Ashank **Behara**

Aspiring Robotics and Perception Engineer

119 Gilbert Avenue, Santa Clara, CA 95051

(+1) 669-226-1554 | abehara2@illinois.edu | https://abehara2.github.io/ | abehara2 | ashankbehara

Education

University of Illinois at Urbana-Champaign

Mechanical Engineering and Computer Science, Bachelor's — *August 2018 - May 2022*

Robotics, Autonomous Systems, Deep Learning, Computer Architecture, Data Structures and Algorithms, Linear Algebra, Circuits/Electronics, Dynamics, Solid Mechanics, Statics, Computer Aided Design, Differential Equations, Fluid Dynamics, Thermodynamics, Discrete Structures

Experience

Center for Autonomy | Human Centered Autonomy Lab — *Urbana, Illinois*

Undergraduate Perception Researcher — *August 2020 - Present*

- Building deep learning and Velodyne **LiDAR based 3D object detection** model using **OpenCV and Pytorch** for electric and **autonomous car** in real time
- Researching **sensor fusion** models and algorithms for 3D object detection and semantic segmentation for camera and LiDAR based systems
- Streaming **point cloud** and camera data from different hardware components and sensors across the Polaris GEM car using **ROS** and testing already existing object detection models and SLAM algorithms on a Turtlebot in simulation with **Gazebo**

3M | Advanced Systems Lab — *Maplewood, Minnesota*

R&D Computer Vision Intern — *May 2020 - August 2020*

- **Real-time image processing** on live video of highly reflective and complex surfaces of vehicles to support robotic vision and perception
- Custom trained and implemented **YOLO based R-CNN** model with a DarkNet backbone for real-time object detection and localization platform
- Leveraged **OpenCV** to extract specific features and perform computations used to provide quantifiable metrics from images and improved accuracy of calculations using a multiple polynomial regression machine learning model trained and built using SciKit-Learn
- Deployed **2D object detection** model and image processing code on **multi-axis robotic arm** for localization of low visibility bodies
- Built image classifier using a custom built **CNN in Tensorflow and Keras** and deployed on NVIDIA Jetson-Nano for IoT solution

Hack4Impact — *Urbana, Illinois*

Software Developer — *September 2019 - Present*

- **Full stack development** in tech for social good 501(c)(3) shipping robust software solutions to other nonprofits across the world
- Worked in a wide variety of areas such as auth infrastructure, backend **REST API development in Node.js** and Flask, integration of external APIs, **frontend development in React.js** and Next.js, and SQL and MongoDB **database design**
- Built and shipped interactive project sharing platform and built frontend for proof of concept ride sharing web application for UIUC students

Caesar Research Group — *Urbana, Illinois*

Undergraduate Researcher — *March 2020 - August 2020*

- Working on frontend infrastructure team for large scale IoT Virtual Circuit Emulator tool available for all UIUC engineering courses
- Modeling virtual user-constructed hardware components as Immutable.js objects and writing unit tests for translation to JSON
- Developing multiple displays with React (Typescript) and Konva.js for web frontend to visualize circuits and dynamically edit circuit properties

RAAD Systems — *San Jose, California*

Mechanical Design Engineering Intern — *June 2019 - August 2019*

- **Designed and modeled 6-axis robot** and mounting interface for mobile robot using **Autodesk Inventor**
- Performed inertial and torque analysis for motor selection and functionality testing for kinematics analysis using **MATLAB**
- Gained knowledge in good industry practices to robustify load bearing mechanical systems and proper design procedures for tolerancing

Projects

Vision-based PPE Validation

https://github.com/abehara2/GotMask

C++ and Python implementations of **real time object detection** of face-masked and gloved medical personnel using image segmentation and HAAR classifiers with **OpenCV**. Built, trained, and optimized CNN to 96.3% accuracy using **Tensorflow and Keras** for glove identification. Deployed on **Raspberry Pi 4** with external camera and i2c LCD display.

Autonomous Early-Collision Detection System

https://github.com/abehara2/RideSafe

Implemented Single Shot Detector in **Python and OpenCV** for detection and localization of **pedestrians, vehicles, and road signs**. Built **depth perception system** to accurately compute distance to a detected object and see if an object is within a set distance to the camera.

Fatemaker

https://github.com/hack4impact-uiuc/kids-save-ocean

Sustainability project accelerator aimed at motivating children to make a change in their communities and empower other children across the world. Full stack **web application** developed using **Next.js, MongoDB Node.js, and Express.js**. Worked vertically in tech stack on a team with other software developers and product designers to build the best possible product.

Skills

Development: C++, Java, Python, Tensorflow, Keras, OpenCV, Pytorch, ROS, Gazebo, Javascript, MATLAB, React.js, Node.js, MongoDB, Verilog, SciKit-Learn
Modeling and Analysis: Autdesk Fusion 360, CREO Parametric, Solidworks, Autodesk Inventor, APriori

Extra Curriculars and Awards

Co-founder and VP of Neurotech @ UIUC: Machine learning and technical consulting for Fortune 500 companies
1st Place @ Autodesk BioEngineering Designathon: Designed knee injury simulator for medical students
Honorable Mention @ Health Make-a-Thon: Designed wearable for chronic illness detection for elderly patients in rural areas
Illinois Club Tennis Team: Opportunity to play a sport I love at a high level!