

The Robotic Arm

David Brady

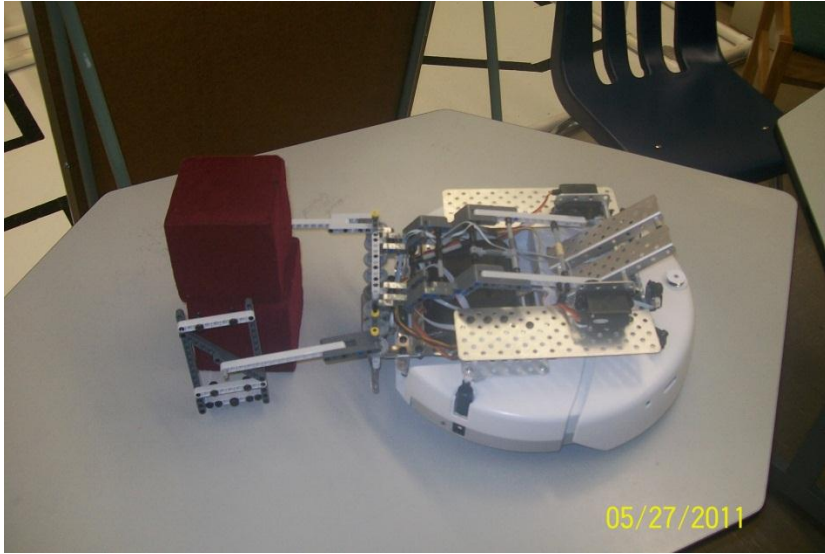
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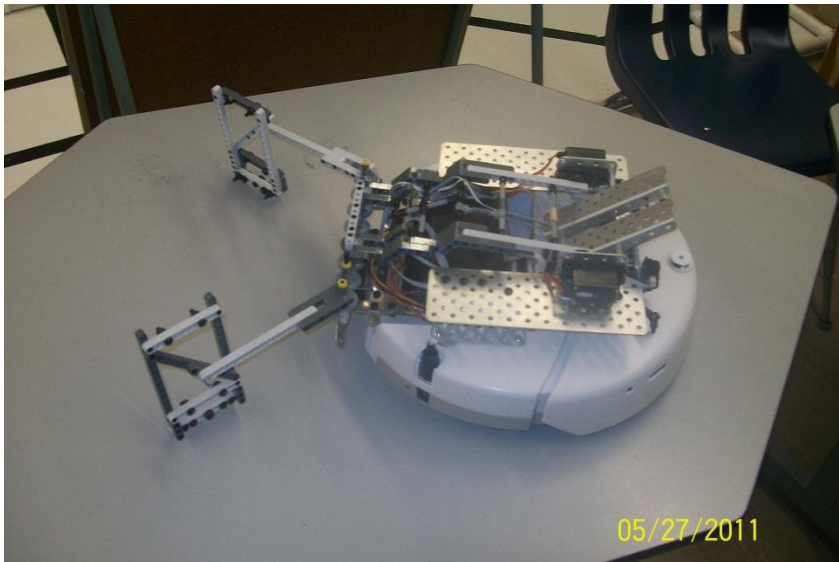
In order to maneuver objects, robots need effectors and end effectors. Effectors are like an arm for the robot. They can move and direct the end effector. The effector also connects the end effector to the robot itself, just as your arm does for your hand. Also depending on the size and the function of the end effector, effectors need to be durable and versatile enough to support it. For example the Canadarm on N.A.S.A.'s space station needs to be durable enough to withstand the conditions of space. On the other hand, the Haverhill Robotics team Large Robot just needs to be strong enough to support a couple of cotton blocks.

The end effectors in return need to be just as durable and versatile as the effector that supports them. End effectors can move, turn, and/or twist objects in any sort of way. In order to move like this however, the end effectors require gears, motors, and servos. Without these, the end effectors are not able to grab, move, or so much as even lift anything. Although end effectors can do all of this, they should be designed for one task only, so that it does one task and it does that one task well.

For our robots in Botball we used effectors and end effectors. On our big bot (Gladis) we had two effectors. They would clamp together onto the red blocks (radio towers) and then using the end effectors, they would flip the blocks over Gladis and place the blocks over in the times two area.



(GLaDOS holding radio towers with effectors and end effectors.)

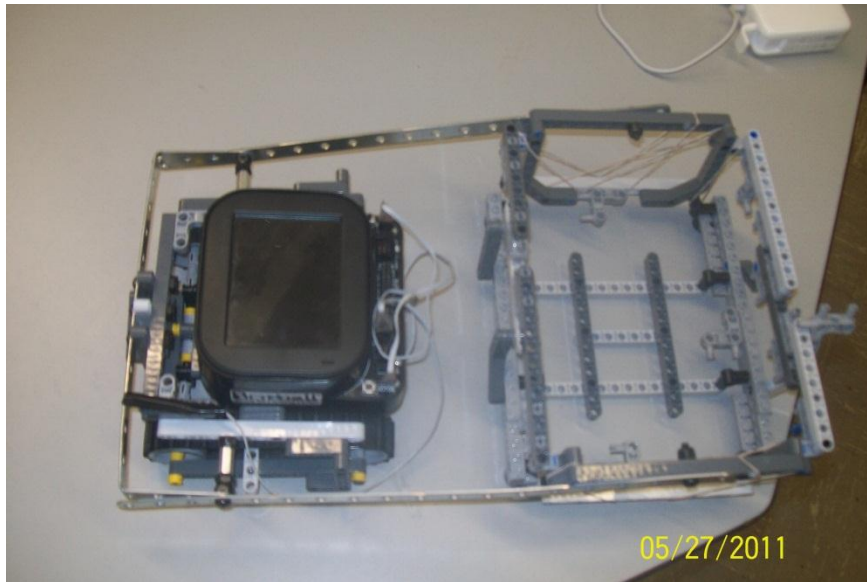


(GLaDOS arms extended outward.)

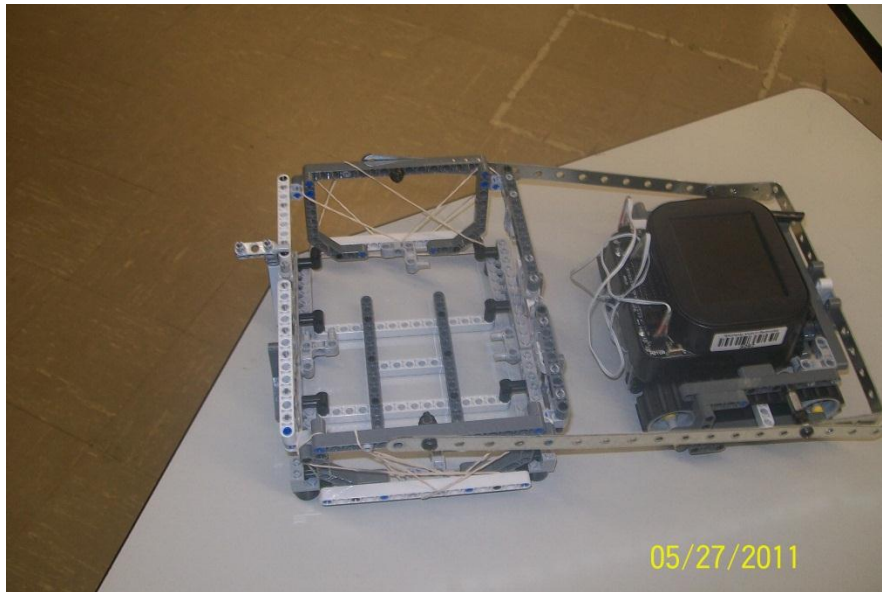


(GLaDOS condensed into smaller size.)

Our small bot (companion cube) had two effectors connected to a basket which was the end effector. The basket would push the blocks out of the way and collect the ping pong balls (biofuels) and then pour the biofuel into the 5 point bio fuel area.



(A picture of Companion Cube taken from the right angle.)



(A picture of Companion Cube taken from the left side.)

Another team at the New England regionals had an effector and end effector that worked like a fork lift and it would stack the blocks (radio towers) on top of each other. This strategy worked every time and that qualified them for the global conference in California.

People use effectors and end effectors for N.A.S.A. uses effectors and end effectors on one of their satellite station. It is called the Canadian Space Arm. The CSA can move in any direction. N.A.S.A. is currently using the second model of the CSA on the space station ("Satellites"). At the OAK ridge National Laboratory they are working in a robot that can "blast" out in grained substances from walls using jet propulsion tanks. It is called a linear scarifying end-effector. Oak ridge is using this robot to clean the more unsanitary areas of their facility (Fitzgerald, Falter, and Depew). Two college level students and a professor designed a robot that can pick up various house hold objects such as a phone or a TV remote. The interesting thing is they did using a Create which is exactly what our teams use for the larger robots in Bot Ball (Xu, Deyle, and Kemp).

In conclusion effectors and end effectors are very useful in robotics. They are so important that N.A.S.A. uses them on their space station. This arm is used to Effectors and end effectors are now being used to clean science labs. They can also be used for smaller projects, such as our Botball competition. We use them every year to achieve on single goal in the game. And that is what effectors and end effectors are for to perform one task and to do it well.

References

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