BROOKLYN, NY
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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 mobile robots traversing ground, sea, and air, in all of military, commercial, and educational settings. My broad experience in forming autonomous robotics solutions, and working alongside the teams necessary to accomplish this, allows me to provide to you 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

- Algorithm implementation
- Sensor fusion
- Robot perception
- Motion planning
- Computer vision
- Systems engineering
- Simulation & visualization
- C/C++, Python, Java
- CUDA / GPU programming
- Linux, Mac OS, Windows
- ROS (Robot Operating System)
- PX4 autopilot
- AWS
- Git / Docker / CI

EXPERIENCE

Pensa Systems, Brooklyn NY / Austin TX – *Co-founder & Robotics Lead*

DECEMBER 2016 - PRESENT

- Led team through the hardware & software design of a production-ready autonomous drone & landing pad
- Architected quadcopter autonomy software stack & features- waypoint following, dynamic path planning, obstacle detection & avoidance, indoor space mapping, using redundant localization methods using visual odometry, lidar SLAM, and ultrawide-band time-of-flight triangulation
- Proved out early-stage company tech for deep learning object recognition & autonomous drone flight
- Aided the organization of live product demonstration at NRF conference consisting of almost 300 consecutive autonomous drone flights over 3 days in front of 37000 attendees

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

- Implemented template matching algorithm for detection & tracking of on-road vehicles using sparse data from Velodyne lidar mounted on a self-driving car
- Designed monocular camera solution for typing tutor to map fingers with typed keys
- Implemented GPU version of Histogram of Oriented Gradients (HOG) for real-time visual people detection from a moving, off-road vehicle
- Authored winning $150k phase 1 SBIR for smart energy meter technology

Goldman Sachs, New York NY — *Vice President, Commodities E-Trading*
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 and tools to manage team software
- Fused camera and radar data to speed person detection in areas-of-interest
- Combined 9 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, an anthropomorphic robot that competed against museum-goers in the “Simon” game
- Developed & installed National Air and Space Museum exhibit, an anthropomorphic robot that autonomously picks up a “space station tool” and plugs it into a receptacle, and then yielding control of the robot’s arms to a museum-goer to do the same
- Developed autonomous grasp planning for 7-DOF Barrett arms with custom 5-fingered hand attachment, using stereo & monocular vision combined with force torque & pressure sensors

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

- Implemented path planning algorithms (A*, RRT) 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 EKF for fusing GPS and IMU, waypoint following, and sonar obstacle avoidance features for Talon EOD robot and MAARS defense robot
- Developed room mapping feature with actuated Hokuyo scanning lidar from a mobile ground 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
- Won 1st place in the 2006 international Robosub competition for AUVs

EDUCATION

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