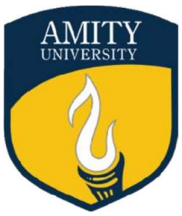
Major Project Diary

On

“Self-Driving Car Simulation Using AI”

Submitted to

Amity University Uttar Pradesh



In partial fulfilment of the requirements for the award of the degree of
Bachelor of Technology
In
Computer Science and Engineering By

Akshay Kumar Raghav (A2305218445)
Mohit(A2305218459)
Kuldeep Dwivedi(A2305218477)

Under the guidance of
Ms. Seema Sharma

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
AMITY UNIVERSITY, NOIDA
UTTAR PRADESH

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

B. Tech (CSE)

Project Title: Self Driving Car Simulation Using AI

Academic Session: 2021-2022

Project Guide: Ms. Seema Sharma

Project Team:

S.No	Name	Enrollment Number	Signature
1.)	Akshay Kumar Raghav	A2305218445	
2.)	Mohit	A2305218459	
3.)	Kuldeep Dwivedi	A2305218477	

Project summary:

AI research is highly technical and it is deeply divided into subfields that often fail to communicate with each other. Some of the division is due to social and cultural factors: subfields have grown up around particular institutions and the work of individual researchers. AI research is also divided by several technical issues. Some subfields focus on the solution of specific problems. Others focus on one of several possible approaches or on the use of a particular tool or towards the accomplishment of particular applications.

The dynamic path finding tool is quite beneficial because it provides real-time navigation instructions based on the car's current location. When compared to Dijkstra and BFS, the A* approach, which is used to implement paths based on current and final locations, is extremely fast. We use a PID controller to discover the smoothest approach to the objective because A* only delivers square paths.

Self-driving car is very sophisticated technology allows the onboard computer to do hundreds of calculations per second. These include the path from objects, your current

speed, the conduct of other drivers, and your geographic location. Because the only accidents so far have occurred while human drivers were in control, these ultra-accurate measurements have almost eliminated driving errors for test cars on the road.

Self-driving cars have huge capability for reducing traffic congestion because they are rarely involved in accidents. Not only that, but because self-driving cars can interact with one another, traffic lights would be obsolete. Better traffic coordination might result in less congestion if people drove slower but made fewer stops.

Methodology to be adopted:-

The main purpose here is to create and optimize a software implementation required for the detection of location i.e. localization, dynamic path finding from a fixed source to fixed destination in a real time scenario and also the necessary controller for the efficient control of an autonomous or the self-driving car.
And this can be achieved by using several artificial intelligence techniques for localization such as Kalman Filters, Histogram Filters and the heuristic approach algorithm A* for dynamic path finding.

Resource requirement (Hardware & software etc):-

- The UI that we will utilize is Visual Studio which is a Python IDE used to compose and investigate Python code.
- We have picked Windows as our Operating System for improvement for its best help and ease of use.
- Hardware: Minimum of 4GB RAM, Minimum of Intel i5 range processor, Minimum of2GB GPU
- Software: Python 3, Visual Studio, Pen Studio etc.

Justification of the project:-

"The technology is ahead of the level of governance in many areas," according to the report, which states that "all presume to have a human running the vehicle." "The technology is currently advancing so quickly that it is in danger of outstripping existing standards," according to the report. Such huge concerns have put the research on hold for a long time. With encouraging trials and continued improvement, the driverless automobile, also known as an autonomous car, has become a hotbed of study and expertise.

The goal of this project is to create and optimize a software implementation required for the detection of location i.e. localization, dynamic path finding from a fixed source to fixed destination in a real time scenario and also the necessary controller for the efficient control of an autonomous or the self driving car.

To achieve this goal we will be using several artificial intelligence technique for localization such as Kalman Filters, Histogram Filters and the heuristic approach algorithm A* for dynamic path finding.

Project Weekly Progress Table :-

Week	Weekly Progress Review Report	Duration	Faculty Remarks
1.)	**1. Target of the week:** 1.) Configured visual studio by installing necessary libraries and understanding their working. **2. Achievements:** 1.) Installed all necessary modules and Visual Studio Code. **3. Future Work Plans:** (1.) Implementation of Localization Algorithm.	03/01/2022 to 09/01/2022	Satisfactory Satisfactory
2.)	**1. Target of the week** 1.) Implemented Algorithm Replace in Localization. **2. Achievements** 1.) Successfully implemented and tested algorithm Replace. **3. Future Work Plans** 1.) Completion of Localization and Implementation of Particle Filter Algorithm	10/01/2022 to 16/01/2022	Satisfactory Satisfactory
3.)	**1. Target of the week** 1.) Completion of Localization and Implementation of Particle Filter Algorithm **2. Achievements** 1.) Working on the software implementation of Particle Filter Algorithm. **3. Future Work Plans** 1.) Complete the coding part of Particle Filter Algorithm	17/01/2022 to 23/01/2022	Satisfactory Satisfactory
4.)	**1. Target of the week** 1.) Implementing the coding part of Particle Filter Algorithm. **2. Achievements** 1.) Successfully completed the	24/01/2022 to 30/01/2022	Satisfactory Satisfactory

	coding part of Particle Filter Algorithm. 3. **Future Work Plans** 1.) Implementation of Kalman Filter Algorithm		
5.)	1. **Target of the week** Implementing the graphical representation of Kalman Filters 2. **Achievements** 1.) Successful completion of implementation of the graphical representation of Kalman Filters 3. **Future Work Plans** Software Implementation of Kalman Filter Algorithm	31/01/2022 to 06/02/2022	Satisfactory Satisfactory
6.)	1. **Target of the week** Software implementation of Kalman Filter Prediction 2. **Achievements** Successfully implemented the Kalman Filter Prediction 3. **Future Work Plans** Implementation of sense and move part of Kalman Filter	07/02/2022 to 13/02/2022	Satisfactory Satisfactory
7.)	1. **Target of the week** Implementation of Kalman Filter Design such as sense and move. 2. **Achievements** Successfully Implemented the Kalman Filter Design. 3. **Future Work Plans** UI implementation of Particle Filter Algorithm.	14/02/2022 to 20/02/2022	Satisfactory Satisfactory
8.)	1. **Target of the week** UI Implementation of Particle Filter Algorithm. 2. **Achievements** Successfully implemented the UI of Particle Filter Algorithm. 3. **Future Work Plans** Implementation of A* algorithm for motion planning.	21/02/2022 to 27/02/2022	Satisfactory Satisfactory
9.)	1. **Target of the week** Implementation of A* algorithm for motion	28/02/2022 to 06/03/2022	Satisfactory Satisfactory

	planning. 2. **Achievements** Successful implementation of A* algorithm for motion planning 3. **Future Work Plans** Implementation of various heuristic methods in A* Algorithm.		
10.)	1. **Target of the week** Implementation of various heuristic methods in A* Algorithm. 2. **Achievements** Successfully implemented the various heuristic methods in A* algorithm. 3. **Future Work Plans** UI implementation of A* algorithm with various heuristic approaches.	07/03/2022 to 13/03/2022	Satisfactory Satisfactory
11.)	1. **Target of the week** UI implementation of A* algorithm with various heuristic approaches 2. **Achievements** Successfully implemented the UI of A* algorithm with various heuristic approaches. 3. **Future Work Plans** Implementation of Breadth First Search algorithm in motion planning.	14/03/2022 to 20/03/2022	Satisfactory Satisfactory
12.)	1. **Target of the week** Implementation of Breadth First Search algorithm in motion planning. 2. **Achievements** Successfully implemented the Breadth First Search Algorithm. 3. **Future Work Plans** UI Implementation of Breadth First Search Algorithm in motion planning.	21/03/2022 to 27/03/2022	Satisfactory Satisfactory
13.)	1. **Target of the week** UI Implementation of Breadth First Search Algorithm in motion planning. 2. **Achievements**	28/03/2022 to 03/04/2022	Satisfactory Satisfactory

	Successfully implemented the UI of Breadth First Search Algorithm. **3. Future Work Plans** Implementation of Dijkstra Algorithm in Motion Planning.		
14.)	**1. Target of the week** Implementation of Dijkstra Algorithm in Motion Planning. **2. Achievements** Successfully implemented the Dijkstra algorithm in motion planning. **3. Future Work Plans** UI implementation of Dijkstra Algorithm in Motion Planning.	04/04/2022 to 10/04/2022	Satisfactory Satisfactory
15.)	**1. Target of the week** UI implementation of Dijkstra Algorithm in Motion Planning. **2. Achievements** Successfully implemented the UI of Dijkstra algorithm in motion planning. **3. Future Work Plans** Integration of all algorithms in motion planning.	11/04/2022 to 17/04/2022	Satisfactory Satisfactory
16.)	**1. Target of the week** Integration of all algorithms in motion planning. **2. Achievements** Successfully integrated of all algorithms in motion planning. **3. Future Work Plans** To write the first draft of the report.	18/04/2022 to 24/04/2022	Satisfactory Satisfactory

Signatures of Project Team **Signature of Project Guide**
Date:

Akshay Kumar Raghav

Mohit

Kuldeep Dwivedi