Motivation

* This project is to develop an algorithm that combines the visual and actuator systems of the Baxter robot with a solution scheme. Demonstrate the capabilities and flexibility of the Baxter Research Robot and its related platform. We will explore the ability of the Baxter robot to perform tasks that are relatively difficult.
* Currently research has been done to develop an algorithm to solve a Rubik’s cube using the Baxter robot, but the solution requires the use of external hardware such as scanners. I hope to eliminate the use of external hardware and focus solely on the Baxter platform.

Objectives

* To develop an algorithm that allows combination of the vision and servos of the Baxter robot to allow it to locate, pick up and then solve a Rubik’s cube while avoiding using major external hardware such as scanners or robotic manipulators.
* Algorithm must allow any combination of a Rubik’s cube to be solved.
* Product must not take an unreasonable amount of time solving Rubik’s cube, ideally the algorithm will find the minimum number of moves to complete the task.
* Must use the Baxter Research Robot, and preferable not require any external devices, to fully show the capabilities of such a robot.
* Ideally, checks will be put in place to ensure the Rubik’s cube is valid, and allow the algorithm to fill in any missing squares.
* Area is assumed to be well lit, allowing for ease of visual inspection

Significants

* Will allow us to use only the Baxter unit to perform complex tasks.
* Will show that complex tasks can be done by robots of this nature.
* Will show in industry that robots can be used for smart tasks while requiring less specific conditions, for example having to ensure every part is aligned and orientated in a predetermined way. This allows us to use robots for more manufacturing and assembly line applications.
* Shows that robots can be used in an intelligent way, making decisions and allowing them to perform more complex tasks. This reduces need for human operators, and can increase productivity and overall product quality.