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

Semester: VII

Project Title: **Unmanned Ground Vehicle**

Project Team Members

Roll No	Name	Mobile No	Email
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Mentor Name: Professor Sanjay Deshmukh

Department: Computer Department (Networking)

Note:

- Marks per week (out of 5)
- Total weeks to be considered 12 per semester

Rubrics for Evaluation:

1. Punctuality & Ethics: 2 Marks
2. Efforts and Quality: 3 marks

Week No - 1 **Date of Meeting:** 14/08/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Determining the domain of Interest	After intensive research and shortlisting various domains and ideas, the group finalised upon the domain - “Internet of Things (IoT)”	✔	
Finalising the area of execution in the IoT domain	IoT being a vast domain required detailed discussions on the implementation and executions of different sections of the domain after which, “Unmanned Ground Vehicle” was finalized.	✔	
Knowledge gain through research papers	Each group member read a couple of research papers to lay down a strong foundation for the domain.	✔	
Topic Approval Presentation	Collectively worked on the presentation as per the required criteria.	✔	

Mentor’s Signature & Marks:

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

Week No - 2 **Date of Meeting:** 21/08/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Guidance from mentor	After the topic approval presentation, the mentor guided us on how to approach the Final Year Project systematically and explained the important aspects to focus on.	✔	
Planning and division of work	Discussed and planned the required research. Division of work was thereby done for gaining a faster and effective output of the group.	✔	

Mentor’s Signature & Marks

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

Week No - 3 **Date of Meeting:** 28/08/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Finalizing the main components of unmanned vehicles.	Finding and reading research papers for understanding the components of unmanned vehicles. Decided and finalized upon major parts of unmanned vehicles such as using Raspberry Pi and Arduino for controlling the unmanned vehicle and processing data from different sensors.	✔	
Getting familiar with Raspberry Pi.	Purchasing Raspberry Pi and reading the user manual/ documentation to operate it. Watching videos to understand different parts and components of Raspberry Pi.	✔	
Initializing Raspberry Pi.	Setting up the Raspberry Pi by installing its operating system. Connecting it to a laptop with a GUI based interaction alongside connecting it remotely with Wi-Fi using an in-built Wi-Fi module for wireless communication.	✔	

Mentor's Signature & Marks:

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

Week No - 4 **Date of Meeting:** 04/09/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Understanding Arduino	Buying Arduino and reading the documentation to familiarize oneself with Arduino. In order to begin with programming Arduino, an IDE was installed, "Arduino Desktop IDE" by connecting it with a laptop.	✔	
Determining the mode of communication	Inorder to use both Raspberry Pi and Arduino in the unmanned vehicle, the two have to communicate. Understanding serialization and implementing basic	✔	

between Arduino and Raspberry Pi	codes for serialization was done with the help of online resources.		

Mentor's Signature & Marks

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

Week No - 5 **Date of Meeting:** 11/09/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Detailed research on System Architecture	Read research papers highlighting various architectures of unmanned vehicles. Finalized the entire system design after a thorough and comparative study.	✔	
Understanding the System Design and its requirements	Studied the System Design in detail with respect to the Raspberry Pi and Ardiuno. Grasped the working of some important features like protocols, connectivity, hardware requirements and cloud.	✔	

Mentor's Signature & Marks:

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

Week No - 6 **Date of Meeting:** 18/09/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Sought mentor's approval after a thorough reading of the paper	The team sought the mentor's final approval for the revised research papers before beginning work for the M1 Presentation. The mentor's inputs were duly noted, worked upon and applied in the System Design.	✔	

Listing down the required algorithms	Focusing on the end goal of the unmanned vehicle, multiple algorithms were required. The research papers about detection algorithms gave us a good understanding of how different lane and object detection algorithms were implemented. On weighing the pros and cons, the optimal algorithms were finalized.	✔	
M1 Presentation	Commenced work on the M1 Presentation with the given theme and roadmap.		✖
Mentor's Signature & Marks			
Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 			

Week No - 7 **Date of Meeting:** 25/09/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
M1 Presentation	Presented the M1 Presentation to our mentor and the external faculty by proposing the 4 different architectures the team had been through with each of their pros and cons. The PPT also gave an insight on the serialization between Arduino Uno And Raspberry Pi. Explained the hardware which would be used for the Unmanned Ground Vehicle.	✔	
Post M1 Presentation	After the M1 Presentation, the external faculty mentioned a few areas for improvement, so we decided to work upon the suggestions. The remarks touched upon adding the citations for each research paper mentioned in the presentation and gathering more insight on the cloud service to be used.	✔	
Mentor's Signature & Marks:			
Project Team's Signature: (1):  **(2):**  **(3):**  **(4):** 			

Week No - 8 **Date of Meeting:** 02/10/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Commence building report for M2	For M2, we planned on preparing the following: • Finalization of the boards to be used for the project: "2 Raspberry Pi"s or "1 Raspberry Pi" and "1 Arduino". • Finalization of the cloud service to be used for the project. • Finalization of the hardware, i.e., sensors required for the project. • After finalizing the cloud service to be worked upon, a decision on the software to be used was taken followed by zeroing on the pricing model to be chosen. • Working on Arduino Serialization practically.	✔ ✔ ✔ ✔	✖

Mentor's Signature & Marks:

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

Week No - 9 **Date of Meeting:** 09/10/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Sought mentors help for improvement on M2 feedback	The team sought the mentor's approval for the remarks and improvement suggested by external faculty taking the M2 Presentation.	✔	
DC Motor Setup	Understood the working of DC Motor and finalised the connection with the Arduino Uno. The team members tested the working of the motors.	✔	

Raspberry Pi Display and Connection Errors	Unwanted errors during connection of Raspberry Pi remotely to the laptop occurred. Implemented a couple of solutions from forums and online videos to solve the issue.		✖

Mentor's Signature & Marks:

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

Week No - 10 **Date of Meeting:** 16/10/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Fixing of Raspberry Pi	After a week of issues and trials, the team fixed the Raspberry Pi display issues by making changes in the config.txt file in the operating system. We also had to format the SD card and reinstall the OS and then upgrade the software to mend the recurring connectivity issues.	✔	
Object Detection Algorithm Implementation	As the project required object detection algorithms to be implemented, the team went through multiple research papers to understand the pros and cons of each algorithm. We also implemented the Tiny-YOLO algorithm successfully.	✔	

Mentor's Signature & Marks:

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

Week No - 11 **Date of Meeting:** 23/10/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done

Implementation of Live Feed by different methods.	Go through appropriate websites, videos and research papers for the implementation of live feed. Understanding different possibilities of live feed example: on a website or using other applications such as VLC open network.	✔	
Implementation of serialization	Understand the process of serialization using research papers, websites and videos. Set-up environment for serialization. Implement Sample codes.	✔	

Mentor's Signature & Marks:

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

Week No - 12 **Date of Meeting:** 30/10/2021

Planned Milestones	Discussion	Status of Completion	
		Done	Not Done
Understanding the Servo Motor for Advance Movement	Using a servo motor for turning the vehicle and understanding the rotation required. This required understanding the degree of rotation required with respect to the servo motor for the vehicle to turn appropriately. The implementation for the same was also done.	✔	
Preparing Final report and presentation.	Gather the required content for making the report and following the guidelines given by the college for the Final Semester Report. The official template was also used for the presentation. Demonstration of all the work through the report was done thoroughly.	✔	

Mentor's Signature & Marks:

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

Details of participation in any competition:

Competition Name	
Organising Authority	
Date & Place of Event	
Prize Awarded(if any)	

Publication Details:

Title of Paper	
Author Names	
Publishing House	
Impact Factor(If any)	
Indexing(if any)	