

ABHISHEK BAMOTRA

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Master of Science in Computational Design and Manufacturing

Dec 2020

GPA 4.0/4.0

♦ *Intermediate Deep Learning** ♦ *Robot Localization & Mapping** ♦ *ML for Large Dataset* ♦ *Computer Vision*

Thapar Institute of Engineering & Technology, India

Bachelor of Engineering in Mechatronics Engineering

Jun 2019

GPA 9.09/10.0

♦ *Robotics Engineering* ♦ *Industrial Automation* ♦ *Digital Signal Processing* ♦ *Machine Design*

WORK EXPERIENCE

Research Fellow, Computational Engineering and Robotics Laboratory, CMU

Jan 2020 - Present

- ♦ *Developing machine learning algorithms for Point Cloud data.*
- ♦ *Object detection and warpage measuring using PCL.*
- ♦ *Developing algorithms to generate 3-D reconstruction using multi-light 2-D images.*

Teaching Assistant, Machine Learning & Artificial Intelligence for Engineers (24-787), CMU

Aug 2020 - Present

- ♦ *Preparing and teaching recitations, Holding Office Hours to assist students clarifying doubts.*
- ♦ *Mentor groups of students with their course project, Prepare and Grade assignments.*

Course Assistant, Intro to Scientific Computing (24-281), CMU

Jan 2020 - May 2020

- ♦ *Assist professor with Homework, Quizzes, Projects and Tests*

Robotics Intern, BioMechatronics Lab, National University of Singapore, Singapore

Feb 2018 - Jul 2018

- ♦ *Hand-on experience with soft material fabrication.*
- ♦ *Designed robotic hand gripper and an ultra-sensitive tactile sensor using 3-D printing and soft material.*
- ♦ *Soft gripper could lift 200 times its own weight and sensor was sensitive to 0.5 mN force.*

Robotics Intern, Robotics Lab, Universidad Carlos III de Madrid, Spain

May 2017 - Jul 2017

- ♦ *Hands-on experience with ROS, C++, and Linux.*
- ♦ *Programmed Arduino to control mini robots.*
- ♦ *Developed automatic wireless communication between micro and mini robot.*

SKILLS

Advanced: Python, C/C++, MATLAB, Spark, Arduino, 3-D Printing, PTC Creo

Intermediate: SQL, OpenCV, TensorFlow, PyTorch, PCL, AWS, RSLogix, AutoCAD, Solidworks, OpenGL

Basic: Java, OpenAI Gym, NI Multisim, ROS, Keil, R

PROJECTS

New York City Taxi Fare Prediction (CMU)

Jan 2020 – May 2020

- ♦ *Developed a pipeline for a large-scale dataset (~1Tb)*
- ♦ *Algorithms based on Linear Regression, Decision Tree, Random Forest and XGBoost. RSME: 0.73\$*

Multi-View Keypoint 3D-Reconstruction to track object's orientation and motion (CMU)

Jan 2020 – May 2020

- ♦ *Developed a pipeline involving fundamental, essential matrices and triangulation to extract epipolar correspondences.*
- ♦ *Integrated the pipeline with bundle adjustment to 3D reconstruct keypoint to track object's state.*

KeyDetect - Detection of anomalies and user based on Keystroke Dynamics (CMU)

Oct 2019 – Dec 2019

- ♦ *Developed a 2-step authentication model to learn and verify the user based on the typing patterns.*
- ♦ *Algorithms based on SVM, Neural Networks (1-D Conv., with Negative Class), Decision Trees.*

Controller Design for an Autonomous Vehicle to track the route (CMU)

Oct 2019 – Dec 2019

- ♦ *De-noised the input sensor data using Kalman Filter.*
- ♦ *Developed PID, Feedback, Optimal controller for the vehicle and bagged position in top 20 %.*

PATENTS & PUBLICATIONS

Kirigami-Inspired soft end-effector with layer jamming for stiffness control (Patent)

Under review

Abhishek Bamotra, Pushpinder Walia, A.V. Prituja & H. Ren

Jun 2018

Tri-axial Force Sensor (Patent)

Under review

Pushpinder Walia, Abhishek Bamotra & H. Ren

Jun 2018

Layer-Jamming Suction Grippers with Variable Stiffness

ASME JMR

Abhishek Bamotra, Pushpinder Walia, A.V. Prituja & H. Ren [10.1115/1.4042630](https://doi.org/10.1115/1.4042630)

Jan 2019

Fabrication and Characterization of Novel Soft Compliant Robotic End-Effectors with Negative Pressure and Mechanical Advantages

IEEE ICARM

Abhishek Bamotra, Pushpinder Walia, A.V. Prituja & H. Ren [10.1109/ICARM.2018.8610688](https://doi.org/10.1109/ICARM.2018.8610688)

Jul 2018

Design and Fabrication of Soft-bodied 3-D Tactile Sensors with Magnetometers

IEEE ICIA

Pushpinder Walia, Abhishek Bamotra, A.V. Prituja & H. Ren [10.1109/ICInfA.2018.8812448](https://doi.org/10.1109/ICInfA.2018.8812448)

Aug 2018

Active Contact Enhancements With Stretchable Soft Layers and Piezoresistive Tactile Array for Robotic Grippers

IEEE CASE

G. Ponraj, A.V. Prituja, Abhishek Bamotra, Zhu G., H. Ren, et al. [10.1109/COASE.2019.8842882](https://doi.org/10.1109/COASE.2019.8842882)

Aug 2019