

SELF DRIVING CAR- AI AND NEURAL NETWORK

Project-III - (IT208PPC31) report submitted to
Guru Ghasidas Vishwavidyalaya
in partial fulfilment for the award of the degree of
Bachelor of Technology
in
Information Technology

by

Telu Sai Srinivasa Naidu, Amme Manoj, Kommata Vikas
(21036159, 21036112, 21036129)

Under the supervision of
Dr. Amit Dewangan



Department of Information Technology
Guru Ghasidas Vishwavidyalaya

April 03 ,2025

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DEPARTMENT OF INFORMATION TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA
BILASPUR - 495009, INDIA

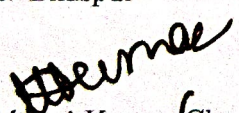


CERTIFICATE

This is to certify that the project report entitled "SELF DRIVING CAR- AI AND NEURAL NETWORK" submitted by Telu Sai Srinivasa Naidu, Amme Manoj, Kommata Vikas (Roll No. 21036159, 21036112, 21036129) to Guru Ghasidas Vishwavidyalaya towards partial fulfilment of requirements for the award of degree of Bachelor of Technology in Information Technology is a record of bonafide work carried out by him under my supervision and guidance during April 03 ,2025.

Date: April 03 , 2025

Place: Bilaspur


Dr. Manoj Kumar (Choubey)
Head of Department
Department of IT
Guru Ghasidas Vishwavidyalaya


Dr. Amit Dewangan
Department of Information Technology
Guru Ghasidas Vishwavidyalaya
Bilaspur - 495009, India

Abstract

Name of the student: Telu Sai Srinivasa Naidu, Amme Manoj, Kommata Vikas

Roll No: 21036159, 21036112, 21036129

Degree for which submitted: Bachelor of Technology

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Thesis supervisor: Dr. Amit Dewangan

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The advancement of autonomous driving technology is bringing a new wave of transformation, connecting people and places while reducing dependence on human-driven vehicles. However, developing a fully autonomous car that can drive itself in varied and dynamic environments presents several challenges. Traditional approaches rely heavily on predefined rules and rigid programming, which limit the system's ability to adapt to new situations. Autonomous driving systems must not only detect and interpret sensory data in real-time but also make complex decisions that account for safety, efficiency, and adaptability. To address these challenges, this project explores the NeuroEvolution of Augmenting Topologies (NEAT) algorithm, a genetic algorithm that evolves artificial neural networks. Unlike conventional neural networks with fixed structures, NEAT adapts its structure and weight connections based on a fitness function, creating an ever-evolving and increasingly capable driving model.

NEAT allows the car to "learn" driving skills through successive generations, using a fitness score based on distance traveled and collision avoidance.

Over time, the car improves its navigation skills and decision-making, becoming more adept at handling a variety of driving scenarios. By enabling real-time decision-making, NEAT acts as a bridge between theoretical models and practical application, showing how AI can be harnessed to solve complex driving problems. Through this project, we aim to develop a self-driving car that not only navigates autonomously but also evolves and improves without direct human intervention. This research demonstrates the potential of adaptive, learning-based driving systems to make transportation safer and more accessible, paving the way for a future where AI-driven vehicles enhance everyday life, reduce accidents, and connect people with greater ease.

Date: April, 2025

(Telu Sai Srinivasa Naidu, Amme Manoj, Kommata Vikas)

Place: Bilaspur

(21036159, 21036112, 21036129)