

Hany Hamed Aly

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Interested in Robot Learning, Multi-Robot Systems & Sim2Real

EDUCATION

Innopolis University

Bachelor of Computer Science (Robotics track)

CGPA: 4.545/5

Innopolis, Russia

Aug 2018 – June 2022

RESEARCH EXPERIENCE

Bachelor Thesis | *In progress*

Oct 2020 – June 2022

- Topic: Learning the behavior for N pursuer vs M evaders in complex environment with realization using drones
- Keywords: Reinforcement Learning, Evolutionary algorithms, Pursuit & Evasion Games, Competitive coevolution
- Supervised by: Prof. [Stefano Nolfi](#) & Prof. [Alexandr Klimchik](#)

Undergraduate Research Assistant

Aug 2019 – Present

Center for Technologies in Robotics and Mechatronics Components, Innopolis University

Innopolis, Russia

- Developed a gym environment for a Tensegrity hopper
- Developed experiments using ARS (RL algorithm) to learn a stabilizing control policy for the tensegrity hopper
- Implemented a simple contactless differentiable physics simulator for tensegrity robots using [Taichi](#)
- Developed experiments to teach different tensegrity robots to learn reaching specific configurations

Summer Research Intern

June 2019 – July 2019 – [\[Doc\]](#)

Center for Technologies in Robotics and Mechatronics Components, Innopolis University

Innopolis, Russia

- Explored the simulation of different robots in NTRTsim (NASA simulator for Tensegrity Structured robots)
- Implemented an integration between NTRTsim and python to be used with learning algorithms
- Explored the possibility to teach a tensegrity robot to perform rolling locomotion using Reinforcement Learning
- Developed a CAD model for a simple tensegrity prototype

PUBLICATIONS

- V. Kurenkov, H. Hamed, and S. Savin, “Learning stabilizing control policies for a tensegrity hopper with augmented random search,” in *2020 International Conference on Industrial Engineering, Applications and Manufacturing (ICIEAM)*, pp. 1–5, IEEE, 2020 ([code](#), [paper](#))
- L. Vorochaeva, S. Savin, H. Hamed, and A. M. Leon, “Analysis of algorithms for controlling the length of crawling robot modules,” in *2020 4th Scientific School on Dynamics of Complex Networks and their Application in Intellectual Robotics (DCNAIR)*, pp. 257–260, IEEE, 2020 ([paper](#))
- L. Vorochaeva, S. Savin, and H. Hamed, “Lateral gait analysis of a crawling robot by means of controlling the lengths of links and friction in the supports,” in *2020 International Conference Nonlinearity, Information and Robotics (NIR)*, pp. 1–6, IEEE, 2020 ([paper](#))
- H. Hamed, V. Kurenkov and S. Savin, “Sim2Real for Tensegrity Robots” [Manuscripts in preparation]
- H. Hamed and S. Savin, “A Survey On Different locomotion control methods for crawling robots” [Manuscripts in preparation]

WORKING EXPERIENCE

Technical Intern

July 2019 – Aug 2019 - [\[Doc\]](#)

Copter Express

Moscow, Russia

- Had a training about main components and construction of drones
- Had a training on COEX’s autonomous drones (ROS, PX4 and indoor navigation by Aruco markers)
- Developed a human pose estimation with a webcam using Tensorflow.js to control a drone
- Integrated RTAP-Map SLAM algorithm with COEX’s drone (Clever 3) using Intel Real-Sense T265 and D435 cameras

PROJECTS

- Human Pose Estimation Drone Control** | *Python, TF.js, ROS* July 2019
- Explored and tested different human pose estimation modules
 - Integrated a drone controller with human pose estimation module built with TensorFlow.js
- Automated 3D Scanner (Team Project)** | *Python, ROS, Gazebo* Jan. 2019 – May 2019
- Reviewed different existing solutions for 3D scanners
 - Collaborated on developing the base idea for the 3D scanner
 - Collaborated on developing a simulation for the 3D scanner
 - Integrated a keyboard teleop with the simulator using ROS to control the motion of the 3D scanner
 - Explored the usage of Open3d for colored point cloud registration

SELECTED AWARDS & CERTIFICATES

- Outstanding Achievements in Innopolis University for Fall 2020** | *Diploma* Feb 2021
- Winter School on Machine Learning in Robotics** | *Certificate of Participation* Dec 2020
- [Coursera] Modern Robotics, Course 1: Foundations of Robot Motion** | *License* Jan 2019
- [Coursera] Modern Robotics, Course 2: Robot Kinematics** | *License* Jan 2019

EXTRACURRICULAR ACTIVITIES

- Leader for RoboCup Small Size League (SSL) Innopolis team** July 2020 – Present
- Constructed a team for participation
 - Reviewed the existing solutions from different teams
 - Constructed the bill of materials for team's equipment
 - Supervised, guided and helped other members in the sub-teams (Mechanical, electrical and control)
 - Prepared plans and tasks for the team's members
 - Developed a basic controller for the robots in the simulation
- Judge at WRO International Finals [Advanced Robotics Challenge - ARC]** 2019
- Developed the game rules for the international competition
 - Judged the Russian qualifications as the Head judge
 - Judged the International competition
 - Collaborated in the development of a playground generator for the competition using C++ and Javascript
- Participant in RoboCup Junior Egypt Open Weight Soccer Category** 2018
- Developed a colored ball detection software using OpenCV
 - Developed PCB boards for the robot
 - Developed the game controller for the robots
 - Won 2nd place