

For this project, the group must build a small robot that will push another robot out of a circular rink. This project will include power supply design, analog design, signals and systems, mechanical design, and embedded programming.

## System Requirements

1. **Customer Requirement: The robot should be able to find and push an object.**  
Engineering Requirement: At least 9 out of 10 times, the system can successfully push out an object out of the rink without human intervention. The size of the test object is the maximum size of mini-sumo robot according to this link:  
[Regulation Link](#)
2. **Customer Requirement: The robot should be debuggable.**  
Engineering Requirement: The development team will be able to read sensor values of each sensor (navigation, wheel encoders, battery sensors, and other sensors) while the robot is competing in a match. This may be done by 7-segment displays on top of the robot, speakers that emit a tone related to a sensor value, or via a computer terminal over a wireless connection. Only one sensor is required to be displayed at a time.
3. **Customer Requirement: The robot is heavy enough to be competitive at mini-sumo.**  
Engineering Requirement: The robot must weigh at least 95% of the maximum robot weight (500 grams for the mini-sumo robot).
4. **Customer Requirement: The robot has reasonable battery life.**  
Engineering Requirement: The system will move for at least 15 continuous minutes on a single charge.
5. **Customer Requirement: The robot looks aesthetically pleasing.**  
Engineering Requirement: Wiring must be grouped with split loom or other wiring organization material. Wiring will be routed through zip ties secured to the chassis. No cardboard or tape will be visible on the final project.
6. **Additional Customer Requirement: The robot needs to find and recognize its opponent very fast.**  
Engineering Requirement: Once the object enters the detection field of the robot, the robot can quickly turn and move towards objects. It needs to be recognized within a maximum of 2 seconds.
7. **Additional Customer Requirement: The robot needs to prompt the information of the game.**  
Engineering Requirement: The robot can judge the outcome of the game, when the robot pushes its opponent out of the ring, the motor of the robot should stop quickly, and the LCD will display a win. The entire process should be complete within 1 second of the match's end.