

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :11/12/2024

(21) Application No.202441097995 A

(43) Publication Date : 20/12/2024

(54) Title of the invention : Efficient Obstacle Detection and Avoidance in Autonomous Robots using Advanced Intelligent Techniques and LiDAR

(51) International classification :G05D0001000000, G01S0017931000, G06V0020100000, G06V0020580000, G01C0021200000

(86) International Application No :NA
Filing Date :NA

(87) International Publication No : NA

(61) Patent of Addition to Application Number :NA
Filing Date :NA

(62) Divisional to Application Number :NA
Filing Date :NA

(71)Name of Applicant :

1)Gowri Shankar Manivannan

Address of Applicant :Associate Professor Department of Electrical and Electronics Engineering Malnad College of Engineering -----

2)Dr. SATISH V TALAWAR

3)Dr. VASUNDHARA M G

4)Mr. SANGAM

5)Mr. NITHISH KUMAR B

6)Mr. GIRISH M R

7)Mr. PRAJWAL M

Name of Applicant : NA

Address of Applicant : NA

(72)Name of Inventor :

1)Dr. SATISH V TALAWAR

Address of Applicant :Assistant Professor, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. -----

2)Dr. GOWRI SHANKAR MANIVANNAN

Address of Applicant :Associate Professor, Department of EEE, Malnad College of Engineering, Hassan – 573202. Hassan -----

3)Dr. VASUNDHARA M G

Address of Applicant :Assistant Professor, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. Hassan -----

4)Mr. SANGAM

Address of Applicant :UG Student, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. Hassan -----

5)Mr. NITHISH KUMAR B

Address of Applicant :UG Student, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. Hassan -----

6)Mr. GIRISH M R

Address of Applicant :UG Student, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. Hassan -----

7)Mr. PRAJWAL M

Address of Applicant :UG Student, Department of Mechanical Engineering, Malnad College of Engineering, Hassan – 573202. Hassan -----

(57) Abstract :

The present invention relates to an Efficient Obstacle Detection and Avoidance System for Autonomous Robots using advanced intelligent techniques integrated with LiDAR technology. The system employs a Hybrid Capsule Network (CapsNet-CNN) in conjunction with the Elephant Search Algorithm (ESA) for real-time obstacle detection, classification, and dynamic path optimization. The LiDAR sensor captures environmental data, which is preprocessed to extract relevant features, such as obstacle distance and position. These features are passed through the CapsNet-CNN for accurate obstacle classification and spatial relationship understanding. The Elephant Search Algorithm is then utilized to optimize the robot's path, ensuring efficient navigation by avoiding detected obstacles and minimizing energy consumption. The hybrid approach of CapsNet-CNN and ESA allows for enhanced decision-making, real-time adaptation, and precise navigation in complex environments. This invention improves the autonomous robot's ability to operate safely and efficiently, making it suitable for a wide range of applications, including mobile robotics, warehouse automation, and autonomous vehicles.

No. of Pages : 24 No. of Claims : 4