Clearpath Robotics
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Dear Hiring Manager,

I am an engineer interested in working at Clearpath Robotics. I'm excited about the possibilities for using autonomous robots to replace humans in dangerous or dull workplaces and I believe that Clearpath will be an important part of that revolution. Reading about your commitment to open source projects and knowing first-hand about your commitment to academic programs, I believe that Clearpath is taking the right approach to revolutionizing robotics. I have the technical skills to excel in a role as an Autonomy Engineer and I'd be excited to join you.

For the past two years, I've been a graduate student at the University of Waterloo building 3-D simulations of the golf swing for use in designing golf clubs. By building a model of the golfer and club using MapleSim and MATLAB on Linux, I was able to evaluate golf club design decisions without building and experimenting with physical golf clubs. To control the model, I took courses in multi-variate, adaptive, and optimal control to find a way to optimize the swing for different parameter sets. The final model was delivered along with concise documentation to an outside partner to be used as part of their evaluation process for new golf clubs.

As my fourth-year design project in 2011-2012, I use ROS to work on an autonomous robot for the NASA Sample Return Robot Challenge. My group's responsibility was to develop a Simultaneous Location and Mapping algorithm for a 6 degree of freedom environment without using GPS sensors. By combining wheel odometry, IMU measurements, and laser scan point clouds in a novel way, we were able to improve on existing techniques for locating the robot in its environment. The final algorithm incorporated a Kalman Filter, the Iterative Closest Point algorithm for aligning point clouds, and GraphSLAM for redistributing error in the estimated position. A Clearpath Husky robot was used as our platform for this competition and since that time, I've always thought of Clearpath as a place I would like to work.

I had many opportunities as part of the coop program at the University of Waterloo to demonstrate my skills in development. At Apple Inc. I designed and developed an internal application for testing location algorithms that included iOS, OS X, and server-side components using Cocoa, Objective-C, C++, and Python. This application was used to help develop a new Kalman Filter based algorithm for determining device locations. In the Vision and Image Processing Lab at uWaterloo I worked on MAGIC, a computer vision program written in C++ used for segmenting satellite images of sea-ice. I developed a new algorithm for this product that used a multi-level segmentation to classify large images. On my own, I've built a few smaller projects which can be found on my website at `http://ddajohnson.com/projects`.

I'm excited by the chance to work at Clearpath in a dynamic environment solving interesting problems with autonomous robots. I hope to hear from you soon.

Sincerely yours,

Daniel Johnson

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