Hardik Gupta

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EDUCATION

Birla Institute of Technology and Science, Pilani   *Aug 2018 - Present*

Bachelor of Engineering (B.E.) in Mechanical Engineering

Courses: *Robotics, Autonomous Mobile Robotics, Engines Motors and Mobility, Vibrations and Control, Engineering Optimization*

Master of Science (M.Sc.) in Biological Sciences

Courses: *Microbiology, Biophysics, Genetics, Developmental Biology, Bioinformatics, Immunology, Physiological Studies, Cell Biology*

RESEARCH

Undergraduate Thesis

MARMOT Lab, National University of Singapore, Singapore   *Sep 2022 – Present*

Under the supervision of Prof. Sartoretti Guillaume and Prof. Saket Verma

- Control of the single robotic system through the use of Nonlinear Model Predictive Control for collision avoidance in a dynamic obstacle environment
- Scaled the system to two-robot systems and currently working on improving the system for multi-agent systems

Research Intern

BRAIL Laboratory, Indian Institute of Technology, Guwahati   *May 2022 – Jul 2022*

Under the supervision of Prof. Shyamanta M. Hazarika

- Printed the 3D model for underactuated anthropomorphic hand
- Analyzed Force-Signals using Haar Wavelet Transform to detect slip and load, which identified the appropriate force for grasping
- Embedded Force-sensing resistors, encoders, and DC motors for ideal model of the human hand to identify prosthetic grasping slip and load

Research Intern

CSIR-CEERI, Pilani   *May 2021 – Dec 2021*

Under the supervision of Dr. Soumendu Sinha

- Formulated a Generative Adversarial Network using CycleGAN pipeline for the conversion of RGB Images to Thermal Images
- Analyzed the cross-modality of both images for object detection for use in the autonomous vehicles industry
- Summarised the results and currently writing a research article for the project

EXPERIENCE

Intern

Ericsson, Gurugram   *Aug 2020 – Dec 2020*

Under the supervision of Pradipta Mitra

- Analyzed and Modeled parameters, of the telecommunication sector, responsible for outages and measured their correlation.
- Modeled the exception rules and other feature extraction in Tableau form
- Designed a primary machine learning pipeline for the prediction of site outage and its parameters' weightage

Engineering Intern

Bharat Heavy Electricals Limited, Visakhapatnam   *May 2020 – Jun 2020*

Under the supervision of Prof. Sabareesh Geetha Rajasekharan and Satish Kumar

- Innovated preliminary designs of Pressure Vessels using different value entries to help comprehend
- Developed Excel Macros using ASME estimating Circumferential, Longitudinal Stress, and Induced Thickness.
- Saved time for the engineers to take up custom data and make an assumption concerning the feasibility.

PROJECTS

Modelling of Neurons and Synapses with the focus on Stochastic Resonance Phenomenon *Jan 2022 - May 2022*

Under the supervision of Prof. Venkatesh Kadbur Prabhakar Rao

- Studied the electrophysiological properties of single neurons and prepared the Hodgkin-Huxley model on NEURON simulation environment
- Studied the membrane voltage and time relationship in the model on addition of leak conductance and active ion channels
- Upgraded the model with introduction of dendrite and synapse, and compared presynaptic and postsynaptic results

Implementation of Particle-Filter Localisation *Oct 2021 - 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.
- Received the highest score for the project

Modeling and Analysis of the thermal Management system in Fuel-cell vehicles *Oct 2021 - Dec 2021*

Under the supervision of Prof. Saket Verma

- Designed a model in MATLAB for a PEM cell to assess the cell's internal profiles and interactions in steady and transient states.
- Formulated the output performance and losses to evaluate the different cell efficiencies
- Examined the control model of water/coolant management systems in channels to stabilize the temperature in response to current

Phylogenomics of Leader Sequence within Enterobacteriaceae family *Jan 2020 - Dec 2020*

Under the supervision of Prof. Sandhya Marathe

- Explored the Enterobacteriaceae family's intricate evolutionary patterns to acquire developmental and pathogenic insights
- Examined the essential genes related to the horizontal gene transfer across genera for correlating with different families for better research.
- Submitted a research article to **Computational Biology and Chemistry Journal**, which is under peer review

VOLUNTEER EXPERIENCE

Child Rights & You *May 2021 – Jul 2021*

Banglore, India

Guided children on the exciting career opportunities in STEM and counseled them about the required study programs

Child Rights & You *May 2020 – Jul 2020*

Delhi

Taught STEM subjects to the children in the COVID-19 crisis and helped bridge the gap due to the pandemic lockdown

The/Nudge Foundation *May 2020 – Jul 2020*

Virtual

Designed their blogs about the events and activities around the city on various media platforms such as Linkedin

CONFERENCES & WORKSHOPS

NVIDIA GTC'22 *Mar 2022*

Virtual

NVIDIA GTC'21 *Apr 2021*

Virtual

NVIDIA GTC is a global virtual technology conference that provides an opportunity to participate and learn the latest in AI and advanced technologies that are transforming today's industries. The virtual event was supplied with live webinars, workshops, recorded sessions, and demos.