



Jayprakash Nair

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ABOUT MYSELF

Aspiring to be a researcher in Multi-Agent Multi-Robot Systems. My current research focuses on **Autonomous Systems, Federated Learning** and **Swarm Learning**, and **intelligent agent coordination**. I have co-authored two papers on decentralized learning strategies in **multi-robot environments** using **mobile agents**. With a passion for advancing **multi-agent systems**, I aim to contribute to innovative life-long learning solutions in the realm of robotics.

EDUCATION AND TRAINING

30/07/2024 – CURRENT Patna, India

MASTER OF TECHNOLOGY IN ARTIFICIAL INTELLIGENCE AND DATA SCIENCE Indian Institute of Technology Patna (IIT Patna)

Website <https://www.iitp.ac.in/> | **Level in EQF** EQF level 7

30/07/2018 – 30/06/2022 Thiruvananthapuram, India

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGG. APJ Abdul Kalam Technological University

Website <https://ktu.edu.in/> | **Level in EQF** EQF level 6

WORK EXPERIENCE

11/07/2022 – 02/08/2024 Bengaluru, India

SOFTWARE ENGINEER PEOPLE10 TECHNOLOGIES INC.

- Developed e-commerce features for Allegiant Air (GraphQL, pricing, bundles, bookings)
- Implemented QA automation scripts
- Managed event logistics and participant activities for Code Combat (Hackathon)

01/02/2019 – 01/12/2019 Guwahati, India

RESEARCH INTERN INDIAN INSTITUTE OF TECHNOLOGY (IIT) GUWAHATI

- Learnt to control robots within Webots using Python
- Program mobile agents using Tartarus, a multi-mobile agent platform

PROJECTS

11/07/2022 – 02/08/2024

Allegiant Air Navitaire Initiative (at People10 Technologies)

- Contributed extensively to UI enhancement in the Navitaire Initiative of the Allegiant Air project, using PHP and GraphQL
- Developed a GraphQL mutation for session resets within the post-booking middleware
- Managed shopping cart pricing updates in the Change City Pair initiative
- Implemented automation projects to streamline QA processes, ensuring efficient and reliable software delivery

12/12/2021 – 12/05/2022

On Decentralizing Federated Reinforcement Learning in Multi-Robot Scenarios (Bachelor's Project)

- Realized **Decentralized Federated RL** (Q- & SARSA) for robots running on multiple instantiations of Webots running on different PCs connected via the LAN, using mobile agents

01/08/2020 – 01/12/2020

RL for e-puck within Webots

- Coded RL (Q- and SARSA)-based robot controllers within Webots.
- Analyzed and compared the performances of these RL controllers.

DIGITAL SKILLS

GIT version control, Linux Command | Linux (Terminal Commands, Bash/Shell) | Windows, Ubuntu, iOS | LaTeX (very good) | Overleaf & LaTeX

Machine Learning for Robotics

Webots: robot simulator | Multi agent system | Python(Pandas Matplotlib Seaborn Pytorch Tensorflow) | Federated Learning | Reinforcement Learning | Swarm Robotics | PYTHON (intermediate)

Web Development

PHP (7.x) | JAVAScript | HTML, CSS, Javascript, ReactJs | C,C,C++ | PHP(SymfonyDrupal8BroadwayPHPUnit)

LANGUAGE SKILLS

Mother tongue(s): MALAYALAM

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C1
HINDI	C2	C1	C2	C2	C1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

PUBLICATIONS

2023
A Hybrid Federated Reinforcement Learning Approach for Networked Robots

Federated Learning (FL) ensures data privacy by aggregating local models instead of raw data at a central server. However, centralized FL risks failures due to server or network issues, while decentralized FL avoids this but increases learning time. This paper introduces **Hybrid Federated Reinforcement Learning (HyFRL)**, a mobile agent-based approach combining centralized and decentralized methods for networked robotics. Using **Webots**, an open-source robot simulator, multi-robot experiments demonstrate HyFRL's effectiveness in aggregating and sharing Q-tables across connected robots, outperforming both centralized and decentralized FL approaches.

G. Rangu, D.D. Kulkarni, J.S. Nair and S.B. Nair ICSTE 2023. Vol 1071. Springer, Singapore.

Link https://scholar.google.com/citations?view_op=view_citation&hl=en&user=heZachgAAAAJ&authuser=2&citation_for_view=heZachgAAAAJ:u5HHmVD_uO8C

2022
On Decentralizing Federated Reinforcement Learning in Multi-Robot Scenarios

This paper presents a mobile agent-based approach to **Decentralized Federated Learning (FL)** in multi-robot systems, addressing challenges like central node failure and bandwidth bottlenecks. Using **Webots**, an open-source robot simulator, and **Tartarus**, a mobile agent platform, we demonstrate how mobile agents enable **Decentralized Federated Reinforcement Learning (dFRL)**. Experiments with **Q-learning** and **SARSA** show the viability of aggregating Q-tables across connected robots without central control. The proposed framework is adaptable to other learning algorithms and real robots, offering a versatile tool for studying decentralized FL in heterogeneous multi-robot systems.

J. S. Nair, D. D. Kulkarni, A. Joshi and S. Suresh (SEEDA- CECNSM), Ioannina, Greece, 2022, pp. 1-8

Link https://scholar.google.com/citations?view_op=view_citation&hl=en&user=heZachgAAAAJ&authuser=2&citation_for_view=heZachgAAAAJ:u-x6o8ySG0sC