Abhinav Grover

AI/ML Software Engineer

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Education

Masters of Applied Science
AI & Robotics Engineering
University of Toronto

Graduation September 2021
GPA: 4.0/4.0

- AI & Perception for Robotics
- State Estimation
- Optimal Control

Bachelors of Applied Science
Mechatronics Engineering
University of Waterloo

Graduation April 2019
GPA: 91.5%

- Deep Learning
- Autonomous Robots
- Control Systems

Skills

Coding	**Python, Golang, C/C++, Bash, MATLAB, LaTeX**
Libraries	**Pytorch, Keras Tensorflow, Pandas SciPy, Opencv, NumPy, PCL, Matplotlib, Fx**
Frameworks	**VertexAI, Docker Nvidia Triton, ROS, Nomad, gRPC, REST**
Soft Skills	**Communication, Quick Learner, Collaboration, Highly Creative**
Languages	**English, Hindi, Punjabi, Urdu**

Interests

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

Relevant Experience

Machine Learning Engineer II — **09/2021 - Present**
Kindred AI/Ocado Inc., San Francisco
Manager: Gus D'Souza (recommendation on LinkedIn)

- Co-lead development of robotic manipulation systems implementing a **Docker** based **microservice** architecture employing **nomad** and **gRPC** framework.
- Developed a **gRPC** microservice in **python** to generate 3D item-grasping candidates using a **pyTorch** instance segmentation network trained on custom in-house data.
- Built a multi-threaded robot behavior controller as a microservice in **golang** using an event-driven architecture, implementing complex concurrent logic.
- Developed software drivers in **golang** and **python** for cameras, scanners, and conveyor systems, implementing **gRPC** interfaces to external hardware.
- Contributed to software re-architecture efforts, improving overall system reliability, traceability, and extensibility.
- Co-established and contributed to a company-wide Golang coding style-guide.

Graduate Researcher | Masters Student — **09/2019 - 08/2021**
STARS lab, University of Toronto Robotics Institute
Supervisor: Dr. Jonathan Kelly

- Developed a novel learned approach to detect object slip with in-expensive tactile sensors using **temporal convolution models**.
- Presented a workshop paper at **IROS 2021** and an oral presentation at **ICRA 2022**.

Software Engineering Intern | Autonomous Vehicles — **01/2018 - 08/2018**
Nvidia Inc., New Jersey
Manager: Joyjit Daw (recommendation on LinkedIn)

- Implemented a driving data recorder as a **linux application** in C++ for a retrofit system, increasing vehicle fleet utility by 400%.
- Tuned kinematics model parameters of simulated autonomous vehicles using recorded driving data, bridging the **sim-to-real gap**.

Relevant Projects

Accurate Road Segmentation using Camera and LIDAR Data — **Project Link**
Pytorch, OpenCV
Implemented a Fully Connected Network (FCN) based **Road Segmentation pipeline in PyTorch** on Audi's A2D2 dataset. Implemented a late and early fusion strategy published by Caltagirone et. al. and achieved an average precision of over 90%.

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.

Publications

"Learning to Detect Slip with Barometric Tactile Sensors and a Temporal Convolutional Neural Network", **A. Grover**, C. Grebe, P. Nadeau, and J. Kelly, IEEE Int. Conf. of Robotics and Automation (2022). Link to publication.

"Certifiably Optimal Monocular Hand-Eye Calibration", E. Wise, M. Giamou, S. Khoubyarian, **A. Grover**, and J. Kelly, IEEE Int. Conf. on Multisensor Fusion and Integration (2020). Link to Publication.