Autonomous Walking with the Atlas Humanoid

Short description
The Institute for Human and Machine Cognition (IHMC) is participating in the DARPA Robotics challenge (DRC) and is looking for talented, motivated, and competitive new team members. The DRC is a competition for developing robots capable of assisting humans in responding to natural and man-made disasters. Team IHMC was the second place finisher in the DRC Trials and is now working on the final phase of the DRC. This involves getting the Boston Dynamics Atlas humanoid robot to perform a series of real world challenges such as driving a vehicle, removing debris, and drilling a hole into a wall [1].

Autonomous operation is an important aspect for the finals of the DRC. To achieve this goal, we are developing a set of behaviors that allow the robot to fulfill tasks without direct human guidance. In this project, we are aiming at achieving autonomous walking over rough terrain. The student will develop methods to automatically and adaptively plan a safe sequence of steps over previously unknown terrain. This includes choosing and adapting footholds based on an acquired map [2] and optimizing a collision free trajectory for the swing leg.

The research focus for this opportunity will involve controls, optimization, planning, perception, and programming as applied to human motion generation. There will be significant hand-on work directly with the hardware as well as work in simulation. We do all of our programming in Java, so having experience in object oriented programming is essential.

This project will be conducted at IHMC in Pensacola, Florida in an integrated exchange program that is part of a collaboration between the Autonomous Systems Lab and the biologically inspired robotics group at IHMC. We will only consider excellent students for this project that will be carefully selected.

Type Master’s thesis, Internship
Partner Florida Institute for Human and Machine Cognition (IHMC), http://robots.ihmuc.us
Time period 6 months, flexible starting date
Student(s)
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Key words
Legged Robotics, Humanoid, Foothold Planning, Autonomous Walking, DARPA Robotics Challenge