ERTS Lab
Department of Computer Science and Engineering
Indian Institute of Technology Bombay,
Powai, Mumbai-400 076.

INTERNSHIP CERTIFICATE

This is to certify that **Jayesh Pandharinath Khalane**, student from **JSPM's Rajarshi Shahu College of Engineering** has undertaken Internship at e-Yantra, IIT Bombay working on a project entitled: **TurtleBot-based Swarm Robots** during the period from **27th May to 19th July, 2024**. This project was successfully completed in collaboration with Prof. Leena Vachhani (Systems and Control Engineering, Indian Institute of Technology, Bombay).

Prof. Kavi Arya
Principal Investigator, e-Yantra
Professor
Department of Computer Science and Engineering
Indian Institute of Technology Bombay

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e-Yantra is a project sponsored by MHRD, Government of India, under the National Mission on Education through ICT (NMEICT).

Engineering a better tomorrow

Intern Evaluation

The primary objective of the project was to develop a robot identification methodology using only LIDAR measurements in an environment with both obstacles and robots. This objective was successfully met during the internship by creating a method that utilizes a threshold ratio derived from 2D LIDAR readings. Key accomplishments include: devising a novel approach to distinguish between obstacles and robots, implementing this approach for a swarm of robots using ROS, and exploring a deep learning-based alternative. The results offer a simplified solution compared to other swarm algorithms that require map learning for localization.

Jayesh demonstrated exceptional dedication and diligence throughout his internship. He consistently completed tasks promptly and provided end-of-day updates. He quickly grasped the problem and developed a solution within a week. His strong expertise in ROS and proficiency in C++ were evident, and he effectively implemented the proposed methodology in ROS, showcasing progress through Gazebo. Jayesh also adapted swiftly to Python to expedite results. He was highly motivated to learn, took feedback seriously, and meticulously documented his work in his GitHub repository, where all necessary software and tools are clearly listed.