



Gayathri Rangu

Roll No.:216101003

Ph.D - Computer Science and Engineering

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EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
Ph.D.	Indian Institute of Technology Guwahati	7.9	2021-Present
B.Tech	Guru Nanak Institutions, Hyderabad	8.5	2017-2021
Intermediate	Narayana Junior College, Hyderabad	96.4%	2017
Secondary	Saint Mary's High School (SSC)	9.3	2015

RESEARCH

I am an up-and-coming researcher specializing in the topic of Immuno-inspired Federated Reinforcement Learning in a Robotic Network. My focus lies in leveraging advanced techniques, such as Federated Reinforcement Learning (FRL) and Sim-to-real Transfer, to enhance coordination and learning capabilities within robotic groups. By harnessing Evolutionary Algorithms and Artificial Immune Systems, I strive to enable robots to adapt and learn in dynamic environments. Through FRL, I aim to develop intelligent algorithms that facilitate multiple robots to collaborate, optimizing their performance through Reinforcement Learning. Additionally, my research delves into Sim-to-real Transfer, aiming to bridge the gap between simulated and real-world environments by enabling robots to transfer learned behaviors and policies. My future work also involves investigating robot learning using Human Feedback.

TEACHING ASSISTANTSHIP

- **Head TA - CS666 Mobile Robotics Lab.** *Jul. 2023 - Nov. 2023*
 - Conducting hands-on sessions on Webots, a robotic simulator, introductory sessions on basic robots like FireBird V, Lego NXT, etc
- **Head TA - CS321 Smart Systems Lab.** *Jan. 2023 - May 2023*
 - Delivered tutorials and conducted Lab. sessions on IoT and Embedded systems concepts such as Microprocessors, Multi-Agent Systems, MQTT, etc.
 - Prepared course materials and evaluated students' performance on a weekly basis
- **TA - CS321 System Software Lab.** *Jul. 2022 - Nov. 2022*
- **Head TA - CS101 Introduction to Computing** *Dec. 2021 - May. 2022*
 - Prepared Course material and assignments on C Programming concepts
- **TA - CS565 Intelligent Systems and Interfaces** *Jul.2021 - Nov.2021*
 - Prepared and evaluated Course Assignments and Projects on Natural Language Processing (NLP)

INDUSTRY EXPERIENCE

- **CtrlS Datacenters Ltd.** *Dec. 2020 - Jun. 2021*
Network Engineer *Hyderabad, India*
 - As a Network Engineer, worked on Cisco Packet Tracer, handled tickets raised by clients

RESEARCH PUBLICATIONS

- **On Mobile-Agent-based Swarm Reinforcement Learning in a Heterogeneous Robotic Network** *to be appeared ACM Advances in Robotics (AIR 23), IIT Ropar.*
- **A Hybrid Federated Reinforcement Learning Approach for Networked Robots** *Springer International Conference on Science, Technology and Engineering (ICSTE 23)*

PROJECTS

- **Understanding Deep RL Algorithms** *Jul. 2023-Ongoing*
Self Project *github*
 - In-depth studying and Implementation of standard Deep RL algorithms such as DQN, DDQN, Prioritized DQN, etc. using PyTorch
 - Testing them on various robotic environments using **Webots®** simulator
- **Obstacle avoidance in Webots® using Q-learning and SARSA** *Jun. 2022-Sep. 2022*
Self Project *github*
 - Imparting the obstacle avoidance behavior using **Q-learning** and **SARSA** and analyzing the performance of the robot in each case.

– This is implemented on a **Webots®** simulator robot and a real-world **firebird V** robot

• **InnDrone - A Hexacopter for indoor navigation**

August 2023-Current

4i Labs, IIT Guwahati

– Currently working on the SLAM module of the drone. The main challenge is to localize it to indoor spaces without using GPS

• **Digit Recognition through Speech using HMM**

Sep. 2021 - Nov. 2021

Course Project: Dr. Pradip Kumar Das, Prof. at Dept. of CSE, IIT Guwahati

github

– Performed the digit recognition task using speech signals as input. This is done from scratch in C++ using Hidden Markov Model wherein the model is trained on the custom-recorded dataset.

TECHNICAL SKILLS

- **Coding:** Python | C | Prolog | Java | C++
- **Hardware:** Firebird V (ATMEGA2560) Robot | LEGO Mindstorms Robot | Raspberry Pi | Arduino | NodeMCU (ESP8266) | Various sensors and actuators
- **Robot Simulators and Tools:** Webots® | ROS
- **Frameworks:** PyTorch

KEY COURSES TAKEN

- **Robotics:** Mobile Robotics
- **Machine Learning:** Deep Learning | Topics and Tools in Social Media Data Mining | Speech Processing
- **Mathematics:** Mathematics for Computer Science

POSITIONS OF RESPONSIBILITY

- **General Secretary, IEEE Student Branch, Guwahati Subsection:** Elected as the General Secretary of IEEE Student Branch, Guwahati Subsection for the year 2023-2024
- **Core Volunteer, Anchoring Team, IEEE GCON23:** Anchored a 3-day international conference held by IEEE Guwahati Subsection from June 23-25, 2023
- **Volunteer - Workshop on VEGA Processor Ecosystem:** As a volunteer, got an opportunity to organize and help students to work on a Made-in-India microprocessor board, VEGA, developed by C-DAC, Trivandrum from 14-15th April 2023
- **Public Relations Volunteer - NERC 2022, IIT Guwahati:** As a member of the Public Relations and Brand Responsibility (PRBR) team, I monitored the event schedule for the North East Research Conclave (NERC), 2022.
- **Field Coordinator - Voice4Girls(NGO), Hyderabad:** Volunteered as an on-site camp manager at KGBV in Jaipur. In addition to coordinating activities between counselors, school administration, and the organization, my main duties included mentoring four camp counselors and preparing them for their daily teaching.
- **Case Analyst and Content Distributor - Asandwhen, Hyderabad:** At the marketing firm Asandwhen, as an intern, gained experience in creating and managing clients' regular social media advertising campaigns.

MEMBERSHIPS

- Member, **The Robotics Society**
- Member, **IEEE**
- Member, **Toastmasters International**

CO AND EXTRA-CURRICULAR ACTIVITIES

- As a member of the Toastmasters of Guwahati Club, I actively participate in various speaking and leadership activities, honing my communication and public speaking skills.
- Participated in a National-level workshop - Karyashala: High-End Workshop on Control of Autonomous Mobile Robot at NIT Silchar from 16th to 22nd January 2023.
- Showcased robotic projects to school children during the Open day program as a part of NERC, 2022
- As a member of the Athletics Club, IIT Guwahati, participated in various running challenges and also finished a Himalayan trekking expedition in 2022.

ACHIEVEMENTS

- **Gold Medalist: Topper of the department** at GNI, Hyderabad. Secured **2nd** highest CGPA in the entire college
- **Travel Grant:** received a travel grant to attend the Karyashala: A High-end Workshop on Autonomous Control of Mobile Robots, a National-Level Workshop. One among the 25 applicants who got selected for the workshop from various institutions throughout India.
- **1st Prize:** Secured **1st** prize and **Best paper presentation award** at SPOORTHI 2019 - A National Level Technical Symposium, conducted by JNTUH-CEH among 40 participants from 25 institutions
- **GATE Score:** Secured **96.9%**, GATE - CSE, 2021

I hereby declare that all the details provided above are true to the best of my knowledge.

Date:28/08/2023

Signature: Gayathri Rangu