

PHANI TEJA SINGAMANENI

Toulouse, France

🏠 <https://ptsingamaneni.com>

✉ phaniteja.sp@gmail.com

👤 Google scholar

I specialize in HRI and motion planning, with a Ph.D. in social robot navigation from LAAS-CNRS. Previously, I pursued my Masters in robotics from IIIT-Hyderabad, working on whole-body motion planning for a humanoid robot. My research interests encompass robotic design and control, motion planning, reinforcement learning, artificial intelligence, and task planning, with a focus on developing autonomous intelligent robots.

EDUCATION

Ph.D., Robotics and HRI

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

M.S by Research, Robotics

Aug 2018

RRC, Dept. of Electronics and Communications, IIIT-Hyderabad, Hyderabad, India

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 2016

IIIT-Hyderabad, Hyderabad, India

University Gold medalist, IIIT-Hyderabad, for the Dual Degree Class of 2012 in ECE

RESEARCH EXPERIENCE

Postdoctoral Researcher, LAAS-CNRS, Toulouse, France

Mar 2023 - Present

Under Dr. Rachid Alami and Dr. Thierry Simeon

Designing new software architectures in ROS and ROS2 and implementing a human-aware robot navigation planner. It is envisioned to assist the future development of social navigation and maintained for a significant amount of time.

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.
- I have also developed an adaptive robot planning by combining the human-aware navigation system with a task planner. Depending on the task and the action parameters provided by the task planner, the motion's planner parameters and hence the robot behavior are adapted to suit the context better.

Graduate Student, LAAS-CNRS, Toulouse, France

Jan 2019 - Dec 2022

Under Dr. Rachid Alami

- The aim of my thesis is to propose better motion planning solutions for a robot navigating in human environments, otherwise called human-aware or socially-aware robot navigation planning.
- As human-aware robot navigation is a complex problem, it requires decisional abilities on top of contextual understanding for which I proposed a ROS-based human-aware navigation stack that can be employed in a variety of contexts.
- During the course of my thesis, I have developed several methodologies and algorithms to handle both visible and occluded humans better. These solutions have been tested vigorously in simulation and then transferred onto robot platforms, Pepper and PR2, for real-world experiments.
- I have also contributed to the MuMMER European project both by providing a human-aware navigation planner and remote assistance to run the guidance task on the Pepper robot for user studies.

Research Assistant, Robotics Research Center, IIIT-Hyderabad, India

Aug 2016 - Nov 2018

Under Dr. Madhava Krishna, Dr. Suril V. Shah and Dr. Abhishek Sarkar

- I have 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. Over the duration of these projects, I have gained experience in CAD, mechanisms and robot designing, robot simulators, MATLAB and motion-planning algorithms for walking and manipulation.
- While continuing my research on motion planning in my masters, I designed a novel reinforcement learning framework for dual arm reachability tasks of a humanoid robot using Tensorflow and MuJoCo.
- I was at IIT, Jodhpur for 3 months as an exchange student where I worked with Vicon motion capturing system and on human to robot motion transfer.

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
Tutorials for hardware logic and computing, labs for real-time systems
- Teaching Assistant**, IIIT-Hyderabad, Hyderabad, India Aug 2014 - Dec 2017
Tutorials, labs and exam evaluations for 4 courses in 6 semesters

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.
 - I have also worked on a control system to make Crazyflie quadcopter follow a Nintendo Wii remote.

WORKSHOPS AND COMPETITIONS

- Organizing Committee Member**, "The 2nd Workshop on Social Robot Navigation: Advances and Evaluation", IEEE/RSJ IROS, 2023
- Organizing Committee Member**, "Workshop on Joint Action, Adaptation, and Entrainment in Human-Robot Interaction", ACM/IEEE HRI, 2022
- Team Member**, CanSat, IIIT-Hyderabad, 2015
- Team Member**, RoboCon, IIIT-Hyderabad, 2014

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

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, MORSE, Stage, MuJoCo, OpenRave, Webots
- Robots:** Pepper, PR2, Tiago

LANGUAGES

- English** - Proficient, **Telugu** - Native, **Hindi** - Bilingual Proficiency, **French** - Beginner (A1)

PUBLICATIONS

- [22] 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", arXiv:2306.16740, 2023 (under review).
- [21] **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.
- [20] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. "Towards Benchmarking Human-Aware Robot Navigation: A New Perspective and Metrics", IEEE RO-MAN, 2023.
- [19] **Phani Teja Singamaneni**, Alessandro Umbrico, Andrea Orlandini, and Rachid Alami. "Adaptive Robot Navigation through Integrated Task and Motion Planning", PlanRob Workshop, ICAPS, 2023.
- [18] **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.

- [17] 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.
- [16] 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.
- [15] **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.
- [14] **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.
- [13] 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.
- [12] 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.
- [11] **Phani Teja Singamaneni**, Anthony Favier, and Rachid Alami. “*Human-Aware Navigation Planner for Diverse Human-Robot Interaction Contexts*”, IEEE/RSJ IROS, 2021.
- [10] Anthony Favier, **Phani Teja Singamaneni**, and Rachid Alami. “*Simulating intelligent human agents for intricate social robot navigation*”, RSS Workshop on Social Robot Navigation, 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 Singhanian, **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.