Road Map

Application: Cell Production System  
Basic Research:

* Snap-On Forces Modeling
* Sequencing Plan for Snap-On Assembly
* Classification of Successful/Failed Assemblies
* Prevention of Failure

Overview

* Cell production systems have assembly lines in which humans assemble many parts of a product along the conveyor line.

Robot Challenge

* Traditionally, robots can only do one task. So, if robots will replace humans in the traditional assembly line, then the robot must be able to do many operations.
* To do it must learn its motion
* Learn a plan how to do each task
* In particular, it must learn how to do snap-on assembly.
* AIST / Company have a joint study on how to do this.
* Collaboration is until next March.
* Need to show something by December.
* Currently, work is doing in simulation using **FINITE ELEMENT METHOD**

**Goal**

* To enable a robot to successfully carry SNAP-ON ASSEMBLIES
* To successfully simulate snap-on assemblies on OpenHRP
* To successfully carry out the demonstration
* Applications/Use:  
  To be extremely flexible. If easy/flexible to use, it could have an impact in factories, space construction, and cooperation with humans.

Next Step

* Try to construct an *assembly sequence.*
  + Previous attempts consist of creating a force contact map – but failed.
* New strategy considers characterizing the force profile for multiple cases.
  + Force data profiles should be characterized for many cases.
  + Force profiles should indicate which cases lead to successful assemblies and failed assemblies.
  + Develop a *method/function* to predict/anticipate online whether a trial will succeed or fail.
  + If it fails, it should update its path.

Challenges

* The Physics Engine used to model the world was designed for a human sized humanoid.
* The forces generated by snap-on assembly are too small for the finite-element method algorithm employed in the simulation.