**[MS project, Mechatronics of a Humanoid Robot Nino](http://localhost:1313/project/projects_ms/)**

In my video and my main PhD studies (and the project during IHMC internship) are more about developments of QP-based controller design/trajectory optimizations, in this document I want to present my experience of building the bipedal robot system in my master’s studies, which is summarized in the following webpage:

<http://localhost:1313/project/projects_ms/>

During that moment, since the budge for bipedal system development is quite limited compared to the robot arm project, so except for the mechanism design, we also need to develop the control board by ourselves. As the self-developed circuits are less reliable than the industrial products, we established different integration tests to make sure the control board can sustain sufficient current so that it won’t break due to the induced peak current caused by stepping impact. Overall because we checked the designs carefully so there was no too much trouble to assemble the mechanism, while certain trouble-shoot/adjustments were still required for wiring and mounting the circuit boards. Since the control board contains the components for communication, sensor feedback, and motor control, so we also build the control program in C++ to make sure

The sampled code are available in :

<http://localhost:1313/project/projects_ms/>

[**MathWorks, Safe trajectory tracking using Sawyer**](http://localhost:1313/project/projects_intern/)

Another control I implemented though is not on bipedal robot, is the safe trajectory tracking on Sawyer robot from Rethink Robotics.  
<http://localhost:1313/project/projects_intern/>

Since the majority of the team members were busy for algorithm developments, code testing and documentation, or UI, interestingly they ask the intern to try out the Sawyer robot they purchased with the ROS functionalities in Robotics System Toolbox. My project was to implement an application to showcase the manipulator algorithms for potential toolbox users. Because Sawyer was promoted as the smart and collaborative robot, also the safe robot-human interaction is important for the industrial automation; those inspired me to implement the safe trajectory tracking on Sawyer robot.

In this project, starting from Simulation, I tested my implementation with MATLAB, Simulink/Simscape, and then I also deploy the code in C++ as a ROS node (exported from the Simulink) on the Sawyer robot. Since most of my previous experiences are position control with high stiffness, this opportunity also help me to what is the proper way and safe range to implement those interaction control. And this project later on was adapted as one of the demonstration presented in a company-wise annual event!