

Akash Patel

✉ aaka.patel@hotmail.com

in aakapatel

🏠 Google Scholar

🌐 aakapatel

🌐 Personal website

🇮🇳 Indian



Employment

2025 – ···· 📌 **Postdoctoral Researcher** | Luleå University of Technology, Sweden

- Supervise PhD candidates and contribute to research planning, experimental design, and publication output in robotic autonomy.
- Collaborate with academic and industrial partners to translate autonomy research into field-ready solutions aligned with real-world use cases.

2021 – 2025 📌 **PhD Candidate** | Luleå University of Technology, Sweden

- Led research on autonomy algorithms and end-to-end system integration for robots operating in underground mines and other GPS-denied environments (perception, planning, navigation, and field validation).
- Delivered end-to-end autonomy enabling the first autonomous aerial mapping of naturally formed lava tubes in Iceland; translated the research into industry-facing outcomes through European-funded projects with end users (e.g., LKAB, Epiroc, K+S, KGHM) to scope, prototype, and field-evaluate autonomous inspection capabilities for hazardous environments.
- Designed and supported teaching in robotics, including lecture material, assignments, and laboratory experiments for university-level courses.

2017 – 2017 📌 **R & D Intern** | KUKA Systems Aerospace, France.

- Designed mechanical end-effector concepts for drilling and fastening operations on aircraft assembly lines.
- Contributed to the design and integration of modular end-effector components for KUKA industrial robot systems.

Education

2021 – 2025 📌 **PhD, Autonomous Robotic Exploration & Path Planning**
Doctoral thesis title: *Advanced Exploration and Navigation Autonomy for Robots in Complex GPS-denied Environments*.

2018 – 2020 📌 **M.Sc. Space Science & Technology** | Erasmus-Mundus Space Master.
Luleå University of Technology

2014 – 2018 📌 **Bachelors of Technology Aerospace Engineering** .
UPES Dehradun, India.

Research Publications

Journal Articles

- 1 **A. Patel** et al., "Towards field deployment of mavs in adaptive exploration of gps-denied subterranean environments," *Robotics and Autonomous Systems*, vol. 176, p. 104 663, 2024, ISSN: 0921-8890.
<https://doi.org/10.1016/j.robot.2024.104663>.

- 2 **A. Patel**, S. Karlsson, B. Lindqvist, C. Kanellakis, A.-A. Agha-Mohammadi, and G. Nikolakopoulos, "Towards energy efficient autonomous exploration of mars lava tube with a martian coaxial quadrotor," *Advances in Space Research*, vol. 71, no. 9, pp. 3837–3854, 2023, Application of Artificial Intelligence in Tracking Control and Synchronization of Spacecraft, ISSN: 0273-1177. <https://doi.org/10.1016/j.asr.2022.11.014>.
- 3 **A. Patel**, B. Lindqvist, C. Kanellakis, A.-a. Agha-mohammadi, and G. Nikolakopoulos, "Ref: A rapid exploration framework for deploying autonomous mavs in unknown environments," *Journal of Intelligent & Robotic Systems*, vol. 108, no. 3, p. 35, 2023, ISSN: 1573-0409. 10.1007/s10846-023-01836-z.
- 4 B. Lindqvist, **A. Patel**, K. Löfgren, and G. Nikolakopoulos, "A tree-based next-best-trajectory method for 3-d uav exploration," *IEEE Transactions on Robotics*, vol. 40, pp. 3496–3513, 2024. 10.1109/TRO.2024.3422052.
- 5 M. A. Saucedo, **A. Patel**, C. Kanellakis, and G. Nikolakopoulos, "Eat: Environment agnostic traversability for reactive navigation," *Expert Systems with Applications*, vol. 244, p. 122 919, 2024, ISSN: 0957-4174. <https://doi.org/10.1016/j.eswa.2023.122919>.
- 6 A. Mukundan, **A. Patel**, B. Shastri, H. Bhatt, A. Phen, and H.-C. Wang, "The dvaraka initiative: Mars's first permanent human settlement capable of self-sustenance," *Aerospace*, vol. 10, no. 3, 2023, ISSN: 2226-4310. 10.3390/aerospace10030265.

Conference Proceedings

- 1 **A. Patel** et al., "A hierarchical graph-based terrain-aware autonomous navigation approach for complementary multimodal ground-aerial exploration," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 15 879–15 885. 10.1109/ICRA55743.2025.11128079.
- 2 **A. Patel**, M. A. V. Saucedo, C. Kanellakis, and G. Nikolakopoulos, "Stage: Scalable and traversability-aware graph based exploration planner for dynamically varying environments," in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024, pp. 5949–5955. 10.1109/ICRA57147.2024.10610939.
- 3 **A. Patel** et al., "Dronecom: Dynamic relay operations for network efficient communication in underground mines," in *2024 24th International Conference on Control, Automation and Systems (ICCAS)*, 2024, pp. 1206–1211. 10.23919/ICCAS63016.2024.10773079.
- 4 **A. Patel**, C. Kanellakis, A.-A. Agha-Mohammadi, and G. Nikolakopoulos, "Traversability aware graph-based subterranean exploration with unmanned aerial vehicles*," 2, 22nd IFAC World Congress, vol. 56, 2023, pp. 9263–9268. <https://doi.org/10.1016/j.ifacol.2023.10.072>.
- 5 **A. Patel**, C. Kanellakis, and G. Nikolakopoulos, "Multi agent coordination strategy for collaborative exploration of gps-denied environments," in *2023 IEEE International Conference on Robotics and Biomimetics (ROBIO)*, 2023, pp. 1–6. 10.1109/ROBIO58561.2023.10354634.
- 6 **A. Patel**, A. Banerjee, B. Lindqvist, C. Kanellakis, and G. Nikolakopoulos, "Design and model predictive control of a mars coaxial quadrotor," in *2022 IEEE Aerospace Conference (AERO)*, 2022, pp. 1–11. 10.1109/AERO53065.2022.9843799.
- 7 **A. Patel**, C. Kanellakis, and G. Nikolakopoulos, "Traversable frontiers based autonomous exploration strategy for deploying mavs in subterranean environments," in *2022 Eighth Indian Control Conference (ICC)*, 2022, pp. 260–265. 10.1109/ICC56513.2022.10093322.
- 8 **A. Patel**, B. Lindqvist, C. Kanellakis, and G. Nikolakopoulos, "Fast planner for mav navigation in unknown environments based on adaptive search of safe look-ahead poses," in *2022 30th Mediterranean Conference on Control and Automation (MED)*, 2022, pp. 545–550. 10.1109/MED54222.2022.9837293.
- 9 V. K. Viswanathan, **A. Patel**, M. A. Saucedo, S. G. Satpute, C. Kanellakis, and G. Nikolakopoulos, "Spade: Towards scalable path planning architecture on actionable multi-domain 3d scene graphs," in

2025 *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025, pp. 17 510–17 517. 10.1109/IROS60139.2025.11246795.

- 10 M. A. Saucedo, **A. Patel**, A. Saradagi, C. Kanellakis, and G. Nikolakopoulos, “Belief scene graphs: Expanding partial scenes with objects through computation of expectation,” in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024, pp. 9441–9447. 10.1109/ICRA57147.2024.10611352.
- 11 M. A. Saucedo, N. Stathouloupoulos, **A. Patel**, C. Kanellakis, and G. Nikolakopoulos, “Leveraging computation of expectation models for commonsense affordance estimation on 3d scene graphs,” in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 9797–9802. 10.1109/IROS58592.2024.10802560.

Books and Chapters

- 1 **A. Patel**, A. Banerjee, A. Papadimitriou, and B. Lindqvist, “Chapter 4 - control of arws,” in *Aerial Robotic Workers*, G. Nikolakopoulos, S. Sharif Mansouri, and C. Kanellakis, Eds., Butterworth-Heinemann, 2023, pp. 49–65, ISBN: 978-0-12-814909-6. <https://doi.org/10.1016/B978-0-12-814909-6.00010-X>.
- 2 **A. Patel**, S. Karlsson, B. Lindqvist, and A. Koval, “Chapter 7 - exploration with arws,” in *Aerial Robotic Workers*, G. Nikolakopoulos, S. Sharif Mansouri, and C. Kanellakis, Eds., Butterworth-Heinemann, 2023, pp. 109–127, ISBN: 978-0-12-814909-6. <https://doi.org/10.1016/B978-0-12-814909-6.00013-5>.
- 3 **A. Patel**, A. Papadimitriou, and A. Banerjee, “Chapter 3 - modeling for arws,” in *Aerial Robotic Workers*, G. Nikolakopoulos, S. Sharif Mansouri, and C. Kanellakis, Eds., Butterworth-Heinemann, 2023, pp. 31–47, ISBN: 978-0-12-814909-6. <https://doi.org/10.1016/B978-0-12-814909-6.00009-3>.

Skills

Languages	📖 Strong reading, writing and speaking competencies for English, Hindi and Gujarati.
Coding	📖 C++, ROS, ROS2, Docker, L ^A T _E X, ...
Os	📖 Linux, MacOS.
Web Dev	📖 HTML, CSS, JavaScript.
Misc.	📖 Academic research, teaching, training, consultation and publishing.