Martin Matak

PhD Student at the University of Utah

https://martinmatak.github.io

EDUCATION

University of Utah

PhD in Computer Science — Aug 2019 – present

- Advised by Tucker Hermans
- Focused on dexterous grasping and manipulation

Vienna University of Technology / TU Wien (Austria)

MSc in Computational Intelligence / Logic and Computation — Oct 2016 – June 2019

- Advised by Georg Weissenbacher
- Thesis: *Attacks against Neural Networks* [PDF]

University of Zagreb, Faculty of Electrical Engineering and Computing (Croatia)

BSc in Computer Science — Sep 2013 – Jul 2016

- Thesis: *Data Processing with Technology Apache Spark*

PUBLICATIONS

- "DextrAH-G: Pixels-to-Action Dexterous Arm-Hand Grasping with Geometric Fabrics"
  Tyler Ga Wei Lum*, Martin Matak*, Viktor Makoviychuk, Ankur Handa, Arthur Allshire, Tucker Hermans, Nathan D. Ratliff, Karl Van Wyk
  under submission
- "Don't miss the point! Point-based context enables multimodal, multifingered grasping as regression"
  Martin Matak, Karl Van Wyk, Tucker Hermans
  under submission
- "23 DoF Grasping Policies from a Raw Point Cloud" [PDF]
  Martin Matak, Karl Van Wyk, Tucker Hermans
  IEEE International Conference on Robotics and Automation (ICRA) Workshop on Geometric Representations 2023
- "Planning Visual-Tactile Precision Grasps via Complementary Use of Vision and Touch" [PDF]
  Martin Matak and Tucker Hermans
  IEEE Robotics and Automation Letters (RA-L) 2022
- "Comparing Piezoresistive Substrates for Tactile Sensing in Dexterous Hands" [PDF]
  Rebecca Miles, Martin Matak, Mohanraj Devendran Shanthi, Darrin Young, Tucker Hermans
  Preprint
- "Learning Continuous 3D Reconstructions for Geometrically Aware Grasping" [PDF]
  Mark Van der Merwe, Qingkai Lu, Balakumar Sundaralingam, Martin Matak, Tucker Hermans
  IEEE International Conference on Robotics and Automation (ICRA) 2020

WORK EXPERIENCE

NVIDIA, Seattle, US

Research Scientist Intern at Seattle Robotics Lab — May 2022 – May 2024

- Combining RL and low-level control for dexterous grasping.

Deloitte Digital, Vienna, Austria

Analyst (Software developer) — May 2018 – July 2019

- Part of the team that developed a loyalty program used by multiple grocery stores and gas stations.
- Worked on the backend side (Java, Oracle)

Austrian Institute of Technology (AIT), Vienna, Austria

Data Science Intern — Oct 2017 – Feb 2018

- Investigated linkability of *monero* cryptocurrency (Scala, Google Cloud).

CROZ d.o.o., Zagreb, Croatia

Software Engineering Intern — Jul 2016 – Oct 2016

- Worked on graph search through natural language (Croatian).

SELECTED PROJECTS

Grasping Pipeline — Aug 2019 – now

- Generating grasps for a robot from only a partial view of the object. The project is under development.
- Tech stack: Python 2 and 3, ROS, PyTorch, C++
- Source: `https://bit.ly/3UfPDbE`

Adversarial Perturbations Against Deep Neural Networks — Jul 2018 – Apr 2019

- Trained several classifiers for human age estimation from the given image. Evaluated several white-box and black-box attacks against the classifiers. Developed a new black-box attack based on the existing state of the art algorithm. Some adversarial samples successfully tricked Microsoft service for age estimation.
- Tech stack: Tensorflow, Keras, and Python 3
- Source: `https://github.com/martinmatak/adversarial-framework`

Neural Bird — Sep 2015 – Jan 2016

- Five of us developed a harder version of flappy bird and trained the agent (a neural network) to play better than human. My part was developing a neural network from scratch. More info about the project: `http://morgoth.zemris.fer.hr/data-repo/proj/1/`.
- Tech stack: Java
- Source: `https://github.com/martinmatak/NeuralBird`