Low-Cost Reconfigurable Modular Robots

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Low-Cost Reconfigurable Modular Robots

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Abstract: An emerging topic in science today is modular technology. Modular robots provide a wide range of uses in many different areas. Industrial robots assemble the things we use every day, and some mobility robots help navigate and explore rough terrain. Applying the modular aspect on the robot allows for even more flexibility in use.

The focus of this project is to design a modular robot based on movement with the purpose to help educate and inform. This robot could be used in future robotics courses as a teaching tool for future engineers in an undergraduate or graduate program. These robots can come in different forms involving several small modules attached together to form a working and moving robot. This type of design requires not only a mechanical flow between modules but also a steady electronic communication that gives modules the information they need in order to move in the correct manner. The system will be measured by the ability to be reprogrammed, it should have its own power supply so movement is not restricted, this power supply must be rechargeable, the modules should be interchanged easily, and be able to move in a variety of ways.

Through a design decision matrix it was chosen that the modules casing should be made from 3D printed plastic. Using the 3D printers in the engineering department, several trial casings have been created from team created SolidWorks drawings. This prominent aspect of our design has allowed for low-cost and fast creation of trial pieces that have greatly aided in revisions toward a working design.

As of the beginning of March, the group is working to assemble the first prototype, which will be a single module used to test the two internal motors and wireless capabilities. Once the design is confirmed to work for a single module others will be created and combined together to create different configurations, each of which will need to be programmed for a specific type of movement. The current goal is to have five identical modules, which should allow for the creation of unique configurations.