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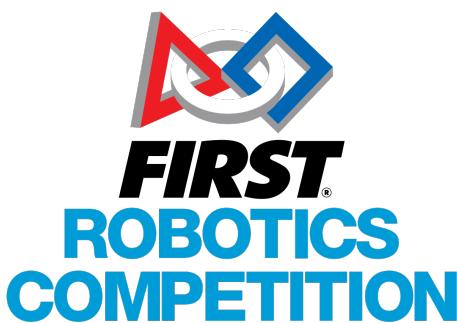
FIRST Robotics Competition

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Barnes & Noble Robotics Fair

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FIRST Robotics Competition



Competition Format

Every January FRC releases the theme of the competition through YouTube, then immediately begins the building period of 6 weeks. After the building period, the mechanical development of robot completely stops, but no restrictions on software development.

Competition Theme: Aerial Assist

Within 7.5m x 16.5m field, 2min 30sec game is played with two allies of 3 teams (6 robots total). Each ally is given a 60cm diameter yoga ball. The score can be gained as follow. Higher scoring ally wins the game.

- Points gained on autonomous control will be double (first 10sec)
- 10pts for making a goal into a frame 3m above the ground
- 1pt for making a goal into a frame on the ground

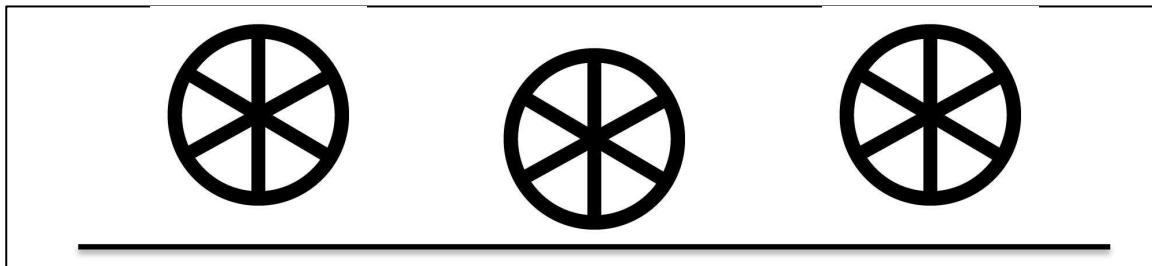
Extra points added on goal by following assists

- 10pts for passing (limit of 2 passes per goal)
- 10pts for throwing the ball over the truss located in the middle of field, 2m above the ground
- 10pts, if caught in the air

Mechanical Building Process

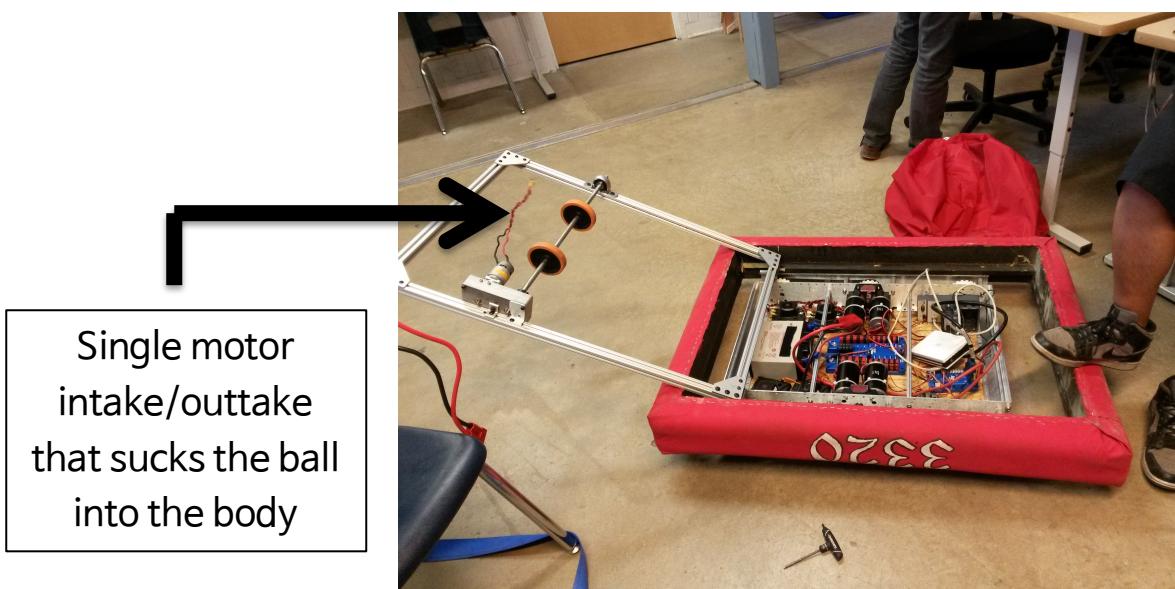
1. Mobility

Given the limited amount of game field, we focused on rapid acceleration, speed, and rotation of the robot. Giving the robot low central heavy chassis accomplished all our needs. Due to its lower center rubber wheels, rotation of the robot is efficient. Even knowing that the robot will wobble, quick acceleration was our priority.



2. Ball Intake

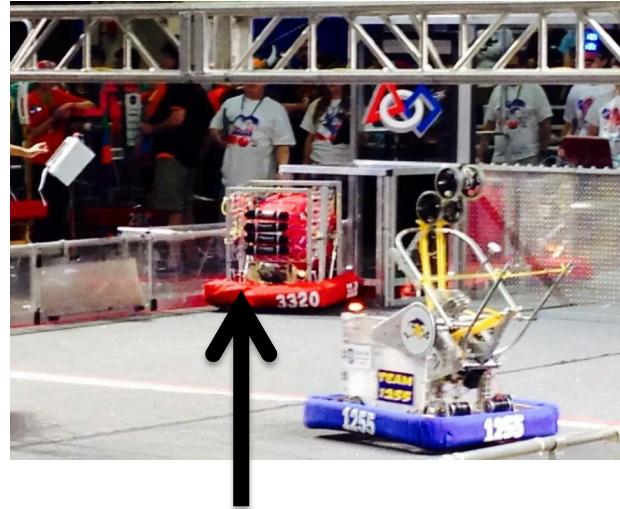
All points relate to intake/outtake of a ball, a crucial feature.



Prototype

3. Delivery

Covering the ball with four walls let the robot carry the ball safely.



Scoring 11pts after a pass

4. Catch

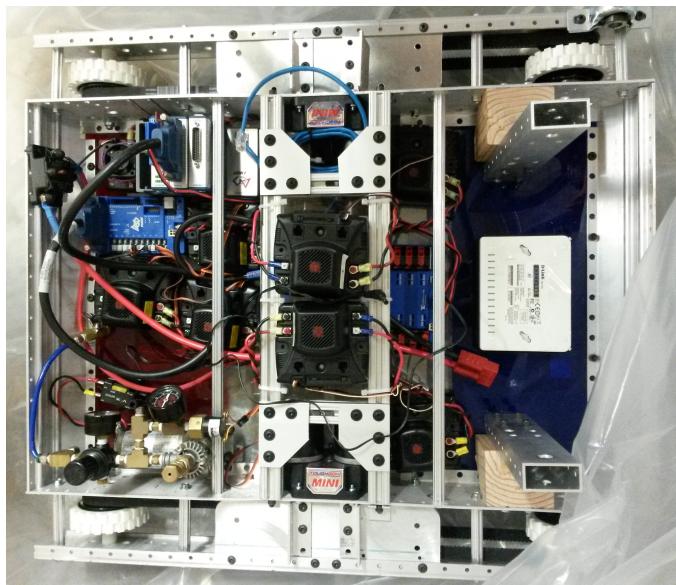
Four walls open and close using pneumatic cylinders. They allow the robot to gain large surface to catch the ball in the air quickly and precisely.



Electricals Building Process

Location Selection of Electrical Parts

Locations of parts are selected by their safety and priority. Main consoles are located away from exterior to protect them, but the sensors are located externally to retrieve necessary information.



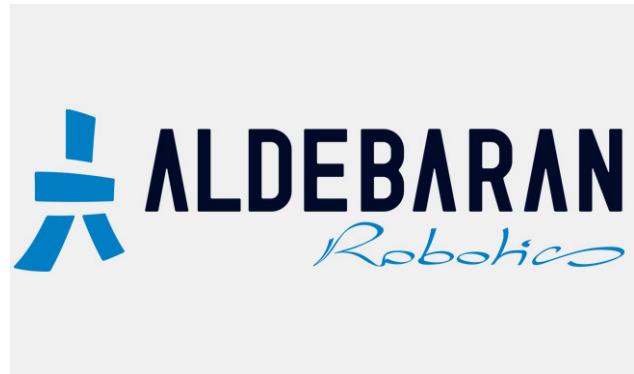
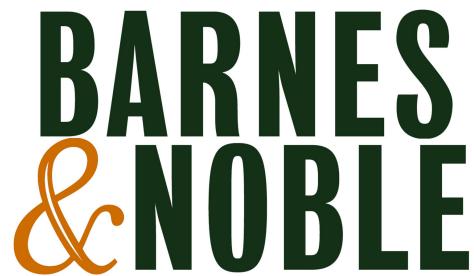
Priority Parts

- CPU
- Sensors
- Internet Router
- Battery, Amp, Breaker
- Power Distribution Panel
- Voltage Regulator Module

- ### Second Priority
- Motors
 - Air Compressor
 - Motor Controllers



Barnes & Noble Nao Robotics Fair

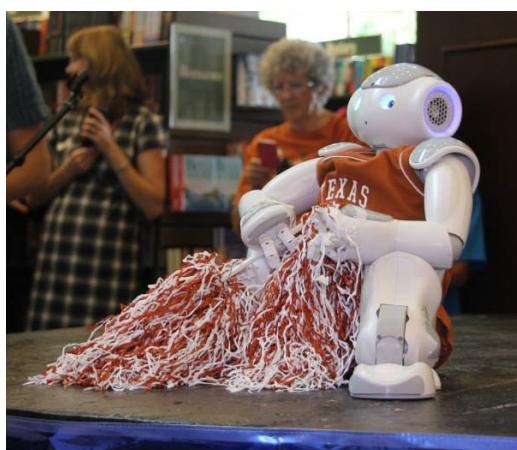


Robotic Fashion Show

Barnes & Noble hosted Robotics Fair sponsored by French humanoid robotics company Aldebaran Robotics. It was hosted to market their robotic products to American consumers.

Fashion Show Format

5 Nao robots and a software developer from Aldebaran were sponsored to the event for the developers to host a show. Programmers were selected by their experience with Nao robots.



Fashion Show Process

Programming Nao Robot

Using Python base program Choregraphe, Nao robots were developed using different sensors built in the robot. Autonomous programming was developed to perform various movements performed on the stage to fit each fashion theme.



Process of compiling
new code and clothes
in queue
(left)

Final review of
program with
Aldebaran developer
Elad Inbar



Fashion Show Result

Attention from Media

Due to the success of the Robotics Fair, the fair was mentioned in different media forms such as, Robot Lab, Austin Short Film, and Portal of Robotics. Also each participating team was sponsored a Nao robot (Retail price \$9,000 USD).

