Yaadhav Raaj

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Objective

I am looking for an internship in the self-driving or autonomy core unit of a startup or company. I have 4 years of research and work experience in modeling and solving detection and tracking problems for various robotic platforms, such as Autonomous Underwater/Surface Vehicles, Industrial Robots and more recently, cars. I have brought most of my research into the real world, and they have already generated revenue for the various companies/startups that I worked in. I believe I can hit the ground running, and work with your team to make the next big impact in ground transportation a reality.

Education

Carnegie Mellon University – (Master of Science in Robotics) – *In Progress*   *Aug 19 – May 21*
- Coursework: Computer Vision, Path Planning, SLAM, Reinforcement Learning
- Research: Human and Car Pose Estimation, Steerable Light Curtains for Self-Driving Vehicle

National University of Singapore - (BEng. (Hons) in Computer Engineering)   *Aug 11 – Feb 16*
- Coursework: Analog and Digital Signal Processing, VLSI, Parallel Programming
- Research: Computer Vision and Robot Localization

Stanford University - SCPD   *Aug 13 - Aug 14*
- Gap year taken under NUS's Overseas College Programme
- Taken courses on Entrepreneurship including MS&E 271, 278 and one CS course CS149

Research/Work Experience

CMU Robotics Institute – (Graduate Student- Pittsburgh, PA)   *Aug 19 – May 21*
Advisor: Dr. Srinivas Narashiman (CMU)
- I am working on detection and tracking of pedestrians and vehicles for self-driving cars using a novel sensing
  technology called Steerable Light Curtains

CMU Robotics Institute - (Research Engineer - Pittsburgh, PA)   *Jan 18 – Mar 19*
Advisor: Dr. Yaser Sheikh (CMU)
- Developed the Multi-CPU/OpenCL and Windows/OSX ports, and Python API for the OpenPose Project
- Developed the Recurrent Spatio-Temporal Affinity Field (STAF) concept for real time multi-person tracking at 30 FPS on a single GPU, and real-time re-identification networks for person re-id
- Developing algorithms for real-time full body 3D tracking from single camera video sequences on GPU
- Maintain and Develop scripts for the Panoptic Studio
- STAF Algorithm was accepted to CVPR 2019 as Oral Paper
- Real time Hand/Body/Face algorithm accepted to ICCV 2019

TUM CREATE - (Robotics Engineer - Singapore)   *Jan 16 – Jan 18*
Advisor: Dr. Suraj Nair (TUM) and Dr. Alois Knoll (TUM)
- Worked on the Gude/ABB industrial robot platform, automating the palletization/depalletization of aviation cargo. This project has now spun off to a startup (SpeedCargo) with significant funding
- Was Lead Vision Engineer, Developed and deployed cargo measurement and tracking via point cloud optimization and mesh reconstruction
- System deployed at the world's best airport (Singapore Changi Airport)
- Measurement Algorithm was accepted to ACCV 2016

Bumblebee Robotics - (Undergraduate Research - Singapore)   *Jan 15 – Jan 17*
Advisor: Dr. Marcelo Ang (NUS) and Dr. Ng Teck Khim (NUS)
- Developed algorithms for localizing objects underwater, fusing Sonar, Camera, IMU and DVL sensors on the BBAUV 3.0, and BBASV 1.0. This project has now spun off to a startup (BeeX)
- Helped team win 2nd place at AUVSI RoboSub 2015 in San Diego, and 4th place at the AUVSI RobotX 2016 in Hawaii
- My Vision Fusion algorithm was accepted to IEEE Oceans 2016 and is patent pending

Publications

Real-Time Multi-Person Whole-Body Pose Estimation via Multi-Task Learning   *Sep 2019*
{ICCV 2019}
{Gines Hidalgo, **Yaadhav Raaj**, Haroon Idrees, Donglai Xiang, Hanbyul Joo, Tomas Simon, Yaser Sheikh}

Efficient Online Multi-Person 2D Pose Tracking with Recurrent Spatio-Temporal Affinity Fields   *Jun 2019*
{CVPR 2019 – *Oral*}
{**Yaadhav Raaj**, Haroon Idrees, Gines Hidalgo, Yaser Sheikh} [pdf] [video]

Adapting the Search Subspace of a Particle Filter using Geometric Constraints   *May 2017*
{Nikhil Somani, **Yaadhav Raaj**, Suraj Nair, and Alois Knoll} [pdf] [video]

Precise Measurement of Cargo Boxes for Gantry Robot Palletization in Large Scale Workspaces using Low-Cost RGB-D Sensors   *Nov 2016*
{13th Asian Conference on Computer Vision (ACCV2016) - Taipei, Taiwan - *Poster*}
{**Yaadhav Raaj**, Suraj Nair, and Alois Knoll} [doi] [pdf] [video]

3D Object Localization using Forward Looking Sonar (FLS) and Optical Camera via Particle Filter based Calibration and Fusion   *Sep 2016*
{IEEE Oceans 2016 - Monterey, California, USA - *Oral*}
{**Yaadhav Raaj**, Alex John, Tan Soon Jin} [doi] [pdf] [video]

Design And Implementation Of Bumblebee ASV 1.0 [pdf] [video]   *Jun 2016*
Design and Implementation Of Bumblebee AUV 3.0 [pdf] [video]
{Robonation Journal}{One of several authors}

Awards/Volunteer Work

Changi Aviation Challenge 2 Finalist - (Singapore)   *Jan 2017*
- Our company was one of the finalists in the Aviation Challenge, securing a 2 Million dollar grant [video]

AUVSI RobotX 2016 - (Honolulu, Hawaii)   *Dec 2016*
- Beat top teams around the world to win 4th place at the AUVSI RobotX 2016 [video]

AUVSI Robosub 2015 - (San Diego, CA)   *Aug 2015*
- Beat top teams from Cornell, Caltech to win 2nd place at the AUVSI Robosub 2015 [video]

Student Volunteer at SIGGRAPH 2015 - (Los Angeles, CA)   *Aug 2015*
- Volunteered at the 42nd International Conference on Computer Graphics (SIGGRAPH) LA

Volunteer Work with YMCA Singapore - (Nepal)   *Dec 2015*
- Volunteered with YMCA Singapore - Team Nirman, helping rebuild schools in Nepal after earthquake.

NUS iCreate App Challenge - (Singapore)   *Aug 2012*
- Won 4th prize at the iCreate App Developer Challenge hosted in my college. [video]

Developer Skills

Programming Languages:
Proficient: C/C++, CUDA, OpenCL, Python, MATLAB
Familiar: Objective-C, C#, Javascript, PHP, Bash

Software Tools:
Proficient: OpenCV, Caffe, Pytorch, PCL, ROS, QT Framework, Git
Familiar: RL, ABB Robot Studio, Beckhoff Twincat, 3D Studio MAX, Meshlab, EagleCAD

Hardware Platforms:
X86: Any AMD/NVIDIA/Intel system on Ubuntu/OSX/Windows
ARM/Other: NVIDIA TX2, Xilinx Zed FPGA, STM32F4, Atmega328P with Linux or Chibi OS

Others

Languages:
Proficient: English and Tamil
Familiar: Mandarin Chinese (spoken)

Interests:
Mainly water sports: kayaking, canoeing, dragonboating, scuba-diving. Part of college team in junior years
Music: play different instruments, including drums, electric guitar, and tabla