Summer 2014

Project FrankNarm

Purpose:

To combine 2 lesser DOF robot arms and make a 7 DOF arm. This arm would be able to be controlled with multiple game controllers and have two control modes: Joint and Inverse Kinematics.

Why it worked:

* Good education tool for an introduction to robotics.
* Combining the two barely working robot arms worked well. Using lesser DOF arms then what NASA uses is not useful for our research.
* Joint control worked well. The Xbox controller seemed to be a pretty good configuration for a 7 DOF.
* This was a cheap platform that had a lot of customization options.

Why it didn’t work:

* Servos were erratic which caused the arm to flail.
* Robot suffers from inconsistent power. Voltage would spike and drop causing us to temporarily lose control of the servos.
* Inverse Kinematics proved to be too difficult for an intern to manage. IK performed erratically. It did work but not well.
* The arm could not lift itself due to weak servos. Springs were installed to help alleviate the problem but was not a perfect solution
* Robot joints constantly were coming loose. A lot of maintenance was required to keep the arm running consistently
* Servos did not have position feedback which made it hard to track the robot’s motion.
* Occasionally the robot would get stuck in a position and the servos would have to be recalibrated
* Sometimes when the robot was struggling to go to position it needed literally a good hard slap to make it move.

Conclusion:

FrankNarm was a great education tool for a classroom environment to learn the rigors of robot design. It was not very useful to our research this summer because of the maintenance required to keep it performing consistently. IK was too difficult a task to get to work on this platform although joint control worked effectively. The Xbox controller performs very well in joint control. It is recommended to scrap the project and research a better solution for cheap kits for outreach and evaluation.