Software – Small Group Discussion

Goals

- What are going to be the standards?
- Who is developing what (and when)?
- Generate answers and questions

Method: Small Group Discussion and Website

- Group 1 **Kris** (lead), Dmitry, Peter, Grey
  Rm. This room

- Group 2: **George** (lead), Yuan, Mike
  Rm. MEM Dept Main Office

- Group 3: **Matt** (lead), and Christopher
  Rm. Down the hall

Group 1 Kris (lead), Dmitry, Peter, Grey

1. Can using DART solve all the problems found when using ODE?

2. Can we combine our previous effort made on openHubo and the new effort made on DART?

3. How does DART deal with collision dynamics for an articulated body like Hubo?

4. Can we measure performance in the simulation accuracy between different simulators?

5. Can the code from HuboLab be imported into Hubo-Ach based controller?

6. How does DART deal with collision dynamics for an articulated body like Hubo?

7.Can we measure performance in the simulation accuracy between different simulators?

Group 2 George (lead), Yuan, Mike

8. Who will deal with the interface from Hubo-Ach, DART to each specific simulator tool? Each team plus the help of GT?

9. How fast is DART? (Assume something like i-7) Is DART parallelizable? Can we get IMU and force/torque data from DART? (Noise or other features would be good)

10. Does DART perform vision? How is the geometry formulated? (I.e. trimeshes, primitives?) Can we see collisions between complex trimeshes? Can we see a complex trimesh grasper grabbing another complex trimesh?

11. Desired controllers:
– Walking (specify foot step locations)
– Whole-body operational space control
– Leg-only static balancing

Group 3 Matt (lead), and Christopher

12. Absolute minimum shared code:
HUBO-ach:
– calibrate robot
– suggest gains for nominal acceleration, velocity
– sensor calibration – IMU bias and drift?
– add arbitrary offset to joints

13. Non-software: any way to speed up robot calibration?

14. Robust walking controller:
– footstep walker (ZMP)
– “joystick control” (dx, dy, dtheta) on top of footstep walker
How far out the branch do we share things?
– footstep planning?
– grasping/reaching?
– whole body control

Group 3 Matt (lead), and Christopher cont'd

15. What if all we share is hard drive space?

Perception: Christopher says we should just use vendor-provided API's: OpenNI, BumbleBee.

16. Could ACH be used to pass images between processes? Should we be using ACH to grab sensor data because of no copying overhead?

17. Perception: What degree of processing is required?
– Example: Kris wants to tag horizontal surfaces, stringers, and rugs
– Matt wants to find doors and handles
– Valve is not hard to characterize, but small and depends on clutter around nearby

18. Is it possible to make a "master point cloud"? Chris: No. Different FOV's, rates, etc. But we can get them all in a a single coordinate frame (level body frame?)

19. Can we make some simple simulation benchmarks? What are the simplest tests that can show that one simulator is better than another?

20. Can Kris and Dmitry talk more about what's deficient with Gazebo/OpenRAVE/OpenHUBO for their tasks specifically?
We all know simulation never repeats from sim to real robot. Why simulate at all?