Mohammad Omama

https://mohdomama.github.io

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Education

- **The University of Texas at Austin** — Austin, USA
  PhD, Graduate Research Assistant (GRA), Swarm Robotics Lab — *August 2023 - May 2027 (Expected)*
- **International Institute of Information Technology (IIITH)** — Hyderabad, India
  MS by Research (CSE), Robotics Research Center. CGPA: 9.67/10 — *August 2020 - July 2023*
- **Aligarh Muslim University (AMU)** — Aligarh, India
  Bachelor of Technology in Computer Engineering. CPI: 9.38/10 — *August 2016 - August 2020*

Experience

- **Lead, Self-Driving Car Team** — Hyderabad
  IIITH (Robotics Research Center) — *January 2021 – June 2023*
  - Led a team of 5 graduate students and 3 undergraduates to develop **AutoDP**, an autonomous driving software suite deployed on a full-sized vehicle serving as an on-campus shuttle.
  - Expanded **AutoDP** into a research platform used by multiple graduate students for advanced perception and navigation research, resulting in over 4 publications to date. https://robotics.iiit.ac.in/auto_dp/
  - **Key Technologies**: ROS, Python, PyTorch, CAN Bus, OpenCV, Arduino, Raspberry Pi
- **System Administrator** — Hyderabad
  IIITH (Robotics Research Center) — *January 2021 – June 2023*
  - Managed a cluster of 4 high-performance servers supporting over 30 researchers; implemented identity management, networking, and monitoring solutions.
  - **Key Technologies**: IPA, Prometheus, Grafana, Linux Modules
- **Machine Learning Research Intern** — Hyderabad
  Techolution — *June 2019 – August 2019*
  - Designed and implemented a face-recognition-based lock system featuring Image Quality Analysis (IQA) and spoof detection, achieving over 93% accuracy in controlled tests. Deployed the system at the companys Hyderabad office, serving 50 employees.
  - **Key Technologies**: TensorFlow, Keras, OpenCV, Python
- **Software Development Intern** — Remote
  Softnerve Technologies — *April 2018 – June 2018*
  - Developed scalable back-end microservices for IoT-based devices, collecting sensor data from multiple nodes and performing real-time anomaly detection using neural networks.
  - **Key Technologies**: Spring Boot, Cassandra, MQTT, TensorFlow
- **Lead, Computer and Vision Team** — Aligarh
  AUV-ZHCET, AMU — *September 2018 – April 2020*
  - Led a 6-member team to develop vision, localization, and path-planning modules for an Autonomous Underwater Vehicle; secured 4th place at SAVe 2019.
  - **Key Technologies**: OpenCV, Python, TensorFlow, Keras
- **Electronics and Computer Team Member** — Aligarh
  AMU Roboclub, AMU — *September 2016 – March 2017*
  - Developed feedback and control systems for a tele-operated robot, advancing to the second round of ABU Robocon 2017 and winning the Judges and Referees Choice Award.
  - **Key Technologies**: Arduino, Embedded C, Eagle PCB

Publications

- **Omama, M.**, Li, P. H., and Chinchali, S. P. (2024). *Exploiting Distribution Constraints for Scalable and Efficient Image Retrieval. arXiv preprint* arXiv:2410.07022. **International Conference on Learning Representations (ICLR) 2025**.
- Choi, M., **Omama, M.**, Goel, H., Yang, Y., Shah, S., and Chinchali, S. (2024). *Neuro-Symbolic Video Search. arXiv preprint* arXiv:2403.11021. **European Conference on Computer Vision (ECCV) 2024, Oral Presentation**. https://utaustin-swarmlab.github.io/nsvs-project-page.github.io/
- Shubodh, S., **Omama, M.**, Zaidi, H., Parihar, U. S., and Krishna, M. (2024). *Lip-loc: Lidar Image Pretraining for Cross-Modal Localization.* **IEEE/CVF Winter Conference on Applications of Computer Vision** (pp. 948-957). https://liploc.shubodhs.ai/
- Jatavallabhula, K. M., Kuwajerwala, A., Gu, Q., **Omama, M.**, Chen, T., Li, S., ... and Torralba, A. (2023). *Conceptfusion: Open-Set Multimodal 3D Mapping. arXiv preprint* arXiv:2302.07241. **Robotics Science and Systems (RSS) 2023**. https://concept-fusion.github.io/
- **Omama, M.**, Inani, P., Paul, P., Yellapragada, S. C., Jatavallabhula, K. M., Chinchali, S., and Krishna, M. (2023). *ALT-Pilot: Autonomous Navigation with Language-Augmented Topometric Maps. arXiv preprint* arXiv:2310.02324. https://navigate-anywhere.github.io/ALT-Pilot/
- **Omama, M.**, Sriraman, S. S. V., Chinchali, S., Singh, A. K., and Krishna, K. M. (2022). *Drift-Reduced Navigation with Deep Explainable Features. arXiv preprint* arXiv:2203.06897. **Intelligent Robots and Systems (IROS) 2022**.
- **Omama, M.**, Chinchali, S., and Krishna, K. M. (2021). *Learning Actions for Drift-Free Navigation in Highly Dynamic Scenes. arXiv preprint* arXiv:2110.14928. **American Control Conference (ACC) 2022**.

Patents

- **Indian Patent (Published):** Modular Autonomous Underwater Vehicle for Algae Identification and Collection Using Particle Image Velocimetry.
  Application No.: 201911015527, Journal No.: 20/2019, Publication Date: May 17, 2019

Honors and Awards

- **UT Austin Engineering Fellowship:** Annual $6,000 scholarship renewed for four years in recognition of academic achievement in engineering.
- **IIIT Hyderabad Research Fellowship:** Full tuition and monthly stipend awarded for demonstrated research excellence.
- **RAS IROS Travel Grant (2022):** Awarded by the IEEE Robotics & Automation Society to present at IROS 2022, a premier international robotics conference.

Professional and Volunteering Activities

- **Conference Reviewing:** Reviewer for MLSys 2024, ICRA 2024, CoRL 2024, and CASE 2022.
- **Teaching at IIIT Hyderabad:** Assistant Instructor for selected topics in the following courses: Mobile Robotics, Robotics Planning and Navigation, and RRC Summer School.
- **Mentoring:**
  - **RAI (AMU):** Mentored two masters students from the Robotics and AI (RAI) Lab at AMU on self-driving vehicles and underwater visual odometry, both of whom received university gold medals.
  - **AMU-OSS:** Founded the college's first open-source society, AMU-OSS, creating a platform for over 350 members to learn and engage with free/libre software.