Academic Year: 2018 - 2022 Course: B. Tech Computer Science (Div E)

Semester: VIII

Project Title: **Unmanned Ground Vehicle**

Project Team Members

Roll No	Name	Mobile No	Email
E006	Vrushit Patel	7506025868	vrushit7506@gmail.com
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Mentor Name: Professor Sanjay Deshmukh

Department: Computer Department (Networking)

Week No - 1 **Date of Meeting:** 13/12/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Discussion with Mentor	With the commencement of the FInal Semester, we first discussed the final outputs of the previous semesters for summary and planned on the execution timeline for the final semester. We also discussed the mistakes to avoid from our learnings in the previous semester.	✔	
Body Prototype	The group tried to figure out ways to connect the Raspberry Pi and Arduino with its sensor connections in a protected body frame. We noted down possible frameworks and its materials through Research Papers and online study content.	✔	

Mentor's Signature & Marks:

Project Team's Signature: (1): **(2):** **(3):** **(4):**

Week No - 2 **Date of Meeting:** 20/12/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Testing synchronous function of Raspberry pi and Arduino	Connecting Arduino with Raspberry Pi with cable for serialization. Using sample code for testing the network. Writing custom code to check serialization and other functions.	✔	
Discussion with mentor	Sharing the insight of the work with the mentor and discussing the scope of optimization and improvement.	✔	
Improvement after discussion	Changing orientation of the microprocessors and placement of the sensors for compact and firm design.		✖

Mentor's Signature & Marks

Project Team's Signature: (1): **(2):** **(3):** **(4):**

Week No - 3 **Date of Meeting:** 03/01/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Improvement after discussion	Changing orientation of the microprocessors and placement of the sensors for compact and firm design.	✔	
Discussion with Mentor	On completing the previous task, we discussed the next task, that is, gathering data from sensors and storing it in the cloud and was guided by the mentor to approach this task.	✔	
Read Research Papers	Read research papers about cloud data storage from sensors.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 4 **Date of Meeting:** 10/01/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Improved Live Feed	After research, we attempted to implement a better live feed that had a higher frame rate leading to less lag.	✔	
Connecting Wheels	We have successfully implemented the control code for the wheels after attaching it to the Arduino.	✔	
Test Run	We ran test runs to control the wheels and check its response. We also tested whether the sensor's data was uploaded on the cloud storage without interruption on the Raspberry Pi.		✖

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 5 **Date of Meeting:** 24/01/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Implementation of live feed on the internet	Integrated Raspberry Pi and the camera in order to cast camera feed from the Pi Camera to a local network..	✔	
Completed Hobby Motors circuit (wheels)	Implemented the Hobby Motors Circuit initially on the TinkerCAD software. On doing so successfully,	✔	

Controlling the wheels through code.	the same implementation was carried out on the required hardware. Successful implementation of wheel control was carried out by developing and executing a code in Arduino.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1): **(2):** **(3):** **(4):**

Week No - 6 **Date of Meeting:** 31/01/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Integration of Raspberry Pi with Firebase	Used the Firebase API and integrated the system with the Firebase cloud storage for storing data from the Raspberry Pi on the cloud.	✔	
Implemented storing images and ultrasonic data on firebase	Successfully stored and automated the process of storing images clicked from the Pi Camera and the data received from the ultrasonic sensors on the cloud.	✔	
M1 PPT	Presented a progress report presentation to an external mentor and took invaluable feedback on the project.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1): **(2):** **(3):** **(4):**

Week No - 7 **Date of Meeting:** 07/02/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done

Integration of Raspberry Pi with Firebase	Continued further integration of data and other sensors.	✔	
Density and Humidity (DH11) Sensor	Studied the DH11 sensor and implemented the execution by retrieving different parameters.	✔	
M1 Remarks	Discussed the suggestions with our mentor and formulated a plan to improve the project based on the remarks of the external mentor.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 8 **Date of Meeting:** 14/02/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Research Paper	Commenced writing our research paper with introduction and literature survey.	✔	
Pi Camera Error	Encountered a major error in the camera, causing Live Feed to not work. Tried different solutions to solve the error		✖
Mentor Discussion	Discussed with the mentor the research paper expectations and parameters to be met. Took valuable insights on it and improved our paper content.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 9 **Date of Meeting:** 28/02/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Research Paper	Continued working on the research paper and referred to multiple other papers for guidance and to understand the research gaps, challenges, limitations, ways of implementations and their contributions.	✔	
Pi Camera Error	Successfully fixed the camera error with the help of mentor and guidance for multiple faculty members of the college.	✔	
Integrated 2 Ultrasonics and DH 11 sensor	Integrated the 3 sensors on the Raspberry Pi and also completed the combined working code to store all the data seamlessly.	✔	
Updated Body Prototype	3D Printed an updated body for the rover to fit in all the sensors, battery pack, wires and wheels		✖

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 10 **Date of Meeting:** 07/03/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Research Paper	Integrated tables, pictures of the finished work as mentioned below and referred to multiple papers to illustrate our project and explain its usage and future scopes.	✔	
Soldering	Had all components soldered to permanently be wired together, making connections easier.	✔	
Final Body Setup	Finished placement of the Ardiuno and Raspberry Pi on the body with its connections. Also added the ultrasonic holder and screwed the 2nd layer of the rover on the body as well.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 11 **Date of Meeting:** 14/03/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Research Paper	Completed the research paper and checked for plagiarism. We also made changes based on our mentors' feedback.	✔	
Website Interface	Created a website interface to control the rover over the internet and added live feed and data graphs to it.	✔	
Test Run	Made test runs to check for errors and interruptions and solved them.	✔	
Mock Presentation	After completing the test runs, the group gave a mock presentation to our mentor and worked about the feedback given to us.	✔	

Mentor's Signature & Marks

Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 

Week No - 12 **Date of Meeting:** 21/03/2022

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
College Report	Completed the official report and prepared it for submission.	✔	
Research Paper for Publishing	Found conferences and sent the paper for acceptance in a journal / conference.	✔	

Final Project Check	Crosscheck all components, connections, outputs, code and working. Run final tests to confirm the desired outputs.	✔	
Presentation	Worked on the presentation and prepared by taking mock presentations with our mentor. Worked on details and execution for final presentation	✔	
Mentor's Signature & Marks			
Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 			

Details of participation in any competition:

Competition Name	Project Competition
Organising Authority	IT Department, MPSTME
Date & Place of Event	26th March, 2022 3rd Floor, RL2 Lab, MPSTME
Prize Awarded(if any)	Competition yet to be held

Publication Details:

Title of Paper	Semi-Automated Unmanned Ground Vehicle With Raspberry Pi and Arduino Uno
Author Names	Vrushit Patel, Dhruv Pathak, Shivansh Sharma, Shrey Thapar
Publishing House	CISES2022: International Conference on Computational Intelligence and Sustainable Engineering Solutions
Impact Factor(If any)	Integration of Raspberry Pi and Arduino for implementation. Remote access to control the rover over the internet.
Indexing(if any)	