado's software engineers in building a codebase for automating the anomaly detection process.

Fellow at Insight Data Science, San Francisco Bay Area Jun - Sep 2015

- Designed a scalable, reliable and fault-tolerant pipeline to detect San Francisco's crowded areas.
- Ingested real-time data of people's locations through Kafka to perform Streaming k-Means algorithm in Spark Streaming.
- Built a web application using Flask and Folium to allow users to visualize clusters of population on the map in real time.

Technical Skills

- **Programming Languages:** Python (Numpy, PyTorch, TensorFlow, OpenCV, Pandas), C++ (OpenCV), R, MATLAB, Scala
- **Selected Machine Learning and Visual Computing Skills:** Deep Learning (Generative Models, Unsupervised Image to Image Translation, Sequential Inputs/Outputs, Classification, Detection, Segmentation), Geometric Modeling in Computer Graphics, ROS, 2D LiDAR SLAM, Visual SLAM
- **Tools:** PostgreSQL, Spark, Elasticsearch, Mongo DB, Hadoop, Kafka, Amazon EC2.

Languages

- English: Fluent.
- Farsi (Persian): Mother tongue.

Hobbies

- **Rock climbing**: Arranged several trips to Stinson beach and Castle Rock Falls. Active member of the Hive bouldering gym in Surrey.
- **Public speaking:** Active member of the San Francisco's Golden Gate Toastmasters prior to moving to Vancouver.