PHANI TEJA SINGAMANENI

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Scholar
ORCiD

I am a researcher in social robotics with a background in motion planning and learning. Specifically, I have been working on different aspects of human-aware robot navigation since my Ph.D. at LAAS-CNRS. Previously, I pursued my Masters in robotics from IIIT-Hyderabad, working on whole-body motion planning for a humanoid robot, exploring classical and learning based approaches. My research interests encompass robot design, motion planning, reinforcement learning, artificial intelligence, and task planning, with a focus on developing autonomous intelligent social robots.

Education

Ph.D., Robotics and HRI Jan 2019 - Dec 2022
LAAS-CNRS, Toulouse, France
Dept. of Computer Science and Telecommunications, Université Toulouse III - Paul Sabatier, France
Dissertation: *Combining Proactive Planning and Situation Analysis for Human-Aware Robot Navigation*
Advisor: Dr. Rachid Alami

Master of Science by Research Aug 2016 - Aug 2018
Dept. of Electronics and Communications, IIIT-Hyderabad, Hyderabad, India
Specialization in Robotics at RRC
Dissertation: *Learning Multi-Goal Reachability in a Humanoid Robot Using Deep Reinforcement Learning*
Advisors: Dr. Madhava Krishna K and Dr. Abhishek Sarkar

B.Tech (Honors), Electronics and Communication Engineering Aug 2012 - Aug 2016
IIIT-Hyderabad, Hyderabad, India
University Gold medalist, IIIT-Hyderabad, for the Dual Degree Class of 2012 in ECE

Research Experience

Postdoctoral Researcher, INRIA, Nancy, France Oct 2025 - Present
Advisor: Dr. Serena Ivaldi

- Developed ROS2 version of the human-aware robot navigation stack (CoHAN). Plan to integrate this on different robots (humanoids and mobile robots) to perform human accompaniment and robust social navigation.

Postdoctoral Researcher, LAAS-CNRS, Toulouse, France Mar 2023 - Sep 2025
Advisor: Dr. Rachid Alami

- Developed a new version of human-aware robot navigation planning system (CoHAN) combining behavior trees and delivered it as part of euROBIN project. Mentored and hosted open challenges that complement or use the new version of CoHAN.
- Collaborations: (1) Proposed a combined Task and Motion Planning framework (with CNR-ISTC, Roma) for context adaptive navigation (2) Conducted a collaborative (with Univ. of Michigan) user study on how different human motion predictions affect the robot navigation and user perception. (3) Explored the use of LLMs (with ISIR, Paris) to improve awareness and the legibility of user built over geometric reasoning.
- Did a research exchange to University of Bremen for euROBIN project integration. This involved integrating CoHAN into their Multiverse Framework.

Research Engineer (Ingénieur de recherche), LAAS-CNRS, Toulouse, France Jan 2023 - Feb 2023

- Research focused on improving human-aware robot navigation in terms of behavior and evaluation.
- Proposed new evaluation metrics to benchmark the *human awareness* of the planning system studying how the robot's behavior could influence humans. The proposed metrics are flexible compared to proxemics and apply to multiple contexts.

Graduate Student, LAAS-CNRS, Toulouse, France Jan 2019 - Dec 2022
Advisor: Dr. Rachid Alami

- Thesis aims to propose better motion planning solutions for a robot navigating in human environments, otherwise called human-aware robot navigation.
- Considering the complexities involved, a multi-modal planning system that chooses an appropriate planning mode based on the situation and context was developed in ROS. Further several methodologies and algorithms that deal with different kinds of humans were incorporated into the system. The whole software stack is made available on github.
- The system has been tested vigorously in simulation on real robot platforms – Pepper, PR2 and Tiago at LAAS and several other robotic labs (through collaborations or independent deployments). Partly (older version) used in MuMMER European project for in-situ user studies.

Research Assistant, Robotics Research Center, IIIT-Hyderabad, India Aug 2016 - Nov 2018
Advisors: Dr. Madhava Krishna, Dr. Suril V. Shah and Dr. Abhishek Sarkar

- Worked on various projects like designing stair-climbing robots, building a 3D-printed humanoid robot and building the required circuitry for it, followed by the work on whole-body motion planning of humanoids.
- Designed a novel reinforcement learning framework for dual arm reachability tasks of a humanoid robot as a part of Masters research.
- Worked on motion capture based human to robot (humanoid) motion transfer as a part the 3 month exchange to IIT, Jodhpur.

Teaching Experience

Teaching Assistant (Vacataire), INSA, Toulouse, France Apr 2022 - Jun 2022
Labs for real-time systems course.

Teaching Assistant (DCE), INSA, Toulouse, France Sep 2020 - Aug 2021
1. Tutorials for hardware logic and computing, 2. Labs for real-time systems

Teaching Assistant, IIIT-Hyderabad, Hyderabad, India Aug 2014 - Dec 2017

Course Name	Duration
Embedded Hardware Design	1 Aug 2014 – 15 Dec 2014
Digital Logic and Processors	1 Aug 2015 – 15 Dec 2015
Communication Theory – 1	1 Jan 2016 – 15 May 2016
Digital Logic and Processors	1 Aug 2016 – 15 Dec 2016
Introduction to Robotics	1 Jan 2017 – 15 May 2017
Digital Logic and Processors	1 Aug 2017 – 15 Dec 2017

Industry Experience

Summer Intern, Uurmi Systems (now Mathworks), Hyderabad, India May 2015 - Jul 2015

- Contributed to the design and development of the software and embedded hardware for an autonomous car project's controller.
- Worked on a control system to make Crazyflie quadcopter follow a Nintendo Wii remote.

Awards and Honors

Best Student Paper Award, Fifth Iberian Robotics Conference 2022

Best Student Paper Award Finalist, IEEE RO-MAN 2020

Microsoft Student Travel Grant, International Symposium on Robotics, Munich 2018

University Gold medalist, IIIT-Hyderabad 2016
Dual Degree Class of 2012 in Electronics and Communication Engineering

Invited Talks

Advances and Challenges in Robot Social Navigation Workshop, ECMR - 2025, Padova, Italy Sep 2025

Publications

Google scholar
h-index: 12, i10-index: 14

Journal Articles

[3] Bachiller-Burgos, Pilar, Ulysses Bernardet, Luis V. Calderita, Pranup Chhetri, Anthony Francis, Noriaki Hirose, Noé Pérez, Dhruv Shah, **Phani Teja Singamaneni**, Xuesu Xiao, Luis J. Manso. "*Towards Data-Driven Metrics for Social Robot Navigation Benchmarking.*", arXiv e-prints, 2025.

[2] Anthony Francis and Claudia Pérez-D'Arpino and Chengshu Li and Fei Xia and Alexandre Alahi and Rachid Alami and Aniket Bera and Abhijat Biswas and Joydeep Biswas and Rohan Chandra and Hao-Tien Lewis Chiang and Michael Everett and Sehoon Ha and Justin Hart and Jonathan P. How and Haresh Karnan and Tsang-Wei Edward Lee and Luis J. Manso and Reuth Mirksy and Sören Pirk and **Phani Teja Singamaneni** and Peter Stone and Ada V. Taylor and Peter Trautman and Nathan Tsoi and Marynel Vázquez and Xuesu Xiao and Peng Xu and Naoki Yokoyama and Alexander Toshev and Roberto Martín-Martín. "*Principles and Guidelines for Evaluating Social Robot Navigation Algorithms*", ACM Transactions on Human-Robot Interaction, 2025.

[1] **Phani Teja Singamaneni**, Pilar Bachiller-Burgos, Luis J. Manso, Anaís Garrell, Alberto Sanfeliu, Anne Spalanzani, Rachid Alami. *"A Survey on Socially Aware Robot Navigation: Taxonomy and Future Challenges*", The International Journal of Robotics Research, 2024.

Conference Publications

[17] **Phani Teja Singamaneni**, Marcello Tascioni, Alessandro Umbrico, Andrea Orlandini, and Rachid Alami, "*Contextual Social Navigation through Integrated Task and Motion Planning*", International Conference on Social Robotics, 2024.

[16] Amandine Mayima, Guillaume Sarthou, Guilhem Buisan, **Phani Teja Singamaneni**, Yoan Sallami, Jules Waldhart, Kathleen Belhassein, Aurélie Clodic, Rachid Alami, "*How to make a robot guide?*", International Symposium on Experimental Robotics, 2023.

[15] Anthony Favier, **Phani Teja Singamaneni**, Rachid Alami, "*Challenging Human-Aware Robot Navigation with an Intelligent Human Simulation System*", Social Simulation Conference, 2023.

[14] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. "*Towards Benchmarking Human-Aware Robot Navigation: A New Perspective and Metrics*", IEEE RO-MAN, 2023.

[13] Olivier Hauterville, Camino Fernández, **Phani Teja Singamaneni**, Anthony Favier, Vicente Matellán, and Rachid Alami. "*Interactive Social Agents Simulation Tool for Designing Choreographies for Human-Robot-Interaction Research*", ROBOT2022: Fifth Iberian Robotics Conference: Advances in Robotics, 2022.

[12] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. "*Watch out! There may be a Human. Addressing Invisible Humans in Social Navigation*", IEEE/RSJ IROS, 2022.

[11] Jérôme Truc, **Phani Teja Singamaneni**, Daniel Sidobre, Serena Ivaldi, and Rachid Alami. "*Khaos: a kinematic human aware optimization-based system for reactive planning of flying-coworker*", IEEE ICRA, 2022.

[10] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. "*Human-Aware Navigation Planner for Diverse Human-Robot Interaction Contexts*", IEEE/RSJ IROS, 2021.

[9] **Phani Teja S** and Rachid Alami. "*Hateb-2: Reactive planning and decision making in human-robot co-navigation*", IEEE RO-MAN, 2020.

[8] Raghu Ram Theerthala, AVS Sai Bhargav Kumar, Mithun Babu, **S Phaniteja**, and K. Madhava Krishna. "*Motion planning framework for autonomous vehicles: A time scaled collision cone interleaved model predictive control approach*", IEEE Intelligent Vehicles Symposium, 2019.

[7] Meha Kaushik, Nirvan Singhania, **Phaniteja S** and K. Madhava Krishna. "*Parameter sharing reinforcement learning architecture for multi agent driving*", Proceedings of the Advances in Robotics, 2019.

[6] **Phaniteja Singamaneni**, Parijat Dewangan, Abhishek Sarkar, and Madhava K. Krishna."*Learning Multi-Goal Inverse Kinematics in Humanoid Robot*", 50th International Symposium on Robotics, 2018.

[5] **S Phaniteja**, Parijat Dewangan, Pooja Guhan, K. Madhava Krishna, and Abhishek Sarkar. "*Learning dual arm coordinated reachability tasks in a humanoid robot with articulated torso*", IEEE-RAS Humanoids, 2018.

[4] **S Phaniteja**, Parijat Dewangan, Pooja Guhan, Abhishek Sarkar, and K. Madhava Krishna. "*A deep reinforcement learning approach for dynamically stable inverse kinematics of humanoid robots*", IEEE ROBIO, 2017.

[3] Divyanshu Goel, **S Phani Teja**, Parijat Dewangan, Suril V. Shah, Abhishek Sarkar, and K. Madhava Krishna. "*Design and development of a humanoid with articulated torso*", IEEE RAHA, 2016.

[2] Sri Harsha Turlapati, Mihir Shah, **S Phani Teja**, Avinash Siravuru, and Suril V. Shah. "*Stair climbing using a compliant modular robot*", IEEE/RSJ IROS, 2015.

[1] **S Phani Teja**, Sri Harsha, Avinash Siravuru, Suril V. Shah, and K. Madhava Krishna. "*An improved compliant joint design of a modular robot for descending big obstacles*", Proceedings of Conference on Advances In Robotics, 2015.

Workshop Papers

[5] **Phani Teja Singamaneni**, Alessandro Umbrico, Andrea Orlandini, and Rachid Alami. "*Adaptive Robot Navigation through Integrated Task and Motion Planning*", PlanRob Workshop, ICAPS, 2023.

[4] **Phani Teja Singamaneni**, Alessandro Umbrico, Andrea Orlandini, and Rachid Alami. "*Towards Enhancing Social Navigation through Contextual and Human-related Knowledge*", International Conference on Social Robotics 2022 Workshop: ALTRUIST, 2022.

[3] Olivier Hauterville, Camino Fernández, **Phani Teja Singamaneni**, Anthony Favier, Vicente Matellán, and Rachid Alami. "*IMHuS: Intelligent Multi-Human Simulator*", IROS2022 Workshop: Artificial Intelligence for Social Robots Interacting with Humans in the Real World, 2022.

[2] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. "*Invisible Humans in Human-aware Robot*

Navigation", IEEE ICRA Workshop: Social Robot Navigation: Advances and Evaluation, 2022.

[1] Anthony Favier, **Phani Teja Singamaneni**, and Rachid Alami. "*Simulating intelligent human agents for intricate social robot navigation*", RSS Workshop on Social Robot Navigation, 2021.

Short Papers

[1] Anthony Favier, **Phani Teja Singamaneni**, and Rachid Alami. "*An Intelligent Human Avatar to Debug and Challenge Human-aware Robot Navigation Systems*", ACM/IEEE HRI, 2022.

Technical Reports

[1] **Phani Teja Singamaneni**. "*Combining proactive planning and situation analysis for human-aware robot navigation. Theses. Université Paul Sabatier-Toulouse III.*" 2022.

Student Supervision

1. Gerardo-Perez, Exchange student (Jul-Sep, 2023)

2. Maxime Nee, Summer Intern (Jul-Sep, 2023)

Professional Activities

Dagstuhl Seminar 27131: Comp. Intelligence in Social and Human Aspects of Robot Navigation 2027
Seminar Organizer

IEEE Robotics and Automation Letters (RA-L) Aug 2025 - Present
Associate Editor

Frontiers in Robotics & AI Mar 2025 - Present
Co-editor of Social Robot Navigation – Opportunities, Algorithms, Tools, and Systems Topic

Advances in Social Navigation: Planning, HRI and Beyond Workshop, ICRA'25 May 2025
Workshop Organizing Chair

Unsolved Problems in Social Robot Navigation, RSS'24 July 2024
Workshop co-organizer

The 2nd Workshop on Social Robot Navigation: Advances and Evaluation, IROS'24 Oct 2023
Workshop co-organizer

Workshop on Joint Action, Adaptation, and Entrainment in Human-Robot Interaction, HRI'22 Mar 2022
Workshop co-organizer

Reviewer
Journals: International Journal of Social Robotics (IJSR), IEEE Robotics and Automation Letters (RA-L), International Journal of Robotics Research (IJRR)

Conferences: IEEE International Conference on Robotics and Automation (ICRA), International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), IEEE/ACM International Conference on Human-Robot Interaction (HRI)

Other Activities

Member of Student Placement Committee for Campus Recruitments at IIIT-Hyderabad 2015-2016

Team Member of CanSat Competition from IIIT-Hyderabad 2015

Team Member of ABU RoboCon from IIIT-Hyderabad 2014

Technical Skills

Languages: Proficient in C, C++, Python, Matlab; Familiar with R and Java
Tools/Libraries: ROS, ROS2, Git, LaTeX, Tensorflow, PyTorch, Solidworks, Blender, Cadence, Xilinx, AVR
Simulators: Gazebo, MuJoCo, Webots
Robots: Pepper, PR2, Tiago