ANANTH RACHAKONDA

Curriculum Vitae

RoCon Lab, RRC
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My Webpage
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Education

2022–Current **MS by Research, ECE(Spec. Robotics)**, *IIIT*, *Hyderabad*, *(Full University Funded)*.
Dynamics, Planning, Nonlinear Adaptive-Robust, Safety-Critical and Learning-based Controls for Dexterous Hands, Bipedal Robots and Drones

CGPA : 9/10

2015–2019 **Bachelor of Technology, EIE**, *CVRCE*, *Hyderabad*, *(Full State Funded)*.
Linear Systems, Communications, Signal Processing, Process Control, Circuit Design and Analysis, Instrumentation, Engineering Mathematics, Applied Physics, Algorithms and Data-Structures, Data Science Fundamentals

CGPA : 9.16/10

Publications

In Conference Proceedings

2023 **Swati Dantu*, Rishabh Dev Yadav*, Ananth Rachakonda*, Spandan Roy, Simone Baldi**, Adaptive Anti-swing Control for Clasping Operations in Quadrotors with Cable-suspended Payload, ***IEEE 62nd Conference on Decision and Control (CDC)***.
* indicates equal contribution

Journal(Submitted)

2023 **Swati Dantu, Rishabh Dev Yadav, Ananth Rachakonda, Spandan Roy, Simone Baldi**, Adaptive Tracking and Anti-swing Control of Quadrotors Carrying Suspended Payload, ***IEEE/ASME Transactions on Mechatronics***.
* indicates equal contribution

Patents(Granted)

2022 **Siva Kumar Kalepu, Keith James Trevor, Ananth Rachakonda, et al**, A Fully Functional Bionic Arm, ***IP India***.
First Inventor

Research Experience

International Institute of Information Technology, Hyderabad

Jul, 2023 – Current ***NMPC for Drones and Multi-fingered Hands***.
A novel nonlinear tube MPC strategy for disturbance rejection in safety critical applications involving regulation, and set-point tracking for the developed bionic hand (grasp pose) and drone payload operations (altitude hold)

Advisors : **Dr. Abhishek Dhar**, *Post-Doc, Division of Automatic Control*, Linköping University, Sweden
Dr. Spandan Roy, *Assistant Professor, Robotics Research Center*, IIIT, Hyderabad

Feb,2023 – Current ***A Dexterous Anthropomorphic Robotic Hand***.
4-dof digits to perform grasping and in-hand manipulation, its associated simulation pipeline, and end to end ROS Moveit based sim-hardware stack - custom plugins for model-based planning and control.

Jun, 2022 – Jan, 2023 ***A Novel Anthropomorphic Condyloid-like Joint***.
An anthropomorphic compliant tendon-driven condyloid-like joint with kinematic and dynamic model, and stiffness analysis.

Apr, 2022 – Current
An Anthropomorphic Bipedal Robot.
4-dof legs. MuJoCo sim pipeline for learning, and model-based controls. Novel Bilateral and Cycloidal drive-train. MIT Cheetah Actuator LL Stack.

Jun, 2022 – Jan, 2023
Adaptive Anti-swing Control of Quadrotors with Cable-suspended Payload.
Design and analysis of adaptive control strategy for considered drone and payload dynamics, implementation in ROS PX-4 Gazebo simulation suite, and on real hardware.

Advisor : **Dr. Spandan Roy**, *Assistant Professor, Robotics Research Center*, IIIT, Hyderabad

CVR College of Engineering, Hyderabad

Jun, 2017 – Jan, 2018
STASIA - A Segway Robot.
Robot Design, Underactuation, Linear Controller Design, Regulation, Robot Software Integration.

Jun, 2018 – Jan, 2019
VBEL - A Visual Servoing System.
YOLO, Centroid Estimation, Error Dynamics, PID Gain Tuning, Tracking

Industry Experience

Dec, 2020 – Nov, 2021
Senior Software Engineer, *Makers Hive Innovations Private Limited*.
Responsible for software research and development engineering of the company's product line.

Aug, 2019 – Dec, 2020
Embedded Software Engineer, *Makers Hive Innovations Private Limited*.
Ideated, designed, developed, integrated, optimized and tested the entire software stack of KalArm.

Fellowships & Awards

Sept, 2021
IIIT International Student Travel Grant to attend ***IEEE Conference on Decision and Control, 2023*** in Marina Bay Sands, Singapore.

Dec, 2021 –Current
IIIT Hyderabad Graduate Researcher Fellowship as a MS by Research Graduate Research Assistantship

Academic Achievements & Talks

2023
Lectures in *"MuJoCo for Contact Rich Learning of Bipedal Locomotion"*, between 27th, September - 14th, October at **Qualcomm Research, Bengaluru**.

2021
Honors in AI at IAIC, CVR College of Engineering, Hyderabad

2015-2017
Academic Achievement Award, CVR College of Engineering, Hyderabad

Software Stack

Programming	Python, C, C++, MATLAB
ML-DL	PyTorch, Keras, Scikit-learn
CAD	Fusion360, Onshape
Simulation	Gazebo, MoveIt, MuJoCo, PyDrake, Simscape Multibody
Systems	ROS 1, Stable Baselines 3, Mushroom RL, OpenAI Gym, Safety Control Gym, PX4, OpenCV
Optimization	CVXPY, CasADi, MPT3, CVX

Teaching

2023 .

Fall
Mentor, MLAIAS, CCE, Indian Institute of Science, Bengaluru, TalentSprint.

Summer
RRC Summer School, *Dynamics and Control*, IIIT Hyderabad.

2022 .

Summer
RRC Summer School, *Dynamics and Control*, IIIT Hyderabad.

Winter
Electronics Workshop, IIIT Hyderabad.