

# Govind Aadithya Rajagopalan

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## EDUCATION

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- **New York University** New York, United States  
*Master of Science in Mechatronics and Robotics; CGPA: (3.833/4.0)* *Aug 2022 – May 2024*
- **SRM Institute of Science and Technology** Chennai, Tamil Nadu, India  
*Bachelor of Technology in Mechatronics Engineering; CGPA: (7.956/10.0)* *Aug 2014 – April 2018*

## SKILLS

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- **CAD Softwares:** SolidWorks, CREO Parametric, Festo FluidSim, Easy EDA.
- **Programming:** Python, C++, SQL, LabVIEW, Matlab & Simulink.
- **Toolkits & Libraries:** ROS, ROS2, Python – Pandas, Django, OpenCV, pytorch ; C++ - Eigen, MATLAB – Robotics Toolbox
- **Robot Platforms:** Robotis OP3, Darwin Custom, & Bioloid, Omron eCobra 800, Yaskawa MotomanGP7

## RESEARCH AND PUBLICATION

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- **Thesis Work**  
*New York University, Applied Dynamics and Optimization Lab* *May 2023 - May 2024*
  - **Simulation Package for OP3:** Build a simulation package with MuJoCo physics engine compatible with Robotis' ROS framework. Additionally, the platform is also compatible with trajectory following from sparse trajectories received from trajectory optimization frameworks with b-spline based rediscretization of trajectories.
  - **Dynamic Lifting:** Assisted with the study of understanding the effects of object mass during lifting and generating dynamic trajectories for lifting motion using Balanced State Boundaries.*SRM Institute of Science and Technology* *Aug 2017 - May 2018*
  - **Multi Robot Planning:** A Decentralized navigation algorithm using optimal control based trajectory optimization framework for multi-robot navigation in a dynamic environment.
- **Conference Publications**  
*IFAC - Advances in Control and Optimization of Dynamic Systems* *Feb 2020*
  - Shravan Krishnan, Govind Aadithya Rajagopalan, Sivanathan Kandhasamy, and Madhavan Shanmugavel. Continuous-time trajectory optimization for decentralized multi-robot navigation. (Link)*IEEE 4<sup>th</sup> International Symposium On Robotics and Manufacturing Automation, India* *Dec 2018*
  - Vijay Arvindh, Govind Aadithya R, Shravan Krishnan, and Sivanathan K. Collision-free multi robot trajectory optimization in unknown environments using decentralized trajectory planning. (Link)*IEEE International Conference on Intelligent Transportation Systems, United States* *Nov 2018*

Shravan Krishnan, R Govind Aadithya, Rahul Ramakrishnan, Vijay Arvindh, and K Sivanathan. A look at motion planning for avs at an intersection. (Link)
- **Other Publications**
  - Shravan Krishnan, Govind Aadithya Rajagopalan, Sivanathan Kandhasamy, and Madhavan Shanmugavel. Towards scalable continuous-time trajectory optimization for multi-robot navigation, 2019. (Link) [Video]
  - Govind Aadithya R, Shravan Krishnan, Vijay Arvindh, and Sivanathan K. Online decentralized receding horizon trajectory optimization for multi-robot systems, 2018. (Link)
- **Patent**  
*SRM Institute of Science and Technology* *Jun 2019*
  - Sivanathan Kandhasamy, Govind Aadithya Rajagopalan, and Shravan Krishnan. A system for decentralized collision-free navigation of multiple robots, Jun 2019. (Link)

## AWARDS

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- **Tandon Merit Scholarship:** Scholarship for MS program from NYU Tandon School of Engineering.
- **Best Paper Award:** Received the best paper award at the IEEE International Symposium on Robotics and Mfg. Automation, Tamil Nadu, India.
- **2<sup>nd</sup> Runner-up in IROS Humanoid Robot Application Challenge:** Performed Magic Trick with Humanoid and won 2<sup>nd</sup> runners-up position in the Humanoid Robot Application Challenge at IROS'17 held at Vancouver, Canada.
- **Multiple Medals in Robogames Competition:** Won 1<sup>st</sup> place in Penalty Kick, 2<sup>nd</sup> place in Biped Race and Freestyle, 3<sup>rd</sup> place in Sumo Wrestling events at Robogames'17 held in Pleasanton, USA.

## WORK EXPERIENCE

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- **Schneider Electric** Gujarat, India  
*Manufacturing, Automation, and Digitization Engineer* Oct 2018 - Jun 2022
  - Design and development of factory automation solutions for Brownfield projects and reducing a total of  $\approx 30$  touch points.
  - Performed network architecture, control logic, and communication design for Special Purpose test and assembly equipment and Robot Work Cells.
  - Engineered software solutions for process automation and assembly interlocks by leveraging HMI design and database management.
  - Spearheaded the Industrial-IoT (IIoT) initiative to monitor equipment and implemented predictive maintenance for critical systems.
- **Srujana - Technology and Innovation Center, LV Prasad Eye Institute** Hyderabad, India  
*LVP MITra Fellow* Dec 2017 - Feb 2018
  - Worked on building the "Bullseye", a portable corneal topographer attachment that can work on any mobile device with a camera.
  - Prototyping the hardware and building the math base for pattern projection and 3D reconstruction.
  - Engineered an image processing software that will run on the cloud and will detect the projected pattern to perform 3D reconstruction of the surface the pattern is projected on and return the deviation observed from an ideal cornea.

## PROJECTS

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- **Embodied AI and Visual Navigation challenge:** Implemented Graph SLAM and VPR algorithm from scratch to perform visual navigation to a given scene in an unfamiliar environment. Code can be found [here](#).
- **Sensor Fusion and State estimation for Aerial Robot:** Developing several data fusion strategies (Extended and Unscented Kalman Filter and State estimation from Vision) from data collected from sensors like IMU, Motion Capture, and Camera.
- **Q-Learning for Inverted Pendulum:** Devised a Q-Learning based controller for the Inverted Pendulum on a cart problem.
- **Trajectory Tracker for Bi-Rotor:** Designing an I-LQR controller for making bi-rotor follow a given trajectory.
- **Visual markers and servoing-based control of robot:** Robot navigation using visual markers and visual servoing methods to navigate a grid structure. The project was executed by integrating Propeller controller and RPi for visual servoing. Code can be found [here](#).
- **Motion replication in animatronic hand:** Used the mediapipe and computer vision to extract joint angles of hand and normalize it for distance of hand in the frame to replicate it on the animatronic hand. The code and details of the project can be found [here](#).
- **Whole body shadowing of human motion:** Objective is to replicate whole body human motion on OP3 robot. This was done by using the Xbox Kinect sensor and the skeletal overlay to estimate joint angle being performed by the operator in front.
- **Ankle strategy control for frontal plane control:** Designed a PD control using ankle strategy with a reduced order inverted pendulum model for Bioloid which was later adapted in the Darwin OP and OP3 robots.
- **Inverse Kinematic and trajectory control for walk cycle:** Inverse Kinematic control to make sure the CoM lies with the BOS thereby improving stability during work and trajectory following for swing foot trajectory.