Using Onshape to design Smart Motors

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Abstract

Smart Motors is a low-cost, trainable robotic system that aims to lower the barriers of entry into robotics. There are many kits in the market that aim to teach robotics to children and have enabled increased integration of educational robotics into the classrooms. However, many barriers like equitable access still exist that emerge from high cost, high barriers to entry that have limited widespread adoption. We have created an open sourced robotics education platform that will enable teachers and students to build their own robotics kits and customize it. For the creation of the hardware we have extensively utilized the cloud based CAD software called Onshape. Onshape has enabled our team to work collaboratively to implement features that enhance the user experience. The assembly feature lets us quickly test how well our parts fit with the PCB and make changes in real time. The parts designed on Onshape can be 3D printed and laser cut for assembly. Once we finalize the designs we will make them publicly available for the users to download and print, as well as modify according to their need. This democratization of technology will enable access to robotics education.

Introduction to Smart Motors

- Smart Motors are robotic kits developed at the Center for Engineering Education and Outreach. Tufts University to lower the barriers of entry to robotics for teachers and students in elementary and middle schools.
- 1. Smart Motors are pre-programmed trainable motors that can be trained to respond to different sensor inputs.
- 2. By eliminating the need of a computer and extensive programming and hardware knowledge we want to make it easier for the teachers and students to get comfortable with use of technology in classrooms.
- Allows different types of activities and affords solution diversity in a classroom.









Fig 1 : Demonstrating the workings of Smart Motors



Fig 2 : Earlier prototypes started from using cardboards to 3D printed parts

