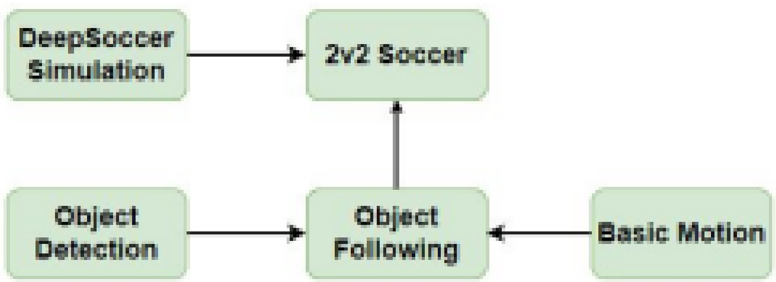
Overview

JetRacer Soccer
Jarod Marshel, Casey Rittenhouse, Arjun Simha, Mason Kang, K Gupta, Julie Ham, Cooper Ritter

Overall Concept:



Overall Project Deliverable	Progress
Basic Movement	In progress
Image recognition	In progress
New sensor implementation	Not started
Ball Striking	Not started
Co-op and Versus	Not started
Github with documentation	Not started
Summary and report	Not started

Project is On Schedule

Gantt Chart/Schedule

PROJECT TITLE: JetRacer Soccer League — COMPANY NAME: Lockheed Martin

PHASE ONE (WEEK 1 – WEEK 3), PHASE TWO (WEEK 4 – WEEK 6), PHASE THREE (WEEK 7 – WEEK 10); days M T W R F

WBS NUMBER	TASK TITLE	START DATE	DUE DATE	PCT OF TASK COMPLETE
1	**Project Conception and Initiation**			
1.1	Project Background and Context	1/8/24	1/19/24	100%
1.1.1	Project Objectives and Deliverables	1/8/24	1/19/24	100%
2	**Project Definition and Planning**			
2.1	Scope and Goal Setting	1/10/24	1/27/24	100%
2.2	Budget	1/10/24	1/20/24	100%
3	**PHASE 1**			
3.1	Research JetRacer	1/10/24	1/27/24	100%
3.2	Initial Hardware	1/15/24	1/31/24	100%
3.3	Basic Motion	1/15/24	1/31/24	80%
3.4	Image Recognition	1/15/24	1/31/24	0%
4	**PHASE 2**			
4.1	Sensor Trade Study	2/1/24	2/12/24	0%
4.2	Preliminary Design Review	2/9/24	2/19/24	0%
4.3	New Sensor Implementation	2/16/24	3/7/24	0%

Short-Term

JetRacer Soccer
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Previous Meeting Action Items:

Item	Description	Owner	Target Date	Status
1	Get familiar with car and previous years' work	Everyone	Jan 22	In progress
2	Move to Sharepoint	Arjun	Jan 19	Done
3	Kanban & Gantt Chart	Julie	Jan 22	Done
4	Car CAD Models	Cooper	Feb 12	In progress
5	Fill out inventory form – initial inventory	Jarod, Arjun, Casey, Julie	Jan 22	Done
6	Reach out to stakeholders and establish weekly meetings	Arjun	Jan 19	Done
7	Unity soccer simulation training	Casey	Jan 31	In progress

Biweekly Action Items:

Item	Description	Owner	Target Date	Status
1	Get all cars working with manual movement	Everyone	Feb 9	In progress
2	Move at least 1 car autonomously	Everyone	Jan 31	In progress
3	Redo hardware attachment to cars	Everyone	Feb 12	In progress
4	Demonstrate image processing	Everyone	Jan 31	In progress
5	Start working on Unity AI model to play soccer	Everyone	Jan 31	Not started

Significant Roadblocks/ Non-developing Items:

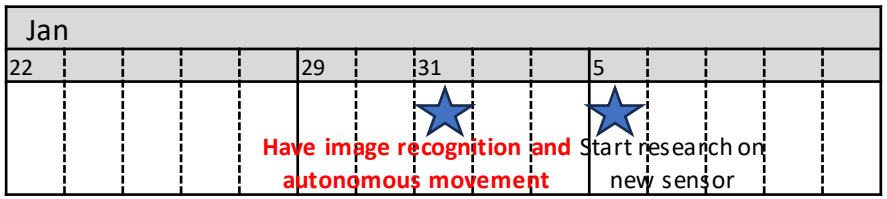
- Not all cars move forwards/backwards or can be controlled
- Documentation and diagrams from previous years are hard to figure out

Budget:

Total Proposed	Plan to Date	Used to Date	Used Vs Plan
$3500 USD	$0 USD	$0 USD	+/-$0 USD

Request for teaching staff:

Short Term Schedule:



Detail

	A	B	C	D	E	F	G	H	I	J
1	Team Members:	Team Lead: Jarod Marshel (jarodmar@uw.edu) Budget Manager: Casey Rittenhouse (caseyrit@uw.edu) Point of Contact: Arjun Simha (arjunvs@uw.edu) Mason Kang (masonry1@uw.edu) K Gupta (kshitijg@uw.edu) Julie Ham (jham2417@uw.edu) Cooper Ritter (ritter4x@uw.edu)			Instructions: Insert new rows at bottom of week >> copy last row with entries >> paste into new rows >> fill in appropriate information. Hover over cells if information is too long to view Dates and information can change everyweek on meeting with NN					
2	Not Started	In progress	Complete	2 - High	3 - Med	1 - Critical				
3	Status	Priority	Task #	People	Goal Date	Last Update	Task	Task Response / Deliverable	Notes	Milestone/Goal
4	Current Week --		Week 3							
5	Complete	2 - High	3	ALL	1/18/2024	1/18/2024	Contact industry sponsor and faculty mentor to set up weekly meet	Meetings: industry Mon 1p, faculty Mon 1:30p		
6	Complete	2 - High	3	ALL	1/18/2024	1/18/2024	Contact Dalton for laptop password.	Password and laptop work		
7	Complete	2 - High	3	ALL	1/22/2024		Fill out inventory sheet			
8	In progress	2 - High	3	ALL	1/22/2024		Figure out tasks.			
9	In progress	2 - High	3	ALL	1/22/2024		Review previous years Githubs to become familiar with project.			
10	Not Started	2 - High	3	ALL	1/22/2024		Biweekly Report due by Monday (1/22)			
11			Week 4							
12	Not Started	2 - High	4	ALL	1/31/2024		Start Training in Unity 5 Engine (JetRacer Soccer 2v2)			
13	Not Started	2 - High	4	ALL	1/29/2024		Biweekly Report due by Monday (1/29)			
14	Not Started	2 - High	4	ALL	1/31/2024		Demonstrate basic motion of JetRacer			
15	Not Started	2 - High	4	ALL	1/31/2024		Demonstrate JetRacer Image Recognition of JetRacer			
16			Week 5							
17	Not Started		5	ALL						
18	Not Started		5	ALL						
19	Not Started		5	ALL						
20	Not Started		5	ALL						
21	Not Started		5	ALL						
22			Week 6							
23	Not Started	3 - Med	6	ALL	2/29/2024		Trade study of possible sensor additions			
24	Not Started	3 - Med	6	ALL	2/29/2024		Preliminary Design Review			
25	Not Started		6	ALL						
26	Not Started		6	ALL						
27	Not Started		6	ALL						
28	Not Started		6	ALL						
29	Not Started		6	ALL						
30	Not Started		6	ALL						
31			Week 7							
32	Not Started		7	ALL						
33	Not Started		7	ALL						
34	Not Started		7	ALL						
35			Week 8							
36	Not Started		8	ALL						
37			Week 9							
38	Not Started	3 - Med	9	ALL			Showcase Vehicle Scoring Soccer Ball in the Goal in Real-World			
39	Not Started		9	ALL						
40			Week 10							

Kanban for task planning and timelines
(will continue to update)

Detail

ENGINE TEAM JetRacer INVENTORY

BUDGET MANAGER CONTACT INFO	
NAME:	Casey Rittenhouse
EMAIL	caseyrit@uw.edu
PHONE - CELL	(925)-490-5868

ITEM	ITEM DESCRIPTION	SOURCE	COST	WARRANTY YES	WARRANTY VALID THRU	PURCHASE/ACQUIRE DATE	MANUFACTURER	SERIAL NO.	LOCATION STORED	CONDITION
JetRacer Car 1		Lockheed Martin				1/9/2024				
JetRacer Car 2		Lockheed Martin				1/9/2024				
JetRacer Car 3		Lockheed Martin				1/9/2024				
JetRacer Car 4		Lockheed Martin				1/9/2024				
4 R/C Controllers		Lockheed Martin				1/9/2024				
2 Soccer Balls		Lockheed Martin				1/9/2024				
1 Plant		ENGINE Lab				1/19/2024				
1Keyboard		Lockheed Martin				1/9/2024				
1 ScrewDriber Power Tool (Pink)		Lockheed Martin				1/9/2024				
2 Krylon Spraypaint cans		Lockheed Martin				1/9/2024				
3 X4 LIDARs		ENGINE Lab				1/19/2024				
1 Jetson Nano (Working)		Lockheed Martin				1/9/2024				
1 Jetson Nano (Fried)		Lockheed Martin				1/9/2024				
4 Anker Portable Charger		Lockheed Martin				1/9/2024				
3 Battery Packs		Lockheed Martin				1/9/2024				
Metal Brackets		Lockheed Martin				1/9/2024				
2 wired mice		Lockheed Martin				1/9/2024				
2 Battery Pack Charger		Lockheed Martin				1/9/2024				
SD Car Reader		Lockheed Martin				1/9/2024				
2 Soccer Goals		Lockheed Martin				1/9/2024				
2 car covers		Lockheed Martin				1/9/2024				

Current inventory spreadsheet with source of each item

Team Roles

- **Project Manager** - Jarod
- **Point of Contact** - Arjun
- **Budget Manager** - Casey

- **ROS/Hardware (Layout, PCB, CAD, LIDAR):**
  - Cooper, Casey, Jarod
- **Unity Team:**
  - Mason
- **CV/Image Recognition Team:**
  - K, Julie, Arjun

Previous Year's Work

- Built and gained full range of motion of 4 JetRacers using software
- Set up a simulation environment to virtually train the agents
- Structured a reward system for the reinforcement learning model
- Implemented object detection model that identifies a soccer ball, opponent, and goal
- Implemented software to follow and strike a ball
- Developed logic process for striking a ball into a goal
- Simulation results with reward structure demonstrate that agents can be trained to efficiently compete in a 2v2 soccer match
- Created a GitHub page documenting the hardware and software instructions to setup JetRacers, a summary of the work completed, and plans for future work

Our Final Deliverables

- Demonstrate basic motion of JetRacer: 01/2024
- Demonstrate JetRacer Image Recognition for soccer play: 01/2024
- Trade study of possible sensor additions: 02/2024
- Preliminary Design Review: 02/2024
- Showcase vehicle scoring soccer ball in the goal in real-world: 03/2024
- Add additional agents in the real world: 04/2024
- Final Data Review: 05/2024