Kiron Mateti, Ph.D.

Versatile self-starter with a continuous learning mindset, passion for automation, strong background in robotics and perception, and track record of implementing perception algorithms on production hardware

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U.S. Citizen (Male)
linkedin profile

Summary of Qualifications

- 8 years experience developing detection and tracking algorithms using sensor data from visible/infrared/depth cameras and/or 2D/3D LiDAR sensors
- 5 years experience developing perception software for industrial automated guided vehicles in multi-threaded C++ (C++14) using Lean-Agile methodologies
- Strong academic background in probability, linear algebra, vehicle kinematics and dynamics, robotic coordinate frames, Kalman filters, and dynamic state estimation
- Experience using ROS and Python to rapid prototype algorithms and visualize point clouds using depth cameras and LIDARs to accelerate solutions to market

Experience

Lead Perception Engineer January 2021 - Present

John Bean Technologies, Automated Guided Vehicles, Chalfont, PA

- Responsible for full life cycle application development: sensor selection, algorithm prototyping, C++ implementation, deployment, and support and documentation
- Developed algorithms for object detection and tracking, feature-based guidance, and collision avoidance software using depth cameras and LIDARs
- Integrated third-party depth camera perception software running on Linux, using ROS, and RViz, and developed automatic extrinsic calibration methods

Research and Development Engineer January 2017 - December 2020

John Bean Technologies, Automated Guided Vehicles, Chalfont, PA

- Developed real-time automated guided vehicle control software using multithreaded C++ (C++11 and C++14) with TCP/IP socket communication to external sub-systems
- Part of a talented team developing in a rapid Lean-Agile type workflow with daily stand-ups using Git, JIRA, and Confluence
- Performed root cause analysis for vehicle error conditions, product placement accuracy, and operation throughput using Matlab and Python
- Modeled and simulated dynamics and control of forklift vehicles for lateral and longitudinal control and stability

Research Scientist June 2012 - January 2017

US Navy, Naval Surface Warfare Center (NSWC), Crane, IN

- Developed object tracking algorithms using Matlab, deployed on NVIDIA Jetson TK1 embedded hardware utilizing CUDA C/C++ and OpenCV
- Analyzed, debugged, modeled and simulated electro-optic and infrared sensor system gimbal dynamics, control systems, and target geolocation

Education

Ph.D. in Electrical Engineering — May 2012

Pennsylvania State University, University Park, PA

Dissertation Title: *Flapping Wing Mechanisms for Pico Air Vehicle Applications Using Piezoelectric Actuators* (pdf)

Candidacy Areas: State Space Control and Estimation, and Probablity Theory

- Modeled/simulated flapping wing mechanism displacement and aerodynamic lift forces in Matlab/Simulink and validated model using experimental results in air and in vacuum
- Measured large wing angular positions using high speed stroboscopic photography and image processing using Matlab, and small signal response using a laser vibrometer

B.S. in Electrical Engineering — June 2005

Wright State University, Dayton, OH

Specialization: Robotics and Control Systems, and Digital Signal Processing

Summary of Skills

Real-Time C/C++ Development (5 years):

- Implemented perception and control system algorithms in MS Visual Studio
- Developed offline unit test methods to use simulated or recorded sensor data to develop algorithms and evaluate performance
- Developed real-time embedded computer vision devices using NVIDIA Jetson TK1 to track on multiple spectrum video feeds using CUDA C/C++ in a Linux environment
- Strong knowledge of using OpenCV C++ to implement perception algorithms

Python (5 years):

- Experience with algorithm development and prototyping using symbolic math (sympy), image/video processing (OpenCV) and 3D point cloud manipulation (open3d and pcl)
- Passion for data analysis and visualization (numpy, pandas, and matplotlib) and web applications (dash and plotly)

Matlab/Simulink (over 15 years):

- Developed extensive custom libraries using Object-Oriented Matlab
- Expert in modeling and simulation, big-data analysis, prototyping computer vision/perception algorithms, and deploy GUI applications

Patents and Publications

- Lead inventor on Patent US 9,599,532, for wearable optical communication devices
- Lead inventor on Patent US 9,602,203, for vibration characterization methods for optics
- Co-inventor on Patent US 10,670,687, for night-vision goggle effectiveness measurement
- Published 13 articles in IEEE/ASME journals/conferences, (researchgate.net)