ALI JAHANI

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EXPERIENCE

Software Developer - Perception Apr 2020 - Present
Avidbots Corp., Kitchener, ON

- **Lead of the semantic segmentation project** i.e. deep neural network design, data collection, data annotation, trainings, and deployments in field
- Implemented **semi weakly supervised** training to boost performance by 3%
- Designed and implemented an **auto annotation tool** using U^2 Net
- Implemented **active learning** based image selection for annotation
- Designed and implemented automated SLAM performance evaluation for continuous integration
- Prototyped Localization Monitor System in SLAM
- *Technologies: **Tensorflow, Pytorch, Docker**, Openvino, Streamlit, ROS, Flatland Simulation, Nvidia ISAAC, Python, C++, OpenCV, Pandas*

Computer Vision Engineer Sep 2016 - Mar 2020
Dot Technology Corp., Edmonton, AB

- Developed a 3D farm Simulator for fast prototyping and synthetic dataset collection
- Collected dataset in fields for combine object detection
- Fine-tuned state-of-the-art semantic segmentation models for a semi-auto annotation tool
- *Technologies: Python, C++, **Unreal Engine 4**, Tensorflow, Pytorch, **Detectron2**, OpenCV, ROS, Carla*

Research & Teaching Assistant Sep 2016 - Aug 2019
University of Alberta, Edmonton, AB

- Used LiDAR (as **supervised**) and Stereo images (as **unsupervised**) to improve state-of-the-art single image depth estimation accuracy by ~3%
- Proposed new evaluation based on cleaned ground truth LiDAR
- Integrated **deep learning depth estimation** with **SLAM** to recover scale and improve accuracy and robustness
- Taught *Introduction to Computing Science* to non-computer science students
- *Technologies: Python, Tensorflow, Pytorch, OpenCV, ROS*

3D Game Developer Intern Nov 2017 - Sep 2018
vrCAVE - Edmonton, AB

- Implemented a rule-based AI and in-game hint system in multiplayer virtual reality escape room games
- Pitched and implemented new successful ideas**,** e.g. destructible meshes
- Performed various profiling and optimizations to reach 90 fps
- Created wiki manual documentation for customers
- *Technologies: Git, HTC VIVE, **Unreal Engine 4***

EDUCATION

MSc, Computer Science Sep 2016 - Aug 2019
University of Alberta, Edmonton, AB

Relevant Coursework: **Deep Learning**, **Machine Learning**, **Computer Vision**, **Computer Graphics**, Robotics
Thesis: Semi-Supervised Single Image Depth Estimation Using Deep Neural Network

BSc, Electrical Engineering Sep 2011 - May 2016
University of Tehran, Tehran

Relevant Coursework: Advanced Programming, Linear Algebra, Engineering Probabilities and Statistic
Thesis: Real-time Video Stabilization and Mosaicing

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PUBLICATIONS

- *Semi-Supervised Monocular Depth Estimation with Left-Right Consistency Using Deep Neural Network*
  A Jahani**,** SY Loo, and H Zhang (ROBIO 2019 **Best Conference Paper Award**) *[PDF] [source code] [Demo]*

- *CNN-SVO: Improving the Mapping in Semi-Direct Visual Odometry Using Single-Image Depth Prediction*
  SY Loo**,** A Jahani, S Mashohor, SH Tang, and H Zhang (ICRA 2019) *[PDF] [Source code] [Demo]*

- *Real-time video stabilization and mosaicking for monitoring and surveillance*
  A Jahani, H Moradi (ICROM 2016) *[PDF] [source code] [Demo]*

SELECTED PROJECTS

Crop Growth Stage Classification *[blog] [Demo]* **Finalist Group** @ATB DATATHON, Edmonton (2019)

- Developed a real-time deep neural network to classify the growth stages of the crop to help farmers
- Performed a live demo on the stage
- Finalist group (top 6 out of 42)
- *Technologies: Python, Tensorflow, Keras, Scikit-learn, OpenCV*

2DGrid Mapping and Navigation using Monocular Camera *[Demo]* Robotics Course (2017)

- Improved state of the art ORBSLAM 2 framework for navigation tasks
- *Technologies: C++, ROS*

Direct Sparse Odometry vs ORB-SLAM *[Demo]* Computer Vision Course (2017)

- Compared direct and indirect methods in Simultaneous Localization and mapping algorithms
- *Technologies: C++, ROS*

Image Segmentation of Choroideremia Disease *[PDF]* Machine Learning Course (2016)

- Implemented ML algorithms such as **SVM, Random Forest, UNet** for pixel-wise classification of retina images
- Due to small dataset size, achieved good results by using bagging methods.
- *Technologies: Python, MATLAB, Caffe*

SKILLS

Programming: Python (4+ years), Modern C++ (Proficient)
ML/DL Tools: Tensorflow, Pytorch, Keras, Scikit-learn
Database: MySQL, Pandas
Robotics, Computer Vision, and Gaming: ROS, OpenCV, Unreal Engine, ISAAC Sim
Optimization and Numerical Analysis: g2o, Scipy, Numpy
Visualization: Streamlit, Rviz,Matplotlib, OpenGL, PowerBI, Plotly
Others: Git, Docker, AWS

CERTIFICATES

- **Sensor Fusion** NanoDegree (Udacity) [In Progress]
- Deep Learning Specialization (deeplearning.ai on Coursera)
- C++: Advanced topic (Linkedin)