Hossein Sheikhi Darani

Robotics Algorithms and Motion Planning (RAMP)
Simon Fraser University
Personal webpage | Personal email

EDUCATION

2020 – NOW
M.SC. IN SYSTEMS AND ROBOTICS, SIMON FRASER UNIVERSIRTY
Master Thesis: Autonomous industrial mobile robot (Not completely determined)

2013 – 2018
B.SC. IN COMPUTER ENGINEERING, K. N. TOOSI UNIVERSITY OF THECHNOLOGY
Bachelor Thesis: Motion planning with constraint on motion model uncertainty for a quadrotor, its simulation and real implementation

RESEARCH INTERESTS

- Robot Perception
- Deep RL

PUBLICATION

Hossein Sheikhi Darani, Ali Noormohammadi , Hamid D. Taghirad, "Simulation and Real implementation of path planning under uncertainty for a UAV", *IEEE Conference on Robotics and Mechatronics (ICROM), 2019*

HONORS AND AWARDS

- Received the 1st Place Award in The International Micro Air Vehicle competition (IMAV), 2016, China, Beijing
- Received the Best in class Autonomy Award in The International FIRA CUP in Rescue League, 2015, Iran, Tehran
- Received the 2nd Place Award in The International FIRA CUP in Rescue League, 2015, Iran, Tehran

RESEARCH EXPERIENCES

- RAMP Laboratory (2020 – now)
  Research on robotics perception
- KN2C Robotics Team (2015 - 2020)
  Software leader of UAV and UGV team
- ARAS Laboratory (2016 - 2018)

Research on path planning

NOTABLE PROJECTS

DEEP RL:

- Implementation of DQN, A2C, and A3C [GitHub]
  DQN, A2C, and A3C algorithms are implemented for the Cart-pole and Breakout environments using TensorFlow and Keras, 2020

AUTONOMOUS ROBOTIC

- ROS2 Ceiling Perception package **(Master thesis)**
  Takes the overhead segmentation package as input and is implemented as a plugin for Nav2 costmap2D package to obtain a global map of the environment, 2021
- ROS2 overhead segmentation package **(Master thesis)**
  Deep CNNs are trained on synthesis overhead images generated in Unity to segment the floor to the occluded vs free pixels using cameras placed on the ceiling looking downward, 2020
- Vision-Based outdoor Localization
  ResNet model is used for feature extraction of aerial images, and matching by pre-GPS-labeled aerial image for a UAV localization, 2019
- Path Planning for a UAV [simulation video][real implementation video]
  Modeling the motion planning problem of a quadrotor as a MDP problem to maximize the probability of avoiding collisions and successfully reaching a goal, 2018
- Vision-Based indoor Localization
  EKF localization algorithm with known corresponding markers is used to localize a quadrotor by its onboard camera, simulation (Gazebo) and real implementation, 2018
- Autonomous Quadrotor [video]
  RTAB-map, Frontier Exploration and Dijkstra algorithm by using ROS packages and RGBD sensor is used to a quadrotor explore the environment autonomously, 2016
- Autonomous Rescue Robot [video]
  Hector-SLAM, Frontier Exploration and Dijkstra algorithm by using ROS packages and laser scanner is used to a rescue robot explore the environment autonomously, 2015
- Object Detection [video]
  OpenCV library is used to line Detection, window Detection, land mark Detection for an autonomous quadrotor, 2017
  OpenCV library is used to an Intelligent victim detection (BOF and SVM algorithm) for an autonomous rescue robot, 2014

OTHERS

- Robot Operating System
  A ROS package for real-time RGBD sensor data transferring through Wi-Fi to the ground station, 2016
  A ROS package as a driver for Parrot Bebop2 drone, 2017

ACADEMIC EXPERIENCS

- Spring 2021, TA, SFU CS department, Embedded Systems
- Spring 2021, TA, SFU ENSC department, Introduction To Robotics

- Summer 2020, TA, SFU CS department, Introduction to Computer Science and Programming I
- Fall 2019, Teacher, Amir Kabir University Robotic High School, Basics in Robotics
- Fall 2018, Teacher, Salam High School, Teacher, Android programming and Introduction to IOT
- Spr. 2017&2018, Teacher, KN2C Robotic Team, Software in Robotic for entrance students
- Fall 2017, Teacher, Salam High School, Teacher, Junior soccer robot
- Fall 2017, TA, KNTU, Advanced of Computer Programming (Java languages)
- Spr. 2017, TA, KNTU, Fundamental of Data Structures
- Spr. 2015, TA, KNTU, Fundamental of Computer Programming (C languages)