Amogh Juloori

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Education

Birla Institute of Technology & Science, Pilani - Hyderabad Campus **Hyderabad, India**

Bachelor of Engineering *November 2020 – May 2024*

- *Major in Electronics and Communication*
- *Minor in Robotics and Automation*
- *Relevant Coursework*: Robotics, AI for Robotics, Machine Learning, Deep Learning, Control Systems, Modern Control Systems, Digital Image Processing, Linear Algebra, Probability and Statistics

Research Experience

Technical Trainee ***Supervisor*: Dr. Mitsuharu Morisawa**

CNRS-AIST Joint Robotics Laboratory, AIST Tsukuba *July 2023 - January 2024*

- Studied the applications of Deep Reinforcement Learning in training the **HRP-5P** humanoid arm for manipulation in contact rich environments.
- Worked with the **Proximal Policy Optimization** algorithm using an **Actor-Critic** style neural network architecture.
- Used the **NVIDIA IsaacGym** simulator with an extensive tensor API integrated with **PyTorch** framework for training and testing the designed RL policies .
- Developed a policy that observes the root state of any cylindrical object within the arm's workspace and generates the optimum viable approach for reaching the object to allow successful grasping.

Projects

Thruster control of a 6 DOF AUV ***Faculty*: Prof. Alivelu M. Parimi**

EEE F422 Modern Control Systems *September 2022 - December 2022*

- Designed and evaluated the performance of **PID** based control loops on **Simulink** for linear and non-linear systems of an eight-thruster AUV in an underwater environment.
- Compared the use of **LQR** control on the AUV by linearization of the non-linear system against the PID control loop and found the former to have better performance.

Design and Fabrication of a Stewart Platform ***Faculty*: Prof. YV Daseswara Rao**

BITS F441 Robotics *September 2022 - December 2022*

- Constructed a **parallel plate manipulator** with servos, spherical rod-end bearings mounted on threaded metallic rods, a 3D printed platform and a wooden base.
- Made use of **Arduino** software for implementing joint actuation and understanding the Forward and Inverse Kinematics involved in generating the required spatial orientation.

Drone Detection using YOLO algorithms ***Faculty*: Prof. Paresh Saxena**

CS F425 Deep Learning *September 2022 - December 2022*

- Understood the working of object detection in images by using **YOLOv3** and **YOLOv5** algorithms on the COCO drone dataset.
- Implemented **Data Augmentation** with inclusion of bird images in the dataset, random cropping, mosaic etc. and **Layer Freezing** for the comparison of the two algorithms in terms of speed and accuracy.

Wheeled Biped ***Faculty*: Prof. Abhishek Sarkar**

Laboratory Project *January 2023 - May 2023*

- Built an **LQR** based control loop on **Simulink** for self-balancing of a wheeled biped with a **four-bar linkage** mechanism using the principles of an inverted pendulum.
- Utilised the **Fuzzy** toolbox for tuning the Kp and Kd gains of the **PD-Fuzzy** controller used for jumping and obtained favorable motor torques to jump over multiple obstacles of varying heights.

Technical Skills

Programming Languages: Python, C/C++, Arduino, MATLAB
Frameworks: PyTorch, Keras, ROS, Gazebo, LabVIEW
Libraries: OpenCV, NumPy, Matplotlib, Pandas
Operating Systems: Linux, Windows
CAD: Onshape, AutoCAD
Miscellaneous: Git, Simulink

Extracurricular Activities

Technical Team Member **BITS Pilani Hyderabad Campus**

Automation and Robotics Club *January 2021 - May 2023*

- Participated in realising the project ideas as a part of the technical team in the club.
- Mentored in the Robotics workshop conducted for Robotics enthusiasts during our Technical-Cultural Fest in 2022.

Volunteer **BITS Pilani Hyderabad Campus**

National Service Scheme *July 2022 - May 2023*

- Volunteered for a tree plantation drive in the neighboring villages of the campus and helped in spreading awareness about their importance.