Hardik Gupta

Contact Information

University of Minnesota
Twin Cities, MN, USA

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Links : LinkedIn, Webpage

Education

University of Minnesota, Twin Cities *Aug 2023 - Present*
Master of Science (M.Sc.) in Robotics
Courses : Artificial Intelligence, Machine Learning, Computer Vision

Birla Institute of Technology and Science (BITS), Pilani ; India *Jun 2023*
Bachelor of Engineering (B.E.) in Mechanical Engineering & Master of Science (M.Sc.) in Biological Sciences
Courses : Robotics, Autonomous Mobile Robotics, Engineering Optimization, Vibrations and Control

Publications

The Phylogenetic Study of the CRISPR-Cas System in Enterobacteriaceae *Apr 2023*
Springer - Current Microbiology
We systematically investigate the evolutionary framework of the CRISPR-Cas system in six Enterobacteriaceae species and its evolutionary association with housekeeping genes as determined by the gyrB phenogram. These results advance our understanding of the dynamics of the CRISPR-Cas system.

Experience

Union Bank of Switzerland Mumbai, India
Finance Analyst Intern *Feb 2023 - Jun 2023*

- Automated the analysis of Pension IPV, prepared the CPV graphs for clients increasing the efficiency of the team.
- Worked with Python & its essential libraries and also used several internal UBS reporting tools, Totem and Bloomberg to report and analyse various financial figures.
- Led a training session on Technology in Finance for 18 senior team members, focusing on NumPy libraries used in finance.

Projects

Modeling of Neurons and Synapses *May 2022*
Under the supervision of Prof. Venkatesh Kadbur Prabhakar Rao
Studied and Prepared the Hodgkin-Huxley model on NEURON simulation environment the membrane voltage and time relationship in the model on the addition of leak conductance and active ion channels Upgraded the model with the introduction of dendrite and synapse, and compared presynaptic and postsynaptic results

Implementation of Particle-Filter Localisation *Dec 2021*
In-fulfillment of the course Autonomous Mobile Robots
Developed a fundamental Particle-filter localization algorithm (Monte-Carlo Localisation) on Python and simulated on a robot in a real-time environment.

Conversion of RGB to Thermal Images using GANs *May 2021*
Contributed to the team at CSIR - CEERI
Formulated a Generative Adversarial Network using the CycleGAN pipeline for the conversion of RGB Images to Thermal Images and analyzed the cross-modality of both images for object detection for use in the autonomous vehicles industry.

Data Prediction on Site Outage Parameters *Dec 2020*
Contributed to the team at Ericsson
Preprocessed, analyzed and modeled the site outage parameters and measured their intracorrelation with the exception rules, and other features extraction. Designed a primary machine learning pipeline for the prediction of site outage and calculation of its parameters weightage.

Research

MARMOT Lab, National University of Singapore Singapore
Under the supervision of Prof. Sartoretti Guillaume and Prof. Saket Verma *Sep 2022 - Dec 2022*

- Programmed the Nonlinear Model Predictive Control of the single robotic system for collision avoidance in a dynamic obstacle environment.
- Simulated the problem of MAV reactive collision avoidance by employing a model-based controller and scaled the system to a two-robot system

BRAIL Lab, Indian Institute of Technology Guwahati, India

Under the supervision of Prof. Shyamanta M. Hazarika *May 2022 - Jul 2022*

- Analyzed Force-Signals using Haar Wavelet Transform to detect slip and load, which identified the appropriate force range for grasping
- Embedded Force-sensing resistors, encoders, and DC motors for the model to identify prosthetic grasping slip and load
- Currently working on a review article for grasping and its implications on prosthetics and robotics as the first author under the supervision