ABHISHEK BAMOTRA

abamotra1707@gmail.com ♦ 412-692-1807 ♦ linkedin.com/in/abamotra

EDUCATION

Harvard University (EDX) **Aug 2021**
Professional Certificate in Tiny Machine Learning (TinyML)

Carnegie Mellon University (CMU), Pittsburgh, PA **Aug 2019 - Dec 2020**
Master of Science in Computational Design and Manufacturing GPA **4.0/4.0**
♦ *Intermediate Deep Learning* ♦ *Robot Localization & Mapping* ♦ *ML for Large Dataset* ♦ *Computer Vision*

Thapar Institute of Engineering & Technology, India **Aug 2015 - Jun 2019**
Bachelor of Engineering in Mechatronics Engineering GPA **9.09/10.0**
♦ *Robotics Engineering* ♦ *Industrial Automation* ♦ *Digital Signal Processing* ♦ *Machine Design*

WORK EXPERIENCE

Engineer, Qualcomm **Feb 2021 – Present**
- *Working on end-to-end data pipelines and visualizations using Python, MySQL/MongoDB, Quick Sight.*
- *Curating machine learning based alternatives to traditional algorithms for better performance.*
- *Developing machine learning models to improve 5G technologies.*
- *Mentored and guided graduate intern with project planning and execution.*

Graduate Researcher, Computational Engineering & Robotics Lab, **CMU** **Jan 2020 – Dec 2020**
- *Developed machine learning algorithms for Point Cloud data.*
- *Object detection and warpage measuring using PCL.*
- *Developed algorithms to generate 3-D reconstruction using multi-light 2-D images.*

Course Assistant, Machine Learning & AI for Engineers (24-787), **CMU** **Aug 2020 – Dec 2020**
- *Prepared and taught recitations, Held Office Hours to assist students clarifying doubts.*
- *Mentored groups of students with their course project, Prepare and Grade assignments.*

Grader, Intro to Scientific Computing (24-281), **CMU** **Jan 2020 – May 2020**
- *Assisted 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

Machine Learning Stack: Python (OpenCV), Apache Spark, MySQL, TensorFlow, PyTorch, PCL, Amazon Web Services
Intermediate: C/C++, MATLAB, Java, OpenGL
Software: NI Multisim, ROS, Keil, Arduino, PTC Creo, RSLogix, AutoCAD, SolidWorks

PROJECTS

TransDocs: Optical Character Recognition with word to word translation **Aug 2020 – Dec 2020**
- *Deep Learning based approach to translate scanned documents/text in wild images from A to B language.*
- *Developed an OCR pipeline with word-by-word LSTM based Sequence-to-Sequence translation.*

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. RMSE: 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 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 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 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 Aug 2019