

PUSHYAMI KAVETI

43 BOYNTON ST, JAMAICA PLAIN, MA 02130
(914) 886-3547 * KAVETI.P@HUSKY.NEU.EDU * HTTP://PUSHYAMIKAVETI.GITHUB.IO

EDUCATION

Northeastern University

Ph.D Candidate in Robotics (GPA 3.83)

Boston, MA
Sep 2016 - Present

University of Florida

M.S., Computer Engineering (GPA 3.57)

Gainesville, FL
Aug 2012 - May 2014

Jawaharlal Nehru Technological University

B.Tech., Computer Science and Engineering (80.04%)

Anantapur, India
Sep 2007 - May 2011

RESEARCH AND WORK EXPERIENCE

Northeastern University Field Robotics Laboratory

Graduate Research Assistant under Dr. Hanumant Singh

Boston, MA
Sep 2016 - Present

- Ph.D research focusing on achieving **robust, large scale** robot perception. I am currently working on using **plenoptic/light-field** cameras to enable robot navigation & mapping in real-world environments, consisting of dynamic objects and occlusions.
- Exploring **infrared** cameras for navigating in low-light/ no-light scenarios, and how to co-relate between day & night data.
- Developed software stack for synchronized image capture in a multi-camera array at **high frame rate**.
- Large dataset collection and processing of highly dynamic and heavy traffic environments for **Autonomous Driving**.
- Explored **Machine Learning** for underwater imagery using Convolutional Neural Networks.
- **Robotic Platforms** : Experience working with **autonomous driving** platforms (Dataspeed Lincoln MKZ), **aerial vehicles** (DJI, Pixhawk, Intel Aero drone), **ground vehicles** (Warthog from Clearpath, Turtlebot)

College of Engineering at Northeastern university

Teaching Assistant,, Dr. Haumant Singh

Boston, MA
Jan- April 2020

- Developed materials for EECE 5554 - Robot sensing navigation course and mentored students during the semester with their projects.

Toyota Research Institute

Research Intern, Dr. Simon Stent

Cambridge, MA
June - August 2018

- Worked on understanding driver interruptibility to help design intelligent speech based interfaces in ADAS.
- Developed a synchronized and feature rich driver-centric dataset to explore driver-car interaction.
- Performed analysis on CAN bus data and developed a model to predict vehicle-driver communication timing that correlated with driver responses.

Florida Institute for Human and Machine Cognition (IHMC)

Research Intern, Darpa Robotics Challenge, Dr. Jerry Pratt

Pensacola, FL
June - August 2014

- Integration of **Multisense SL** sensor from Carnegie Robotics into ihmc's user interface. Validating and debugging the firmware, URDF model and the API.
- Worked on implementation and visualization of the octree occupancy map of the world using point cloud data obtained from the **LIDAR**.
- Developed test cases for the ihmc code base to improve code coverage and reduce bugs.

Research Intern, Darpa Robotics Challenge trials, Dr. Jerry Pratt

August - December 2013

- Developed state machine based high-level controller performing pre-defined behaviors for “Atlas”, a humanoid manufactured by Boston Dynamics using low-level API
- Integrated Black fly fish-eye cameras including developing drivers, ros services and dynamic reconfigure of parameters in **ROS**, video subscribing and compression, and user interface development.
- Implemented **RANSAC** for fitting planes onto the LIDAR data to find the orientation of terrain to be used for placing the virtual footsteps in the user interface.
- Developed a producer/ consumer based software model for sending the planned footsteps over network from robot to the user interface.

PUSHYAMI KAVETI

43 BOYNTON ST, JAMAICA PLAIN, MA 02130
(914) 886-3547 * KAVETI.P@HUSKY.NEU.EDU * HTTP://PUSHYAMIKAVETI.GITHUB.IO

Alces Technology Ltd
Computer Vision Engineer / Software Developer

Park city, UT
October 2014 – May 2016

- Registration of multi view point clouds obtained from Alces **Structured Light system** using point cloud library (PCL) and generate full 3D mesh.
- Developed **Stereo Calibration** routine for Alces structured light system which consists of a camera and a laser projector to obtain the projection matrix and reconstruct 3D point clouds.
- Developed block addressable phase unwrapping and camera alignment technique for calibration of the Alces structured light system under the guidance of Dr. David Bloom.
- Software development for **point cloud** processing, exporting to various file formats like .obj, .pts etc., and visualization using PCL and OpenGL. Developed first person navigation ability into the Alces' 3D renderer.
- Collaborated in setting up tools like Jira, Git, confluence for efficient project and software management.

PUBLICATIONS

- **Kaveti, P., & Singh, H.** (2020). A Light Field Front-end for Robust SLAM in Dynamic Environments.
- **ROS Rescue: A fault tolerance system for Robot Operating System, P Kaveti, H Singh,** Springer Book on ROS Volume 5, 2020.
- **Is Now A Good Time?: An Empirical Study of Vehicle-Driver Communication Timing,** R Semmens, N Martelaro, **P Kaveti, S Stent, W Ju** - Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems.
- **Kaveti, P., & Singh, H.** (2018). Towards Automated Fish Detection Using Convolutional Neural Networks. 2018 OCEANS - MTS/IEEE Kobe Techno-Oceans (OTO), 1-6.
- **Johnson, Matthew, et al.** "Team IHMC's Lessons Learned from the DARPA Robotics Challenge Trials." Journal of Field Robotics 32.2 (2015): 192-208.

SELECTED PROJECTS

Light fields for extracting static features

- Custom built and collected light field data from a multi-camera array.
- Used semantic segmentation and depth maps to camouflage dynamic objects and extract only static portions of the image. The extracted static features can be input for visual odometry to deal with dynamic scenes. This work is submitted to ICRA 2021 titled "A Light Field Front-end for Robust SLAM in Dynamic Environments".

Underwater species detection

- Detection of fish and other species in underwater imagery by performing color-correction and training a single shot detection convolutional neural network. This work has been accepted at OCEANS'18 MTS/IEEE.
- Proposed an automated ground truth labeling pipeline for generating underwater datasets using partially trained neural network making preliminary predictions and humans-in-loop to correct for the labels. This work is in the process of submission to Journal of Ocean Engineering.

ROS Rescue: A fault tolerance in Robot Operating System

- Developed a failure detection and recovery mechanism for master node in Robot Operating System via logging the metadata.
- Showed that our implementation is light-weight when compared to other proposed solutions. This work is submitted to Springer Book on ROS 2020, Volume 5.

TECHNICAL SKILLS

Languages: python, C++, C, cuda, java, bash

Sensors: LIDAR, Cameras, GPS, IMU, Kinect, ZED, intel realsense

Libraries: opencv, ros, lcm, tensorflow, Mavlink, Matlab, mavros, PCL

Platforms: Linux, Nvidia jetson, Arduino, pixhawk

Development & Build Tools: Jupyter notebook, docker, anaconda, Eclipse, QT, git, cmake.

ACADEMIC ACHIEVEMENTS

- Recipient of **Academic achievement** award, University of Florida, 2012-2014.
- Participated in the **Darpa Robotics Challenge** as part of team IHMC robotics and came **second** in the competition.
- Won university level project competition for "USER AUTHENTICATION BASED ON KEYSTROKE DYNAMICS".