# Abhinav Grover

Robotics & AI Researcher/Engineer


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## Education

**M.A.Sc. - Robotics Eng.**
University of Toronto
Robotics Institute
Graduation August 2021
Publication Link
GPA: 3.9/4.0

- (A ) State Estimation
- (A ) Perception for Robotics
- (A ) Optimal Control

**B.A.Sc. - Mechatronics Eng.**
University of Waterloo
Graduation April 2019
GPA: 91.5%

- (A+) Deep Learning
- (A ) Autonomous Robots
- (A+) Control Systems

## Skills

**Python** 3+ yrs.

**Matlab** 3+ yrs.

**C/C++** 2+ yrs.

**bash/zsh** 2+ yrs.

**Keras/TF/PyTorch** 2+ yrs.

**Scikit-learn** 2+ yr

**ROS** 2 yrs.

**Linux Development** 2 yrs.

## Interests

- Badminton
- Tennis
- Cricket
- Chess
- Non-fiction Books

## Relevant Experience

**Graduate Research Student | Teaching Assistant** — 09/2019 - today
STARS lab (Dr. Jonathan Kelly)
University of Toronto
Published a method to detect in-hand object slip using in-expensive tactile sensors for robotic hands, also worked as a teaching assistant for a third year AI course.

**ML Research Intern | Autonomous Vehicles** — 01/2018 - 08/2018
Nvidia Inc., New Jersey
Manager: Joyjit Daw (Recommendation on LinkedIn)
Contributed to the data acquisition infrastructure of Nvidia's self-driving software. Projects also included sensor calibration and vehicle controller tuning.

**Systems Engineering Intern | DRIVE Platform** — 05/2017 - 08/2017
Nvidia Inc., Seattle
Manager: Arun Gona (Recommendation on LinkedIn)
Worked on the OS flashing infrastructure for Nvidia's autonomous driving hardware platform. Implemented incremental flashing to reduce testing delays.

**Software Engineering Intern | Special Projects** — 05/2016 - 08/2016
Intellijoint Surgical, Canada
Manager: Richard Fanson
Created a prototype application for a cranial tool navigation system used for surgical applications. The prototype served as a proof-of-concept for future products.

**Find more information on LinkedIn or my personal website.**

## Publications

- "Under Pressure: Learning to Detect Slip with Barometric Tactile Sensors", **A. Grover**, C. Grebe, P. Nadeau, and J. Kelly (2021). Link to page.
- "Certifiably Optimal Monocular Hand-Eye Calibration", E. Wise, M. Giamou, S. Khoubyarian, **A. Grover**, and J. Kelly (2020). Link to page.

## Relevant Projects

**Accurate Road Segmentation using Camera and LIDAR Data** — Project Link
*Pytorch, OpenCV*
Implemented a Fully Connected Network (FCN) based Road Segmentation pipeline on Audi's A2D2 dataset. Implemented the late and early fusion strategy published by Caltagirone et. al. and achieved an average precision of over 90%. The code, as well as a video, along with a full report are available for further details.

**Failure-Mode Analysis of A Learned Dexterous Hand Controller** — Project Link
*Tensorflow, OpenAI gym, mujoco*
Conducted a failure mode analysis on learned DDPG based policies used to control a dexterous hand with tactile sensors, in an attempt to understand the utility of tactile information. The code, as well as a video, along with a full report are available.

**Invariant EKF SLAM** — Project Link
*MATLAB*
Implemented an Invariant EKF-SLAM method by representing the robot pose as a member of the special euclidean Lie group, with the goal to eliminate the problem of inconsistency. The code, as well as a video, along with a full report are available.