Virbhadrappa**Kalburgi**

Robotics and Automation

About

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Languages

English,Hindi,Marathi
and Kannada

Programming

 ROS
C, C++
MATLAB
Python
Machine Learning
Deep Learning
Arduino.

Objective

Highly skilled Robotics Navigation Researcher with a strong background in ROS, CPP Python, OOP, state machines, point cloud-based mapping, localization, and precise control for robot navigation. Seeking a challenging position in a progressive research environment where I can leverage my expertise to contribute to the development and advancement of autonomous robot navigation systems.

Education

2020	**M.Tech Robotics and Automation** *Amrita Vishwa Vidyapeetham School of Engineering Amritapuri*
2017	**B.E Electronics and Telecommunication** SKN Sinhgad College of Engineering Solapur, University Solapur
2013	**Diploma Electronics and Telecomunication** S.V.S.M.D's Polytechnic Akkaklot, Mumbai board

Experience

2021-Now	**Singapore University of Technology and Design** Senior Robotics Research Assistant In this role, I spearheaded the development and application of advanced navigation algorithms using ROS, C++, and Python to enable autonomous mobility for robots. By designing and integrating state machine-based control systems, I facilitated seamless navigation and decision-making processes. My contributions extended to researching point cloud-based mapping and implementing innovative techniques for efficient map representation and updates. Employing various localization methods, including Adaptive Monte Carlo Localization (AMCL) and hdl localization, significantly improved robot positioning accuracy. Additionally, I played a key role in creating custom controllers for precise motion and path planning, such as PID control and trajectory generation. Collaborating with a multidisciplinary team, I successfully integrated sensor fusion algorithms that combined LiDAR, RGB-D cameras, and IMUs to enhance robust perception. To validate the performance and reliability of navigation systems, I conducted thorough experiments and testing in both simulated and real-world environments. Furthermore, I actively participated in the development and deployment of SLAM techniques for simultaneous mapping and localization in dynamic settings. My research efforts culminated in the publication of valuable findings in reputable robotics conferences and journals, contributing to the academic community's knowledge in this field.

Key strength

Taking leadership,
Confident,
Accept new challenges,
Willing of learning new thing.

Software Skills

MATLAB Simulink
GAZEBO Simulator
V-REP simulator
Moveit Simulator
Carla Car Simulator
Object-Oriented Programming and Design
Robot Localization Techniques
Sensor Fusion (LiDAR, RGB-D cameras, IMUs)
Simultaneous Localization and Mapping (SLAM)

Hobbies

Listening to music,
Playing cricket
Traveling
Bicycling
Explore new place

| 2021 | **The Hi-Tech Robotic Systemz Ltd** **Robotics Software Engineer** |

In this role, I am deeply immersed in the fascinating field of Mobile Robots, specializing in developing and deploying advanced ROS (Robot Operating System) software for these autonomous machines. My passion for cutting-edge technology drives me to design and implement state-of-the-art SLAM (Simultaneous Localization and Mapping) algorithms, which are crucial for the robot to create a map of its environment while simultaneously knowing its precise location within that map.

2018-19 **Rakuten Institue of Technology (RIT), Rakuten Bengaluru** **Research Intern**

As a Research Intern, I worked on Follow behavior robot for last-mile delivery, using the ROS and Machine learning to improve e-commerce.

2018 **Computational Neuroscience and Neurophysiology Labs, Amritapuri**
Student Intern

As an Intern, I worked on robotics arm, which works on spiking CMAC using Izhikivch model. This work helps to study and understand how a human neuron works to perform any task.

Education project

2019 **Adaptive Control system design for insect type legged robot**
Problem statement

Getting the robot stability of legged robot in all terrain area without losing the balance it is very difficult also the surface of the area effect force distributed consuming of the robot. Getting more stable and low power consuming robot is very important while wanting to surveillance of dangers and harmful area such as a tunnel.

Solution

Adaptive controller using ROS for insect type robot with low power consuming and challenge facing like obstacle avoiding without losing robot balance and stability in given environment. ros_controller_manager is helps to manage the each controller which used in the robot to control locomotion of legs.With help of the imu data make robot stable waking.

2018 **Implementation of spiking CMAC neural model to control robotic arm**
Problem statement

How neural microcircuits of human brain comprised of spiking neurons exhibit complex dynamic stable coordinated motor movements can be implemented for robot arm that contributes to motor coordination, timing and precision of movements and to develop a model from the results to understand biological cerebellar pathways responsible for such functions?

Solution

Using the Izhikivch model and CMAC model implemented Spiking CMAC for control 2 DOF robotic arm.

Publication

2019	**Control system design for four-legged walking robot with insect type leg using ROS**
	Journal: materials today proceedings 2019

Abstract

This work presents the development of a control algorithm for an insect type four-legged robot which contains hips, torso and legs joints. The mechanical design is inspired by the locust insect. ROS is adapted because it provides a reliable mechanism for fast robot development and algorithm reuse. We presenting the control algorithm which helps to robot get stable and balanced walking locomotion in a given environment, also able to perform task like avoiding static obstacles. This control algorithm is validated in a simulation environment GAZEBO, RVIZ.

Specialization Courses

2020	**Reinforcement Learning Specialization by University of Alberta** Coursera
	The Reinforcement Learning Specialization has 4 courses, exploring adaptive learning systems and AI. I learned to build RL systems for decision making, formalize tasks as RL problems, and understand its relation to machine learning..
2020	**Self Driving Cars Specialization by University of Toronto** **Coursera**
	This Specialization provides a comprehensive understanding of self-driving car engineering using real data sets from an autonomous vehicle. You'll learn various methods for detection, localization, planning, and control through hands-on projects with CARLA simulator. After successful completion, you'll be equipped to build your self-driving software and pursue jobs in the autonomous vehicle industry.
2020	**DeepLearning.AI TensorFlow Developer Specialization by Deeplearning.ai** **Coursera**
	In the DeepLearning.AI TensorFlow Developer Professional Certificate, I learned to build and train neural networks with TensorFlow, improve network performance using convolutions for real-world image recognition, and create natural language processing systems for understanding and responding to human speech.
2020	**Deep Learning Specialization by Deeplearning.ai** **Coursera**
	The Deep Learning Specialization prepares learners for AI development and understanding the power and challenges of deep learning. It covers fundamental neural networks to real-world applications like Computer Vision, Natural Language Processing, and Speech Recognition.

Achievement

>> Winner in ROBOSOFT2023 competition organized by IEEE Robotics and Automation
>> National level computation in ROBOCON2016 MATLAB workshop winner
>> Second prize in innovation project which is conducted by COEP college pune
>> Delivered a workshop on Arduino at SKN Sinhgad College of Engineering Pandhapur