ASHANK BEHARA

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EDUCATION

University of Illinois at Urbana-Champaign **August 2018 - May 2022**
Mechanical Engineering and Computer Science
Concentration in Robotics

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

WORK EXPERIENCE — SEE MORE

3M **May 2020 - August 2020**
R&D Computer Vision Intern

- Real-time image processing on live video of highly reflective, specular, and complex surfaces of vehicles to support robotic vision and perception
- Custom trained and implemented YOLO based R-CNN model with Tensorflow and Darkflow 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 object detection model and image processing code on multi-axis robotic arm for detection and localization of low visibility bodies
- Built image classifier using a custom built CNN written in Tensorflow and deployed on NVIDIA Jetson-Nano for IoT solution hosted on AWS Greengrass

Caesar Research Group @ UIUC **March 2020 - August 2020**
Undergraduate Researcher

- Working on frontend infrastructure and VR backend teams 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 component properties

Hack4Impact — uiuc.hack4impact.org **September 2019 - Present**
Software Developer

- 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 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

RAAD Systems — raadsys.com **May 2019 - August 2019**
Mechanical Design Engineering Intern

- 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 and implemented a D-H matrix for kinematics analysis
- Gained knowledge in good industry practices to robustify load bearing parts of mechanical systems and proper design procedures for geometric tolerancing

DPQL Lab @ UIUC **June 2019 - December 2019**
Undergraduate Research Assistant

- Wrote multiple MatLab and Python scripts to process, analyze, and correlate data from accelerometers, Vicon motion capture system, and force plates
- Implemented signal processing filters to de-noise data and interpolated data from sources with different frequencies to provide uniform information
- Applied a multiple logistic regression model using SciKit-Learn in Python to determine when wheelchair falls might occur based on generated data

Grasp Lab @ UPenn **June 2017 - August 2017**
Robotics Research Intern

- Performed data analysis of turbulence for fleets of drones and applied black box machine learning models to estimate proximity
- Wrote Vicon motion capture system user guide for entire lab and debugging documentation and experimented with optimal retroreflective marker placement
- Constructed 3D data matrix to represent topography of of areas in Europe and identify fault lines

PROJECTS

Vision-based PPE Validation — 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 to physically show results.

Autonomous Early-Collision Detection System — github.com/abehara2/RideSafe
Implemented Single Shot Detector in Python and OpenCV for classification and localization of pedestrians, vehicles, and road signs. Built depth perception and distance calculation system to accurately identify if objects are within a set distance from the mounted camera spot. Building and training custom UNet with Tensorflow and Keras for real-time semantic segmentation to more accurately calculate distance and localize objects and regions of interest.

Fatemaker — 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, MongoDB Node.js, Fuse.js, and Express.js. Worked vertically in tech stack on a team with other software developers and product designers to build the cbest possible product.

SKILLS

Software & Tools: C++, Python, Java, Javascript, Matlab, OpenCV, Tensorflow, Keras, ROS, Gazebo, React, Node.js, MongoDB, SciKit-Learn
Modeling and Analysis: CREO Parametric, Solidworks, Inventor, Fusion 360, APriori, Cura, Vicon

EXTRA-CIRRUCULARS AND AWARDS

Co-founder and VP of Neurotech @ UIUC: Machine learning and technical consulting for Fortune 500 companies

First Place @ Autodesk 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