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Sean D. Matthews

ABOUT ME

I am a driven roboticist with over a decade of experience in providing solutions for autonomous robots traversing ground, sea, and air, in all of military, commercial, and educational settings. My technological focus has been with high-level algorithm implementation for robot perception and navigation, and as such, I have a broad familiarity with the bodies of knowledge and toolsets necessary to designing and implementing intelligent robotics software solutions.

My broad experience in forming autonomous robotics solutions, and working alongside the teams necessary to accomplish this, allows me to provide you with certain benefits:

- *Offer key design insights for robotic systems-* designing sensor suites, identifying common pitfalls, estimating effort to achieve your project goals, establishing effective software development processes
- *Build, mentor & lead teams-* recognizing skill sets necessary to your projects, providing technical guidance, and enabling team growth & performance
- *Evaluate applicability of incumbent technologies-* proof-of-concepts, mitigating project risk through exploratory spike tests
- *Algorithm implementation-* translating papers to code, porting existing implementations to your platform
- *System integration-* laying the pipework to connect all the pieces into a functioning whole, testing & debugging multi-disciplinary systems in physical & simulated environments

PROFICIENCIES

- C/C++, Python, Java
- Linux, Mac OS, Windows
- ROS (Robot Operating System)
- Algorithm implementation
- Sensor fusion
- Robot perception
- Motion planning
- Robotic manipulation
- GPU programming / CUDA
- Computer vision
- PX4 autopilot
- Cloud robotics
- Simulation & visualization
- AWS
- Machine learning
- Git / docker / CI

EDUCATION

University of Scranton, Scranton PA – *BS Computer Science / MS Software Eng.*

EXPERIENCE

Pensa Systems, Brooklyn NY / Austin TX – *Co-founder & Roboticist*
DECEMBER 2016 - PRESENT

- Led team through the hardware & software design of a production-ready autonomous drone
- Architected quadcopter autonomy stack & features- SLAM, waypoint following, obstacle detection & avoidance, voxel map utilization
- Proved out early-stage company tech for deep learning object recognition

Freelance Robotics Consultant, Brooklyn NY – *Self-Employed*
OCTOBER 2010 - PRESENT

- Developed algorithm for detection & tracking of on-road vehicles using sparse data from Velodyne lidar mounted on self-driving car
- Created iOS app for decentralized, local bluetooth communication
- Implemented GPU version of Histogram of Oriented Gradients (HOG) for real-time visual people detection from a moving vehicle

Goldman Sachs, New York NY – *Vice President*
MARCH 2015 - FEBRUARY 2016

- Implemented & deployed FIX protocol interface to Chicago Mercantile Exchange
- Developed power trading spread marking & extrapolation tool
- Added base metals trading capability to e-trading platform

Caterpillar, Pittsburgh PA – *Senior Software Engineer*
JULY 2012 - SEPTEMBER 2013

- Established software development procedures, a unified build environment, and tools to manage the code base of the development team
- Architected system to fuse raw and derived measurements from camera and radar
- Combined multiple streaming IP cameras into one live stream

RE2 Inc, Pittsburgh PA – *Senior Software Engineer*
DECEMBER 2011 - JULY 2012

- Developed & installed National Museum of American History exhibit- anthropomorphic robot competed against museum-goers in the “Simon” game
- Developed & installed Air and Space Museum exhibit- anthropomorphic robot autonomously picks up a space tool and plugs it into a receptacle, then giving the user control of the robot’s arms to do the same
- Developed autonomous grasp planning for 7-DOF Barrett arms

Blink Gear LLC, Pittsburgh PA – *Co-founder*
JUNE 2010 - DECEMBER 2012

- Blink Gear designed WiFi-enabled electronics for sensor I/O and RC control
- Manufactured & sold over 1000 units globally
- Devised messaging protocol & accompanying mobile apps

Applied Perception Inc, Pittsburgh PA – *Senior Software Engineer*
FEBRUARY 2008 - OCTOBER 2010

- Developed path planning algorithms for add-on to DARPA’s LAGR program
- Developed stereo vision object localization for fly-by-wire manipulation for field extraction of wounded warfighters
- Developed ultra-wideband radio leader following system for mobile robots
- Implemented GPS waypoint following, leader following, and obstacle avoidance features for Talon EOD robot and MAARS defense robot
- Developed room mapping feature with actuated scanning lidar from a small mobile robot

University of Florida, Gainesville FL – *Graduate Research Assistant*
JUNE 2006 - FEBRUARY 2008

- Incorporated IMU position estimations into a feed-forward order-weighted neural network for improved land mine classification & operator usability