

Payam Nikdel

Research assistant at Autonomy lab
Simon Fraser University

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Education

Simon Fraser University (SFU)

Ph.D. Computing Science

– Supervisors: Dr. Mo Chen

Burnaby, Canada

Jan 2019 - Present

Simon Fraser University (SFU)

M.Sc. Computing Science

– Supervisors: Dr. Richard Vaughan and Dr. Anoop Sarkar

– GPA: 4.17 out of 4.33

Burnaby, Canada

Sep 2016 - Dec 2018

Shiraz University

B.Sc. Computer Software Engineering

– GPA: 17.82 out of 20; Achieved the highest GPA among all B.Sc students

Shiraz, Iran

Sep 2010 - Feb 2015

Research Interest

- Reinforcement Learning for Robotics Navigation
- Human Pose Estimation and Prediction
- Zero-Shot Transfer in Deep Reinforcement Learning

Publications

LBGP: Learning Based Goal Planning for Autonomous Following in Front

Payam Nikdel, Richard Vaughan, Mo Chen

Proceeding of ICRA 2021

Proposed LBGP, a follow ahead method that uses both reinforcement learning and point based navigation. Demonstrated zero-shot transfer of the trained policy from simulation to the real world which address the limitations of classical methods and end-to-end approaches by combining Deep RL and a classical motion planner.

Relational Graph Learning for Crowd Navigation

Changan Chen, Sha Hu, Payam Nikdel, Greg Mori, Manolis Savva

Proceeding of IROS 2020

Designed a relational graph learning approach for robotic crowd navigation using model-based deep reinforcement learning that plans actions by looking into the future. **Tools:** Pytorch, ROS, Stage, Python, OpenCV

Recognizing and Tracking High-Level Navigation Features of Occupancy Grid Maps

Payam Nikdel, Mo Chen and Richard Vaughan

Proceeding of CRV 2020

Built an occupancy grid map during online and at the same time use a neural network (Based on ResNet34 and YOLOv2) to detect, locate and say the target classes around the robot. **Tools:** Pytorch, ROS, Stage, Python, OpenCV

The Hands-Free Push-Cart: Autonomous Following in Front by Predicting User Trajectory Around Obstacles

Payam Nikdel, Rakesh Shrestha and Richard Vaughan

Proceeding of ICRA 2018

Presented a human model for an autonomous mobile robot that follows a walking user while staying ahead of them. Used multi-modal person detection and a human-motion model that considers obstacles to predict the future path of the user. **Tools:** ROS, Stage, C++, Python, OpenCV

Reinforcing a Supervised Deep Network for Maximal Map Exploration

Payam Nikdel, Rakesh Shrestha, Faraz Shamshirdar and Richard Vaughan

Poster in IROS 2017

Built a hybrid network trained by a supervised algorithm to learn preliminary tasks, like obstacle avoidance, and then used Deep Reinforcement Learning to learn maximal map exploration. This work presented as a **poster** in **IROS 2017**.

Selected Research and Academic Projects

Human Pose and Orientation estimation

Spring, Fall 2020

Designed a fast human pose/orientation estimator based on the OpenPose structure. Our network output a estimation for each human pose with their current bird view orientation. **Tools:** Pytorch, Python, OpenCV

Lip-Reading Using Dual Attention Model

Spring, Fall 2018

Designed an audio-visual lipreading system that can translate a sequence of face images to natural language. To do so, we generated a data set containing a series of people's mouse images aligned with audio and subtitle from YouTube videos then trained a dual attention model. **Tools:** Pytorch, Python, OpenCV

Describe The Path Using Attention Model

Fall 2017

Dr. Anoop Sarkar and Dr. Richard Vaughan

Proposed a way to help visually impaired people navigate through an unknown indoor environment. The robot provides environmental information and navigational instructions for visually impaired or blind people. It translates a sequence of laser scanner data to human readable language. **Tools:** Pytorch, ROS, Stage, Python, OpenCV

Daydream Ant Algorithm

Fall 2016

Dr. Richard Vaughan

Presented a new approach based on SO-LOST algorithm by adding a thinking part. Daydream algorithm will reduce the path-finding time, and it will guarantee to find an optimal path. **Tools:** ROS, Stage, Python, C++

Person Re-identification Using Point-cloud images

Fall 2016

Dr. Greg Mori

Enhanced and compared several deep-learning approaches for identifying people using 3D point cloud data. **Tools:** Tensorflow, Keras, ROS, Python, OpenCV

Control the mouse cursor with eyes or hands

Fall 2014

Dr. Zohreh Azimifar

Controlled the mouse pointer by tracking the user's eyes or hand (two separate applications). **Tools:** C++, OpenCV

3D Multiplayer Game With AI

Spring 2014

Dr. Farshad Khunjush

Developed a multiplayer online first-person shooter game with AI for enemies. **Tools:** Unity3D, C#, Photon network

Work Experience

Research Scientist

Vancouver, Canada

Advanced Intelligent Systems Inc.

Mar. 2019 - Present

- Designed and deployed research projects all the way from simulation to real-world robotics platforms
- Contributions: Predict Humans Trajectories, Robot Navigation, Object detection, RL Trainable Environment (Pytorch, Gazebo, ROS, C++, Python, OpenCV)

Research Scientist (Internship)

Vancouver, Canada

ScopeMedia Inc.

Jan. 2018 - Apr. 2018

- Designed a multi-person tracker using state-of-the-art techniques (OpenPose, Yolo and different trackers)

System Developer

Tehran, Iran

Petro Gas Jahan & Jahanpars Engineering company

Jul. 2015 - Aug. 2016

- Improved the company network performance tools and contributed to develop software

Technical Skills

Programming Languages:

- Python
- C
- C++
- C#

Programming Platforms & Frameworks:

- Pytorch
- TensorFlow
- OpenCV
- Gazebo
- Reinforcement Learning
- ROS
- Unity
- Git
- Docker
- Deep Learning

Awards, Grants & Honours

Fellowship and RA position from The Simon Fraser University

Spring 2016 & Fall 2018

Fellowship and RA position from The University of Alberta and University of Victoria

Spring 2016

Ranked 1st among class of 2014, BSc Computer Engineering

Fall 2014

Awarded as the Best Undergraduate Student in Computer Engineering at Shiraz university

Spring 2014

Ranked 18th in Iranian National Computer Olympiad for university student

Spring 2014

Ranked 4th in Kashan ACM competition among all Iranian universities

Spring 2011