Brett Pennington

Software Engineer – Robotics, Controls, Motion Planning

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EXPERIENCE

Advanced Controls Engineer

Boston Dynamics, Boston, MA — July 2018 - Present

- Applied optimal control techniques for multi-objective and multi-bodied systems
- Implemented MPC/Planning for linear/non-linear systems
- Designed proprioceptive sensing algorithms for workspace compliance and improved balancing of floating base robots
- Introduced TDD and modular software practices for dynamic systems

Software Engineer – Motion Planning, Robotics & Controls

Automata Tech, London, UK — Apr 2017 - July 2018

- Built custom kinematics, controls & motion planning libraries in C and modern C++
- Designed collision detection systems in embedded MISRA compliant C with low bandwidth constrictions
- Introduced Agile practices: Grew a team from 5 individuals into 3 cross-functional teams with 15 members in 9 months

Software Engineer

Cubic Transportation Systems, London, UK — Apr 2016 - Apr 2017

- Maintained code running the London Transit (Oyster Card) environment along other global metropolitan transit systems (SF Clipper, new NYC Metrocard, Sydney Opal)
- Correlated high-speed, time-sensitive data streams in critical systems handling payments for +6 million users daily in less than 0.3 seconds each
- Delivered client-focused results quickly while adhering to sound development practices and refactoring a large and historic database along the way

Controls Research Engineer

University of Alabama, Tuscaloosa, AL — Jan 2011 - Dec 2015

- Designed multiple embedded systems in different environments to enhance testing ecosystem
- Programmed and modelled safety-critical high performance systems and built adaptive and dependable systems in critical testing environments
- Built diesel engine controls to advance sustainability and performance

Mechatronics Engineer Intern

Caterpillar, Inc., Peoria, IL — May 2015 - Aug 2015

- Developed controller designs for large power systems in C and MATLAB
- Optimized embedded controller improving engine start up time by 90% and reduced gas & diesel mixture stabilization time from roughly 120 seconds to 1.2 seconds

ENGINEERING SKILLS

Software Languages

- *Dream in:* Modern C++ and Python
- *No problem writing:* C, MATLAB, SIMULINK
- *Once upon a time I wrote:* C++98, SQL
- *Could stack-overflow my way through:* JS, JSX, R, Go, Ruby
- *Maybe one day:* Haskell, Rust

Scientific Computing

- Affine/Linear/Non-Linear Systems
- Numerical Optimization Algorithms and Frameworks
- High Speed Distributed Control

Domains

- Real-time embedded systems
- Web & desktop environments

Preferred Work Style

- Test-driven development
- SOLID principles
- SCRUM practices & agile methods

Control Theory & Design

- *Non-linear Systems:* Robotics control (optimal, passive, compliant) and fluid/thermodynamics
- *Linear Systems:* Optimal LQR control to simple PI controllers
- *State Estimation:* Optimal, functional, and stochastic state observers

Machine Learning

- Classification models with Ensemble, SVM, & Naïve Bayes
- Sequential Modelling with LSTMs and RNN-RBMs
- Interest in RL for robust control

Work Style

- Self-starter - never stop learning
- Collaboration and mentorship
- Experienced in team leadership and training

EDUCATION

Ph.D. Mechanical Engineering, University of Alabama

Jan 2011 - Dec 2015

Advanced Controls Systems, Optimal Control, and Computational Analysis

B.S. Mechanical Engineering, University of Alabama

Aug 2006 - Dec 2010

Thermodynamics, Physics, and Mechanical Systems

References available upon request