System Requirements

1. **Customer Requirement:** The robot should be able to find and connect to its charger at close distances.
   Engineering Requirement: At least 9 out of 10 times, the system can successfully navigate and connect to the charger without human intervention when placed at least 2 feet away.
2. **Customer Requirement:** The robot should be able to find and connect to its charger at long distances.
   Engineering Requirement: At least 2 out of 5 times, the system can successfully navigate and connect to the charger without human intervention when placed at least 20 feet away.
3. **Customer Requirement:** The robot can navigate on multiple surfaces.
   Engineering Requirement: The system can travel across tile, carpet, and concrete floors with no more than 10% difference in speed between all surfaces.
4. **Customer Requirement:** The robot has reasonable battery life.
   Engineering Requirement: The system will move for at least 10 continuous minutes on a single charge.
5. **Customer Requirement:** The robot looks aesthetically pleasing.
   Engineering Requirement: At least 9 out of 10 people agree that the robot is as aesthetically pleasing than 4 other commercial robots from the market.
6. **Customer Requirement:** The robot should display its current battery level at all times. It should also display a message when the battery is low.
   Engineering Requirement: An LCD display will continually display the battery level (in percentage) of the robot. Once the battery is at or below 15%, a low battery message will be printed on the LCD.
7. **Customer Requirement:** The robot should be able to continuously drive around a room without getting stuck. When the battery gets low it should navigate back to the charger.
   Engineering Requirement: When the robot is placed in a flat room it should not get stuck while autonomously driving for a minimum of 8 out of 10 trials. Once the battery is at or below 15%, it should navigate back to the charger. At least 6 out of 10 times, the robot will successfully navigate back to the charging station from wherever it is in the room, and initiate charging.