VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI, 590-018

PROJECT REPORT

ON

"MAZE WANDERER: AUTONOMOUS ROBOTIC PATH-FINDING SYSTEM"

Submitted in partial fulfillment of the requirements for the award of degree,

BACHELOR OF ENGINEERING

IN

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

By

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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Shobhavana Campus, Mijar-574225, Moodbidri, D.K., Karnataka

2023 – 2024

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CERTIFICATE

This is to certify that the Project entitled **"MAZE WANDERER: AUTONOMOUS ROBOTIC PATH-FINDING SYSTEM"** has been successfully completed by

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the bonafide students of **Department of Artificial Intelligence & Machine Learning, Alva's Institute of Engineering and Technology** in partial fulfillment for the award of BACHELOR OF ENGINEERING, **DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

06/5/24
Dr. Ramesh G
Project Guide

06/05/2024
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ABSTRACT

This project explores the integration of reinforcement learning, specifically the Q-learning algorithm, into robotic systems for autonomous maze navigation. Driven by the imperative to instill adaptive learning capabilities in robots, the study focuses on enabling a robot to dynamically learn and refine its pathfinding strategies through interactions with a maze environment. Equipped with an array of sensors, the robotic system comprehensively perceives the maze's topology, with a Raspberry Pi serving as the central processing unit for decision-making. The study's central contribution lies in the iterative implementation of the Q-learning algorithm, facilitating the robot's association of specific actions with diverse states within the maze. This adaptive learning process culminates in the refinement of the robot's decision-making, optimizing its ability to autonomously navigate the maze over time. The ongoing work is to adjust the algorithm parameters and optimize the learning process of the robot to make it more accurate. The autonomous robot reached the destination from the starting point by the optimal route with shortest path and less timing.