Sumo Bot Competition

5:30 P.M., March 7, 2017, Engineering Building room 224

Team 21

Rene Diyarza- Project ManagerDavid Feetterer- Budget LiaisonJose Villegas- Website DeveloperYousef Alghareeb- Client Contact

Project Description

Two robots compete in a head-to-head match following the basic system of traditional human sumo matches.

NAU is our primary sponsor financially and managerially

Showcase our skills obtained from the undergraduate program at NAU

Nanobot was dropped at the end of last semester

Bartending robot side project

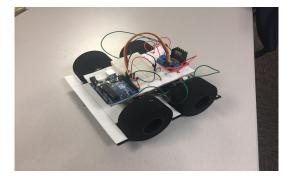
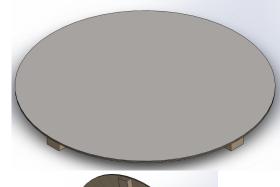






Figure 1. Bartending Pump

- Code for dispensing beverage
- Selected approved tubing for distribution of liquid
- Test the capabilities of the pumps
- Extended research on the liquids that will be used
- Adjust measurement to fit parts
- Customized chemically etched PCB



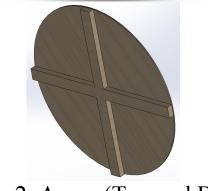


Figure 2. Arena (Top and Bottom)

- Acquired raw materials for base
- Change in material for top (steel)
- Must be compatible with magnets (downward force)
- Order and pick up top in Phoenix
- Material must be within dimensions
 - 154 cm diameter
 - Manufacturing with Machine Shop and Carpentry

- Compared parts specifications benefiting robot(s)
- Researched materials for shell (Weight vs strength etc.)
- Designing the base for components
- Green dot compound wheels for added traction
- Sabertooth speed control 2x5 replaced the arduino
- One battery can directly power motors and Sabertooth
- 2000mAh battery (1960 mAh in iphone 7)
- Standby mode can last for a long time



Figure 3. RC parts

- All parts except sensors were put together and the robot was tested.
- A basic code was written to move the robot forward.
- Research on code for sensors and placement.
- The team is considering changing the motors to increase speed.
- The autonomous robot shell will be built within the next two weeks.
- Design of experiment was tested based on velocity, center of gravity, and weight.

									N =	8	
									r =	2	
			c.o.g	weigh							
		velocity		t							
	1	x3	x2	x1	d2d3	d1d3	d1d2	d1d2d3	y1	y2	ybar
1	1	1	-1	-1	-1	-1	1	1	1.39	1.69	1.54
2	1	-1	-1	1	1	-1	-1	1	1.88	1.6	1.74
3	1	-1	-1	1	1	-1	-1	1	1.74	1.47	1.605
4	1	-1	-1	1	1	-1	-1	1	1.72	1.53	1.625
5	1	1	1	-1	1	-1	-1	-1	1.25	1.53	1.39
6	1	-1	-1	1	1	-1	-1	1	1.31	1.85	1.58
7	1	-1	1	1	-1	-1	1	-1	1.4	1.45	1.425
8	1	1	1	1	1	1	1	1	1.32	1.23	1.275
Effect											
S		-0.9425	-1	1.58	1.5625	-2.4075	-0.925	1.6375			
	1.522	-0.4712			0.7812	-1.2037	-0.462	0.8187			
ß's	5	5	-0.5	0.79	5	5	5	5			
										ybarba	
										r	1.5225

Variable Actual values x1 [,] kg x2 [,] x3 [,] m/s

Figure 4. Autonomous DOE

m =

n = Fraction

Manufacturing (Skills)

- All team members now have access to the machine shop.
- Coding Arduino
- 3D printed parts
- Use of shop for manufacturing shell/frame
- G-Code for all sides of aluminum frame
- Use of breadboard to test electronics
- Adjust code when robot is built for desired behavior
- Team Effort



Figure 5. Solidworks Autonomous Frame



Figure 6. RC and autonomous parts ${\ensuremath{\mathsf{DF}}}$

Schedule

Table 1. Gantt chart

project Name	Begin date	End date	Week 3 Mis/17	Week 4 1/22/17	Week 5 1/29/17	Week 6 26/17	Week 7 2/12/17	Week 8 2/19/17	Week 9 2/28/17	Week 1D Gr5/17	Week 11 3/12/17	Week 12 3/19/17	Week 13 3/28/17	Week 14 4/2/17	Week 15	Week 16 4/16/17	Week 17 4/23/17	Week 18 4/00/17
	1/16/17	1/16/17	01377	84417	162817	45(1)	<i>a</i> 1 <i>a</i> 11	21947	4.0011	Jane	3(12)12	31907	3/28/1/	4/217	40012	4(10(1)		4/27/17
-	1/17/17	1/23/17											_					
staff meeting	1/23/17	1/23/17																
-	1/30/17	1/30/17																
and a second second second second	2/6/17	2/6/17																
-	2/8/17	2/14/17																
Peer Eval 1	2/13/17	2/13/17																
staff meetings	2/20/17	2/21/17																
team meeting	2/27/17	2/27/17																
Midpoint Report due	2/13/17	2/27/17																
Midpoint Review Presentati	3/6/17	3/7/17																
spring break	3/13/17	3/17/17																
hardware review 2	3/16/17	3/21/17																
Peer Eval 2 due after	3/20/17	3/20/17																
team meeting	3/27/17	3/27/17																
staff meeting	4/3/17	4/3/17																
final poster due	4/3/17	4/10/17																
Final Product Testing Proof	4/3/17	4/18/17																
UGRADS presentations	4/24/17	4/28/17																
Operation/Assembly Manua.	4/13/17	4/24/17																
team meeting	5/1/17	5/1/17																
Final Report	4/12/17	5/1/17																
Peer Eval 3	5/1/17	5/1/17																
CAD package	4/17/17	5/1/17																

Budget

Table 2. Budget

Total/Robot	
R/C	229
Autonomous	180
Bartending	173
General	30
Anticipated	331
Subtotal (Currently)	612
Subtotal (w/ Anticipated Costs)	943
Remaining Balance(Currently)	888
Remaining Balance(w/ Anticipated Costs)	557

