



Aditya Arun

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Research interests

- Robot localization and navigation
- WiFi and UWB-based localization
- Hardware prototyping and system development

Education

- In Progress. PhD, ECE**
Univ of California, San Diego
- 2021. M.S., ECE, Robotics and Systems**
Univ of California, San Diego
- 2019. B.S., (Hons) EECS, Eng. Physics**
Univ of California, Berkeley

Programming Languages

- Python ●●●●
- Matlab ●●●○
- ROS ●●●○
- C/C++ ●●●○
- Java/Android ●●○●

Last updated: January, 2024.

Research Experience

June '19 – Present **Graduate Student Researcher**,
Advisor: Dinesh Bharadia

Development of end-to-end systems to perform wireless indoor localization and mapping. Projects undertaken include:

WiFi Sensor Fusion for Robots : Tight fusion of WiFi, camera and Lidar features to develop a robust and compute and memory efficient robot localization and mapping.

UWB Tracking and Localization : Low-power and low-latency accurate UWB-based 3D localization scalable to thousands of miniature tags.

WiFi-based Device localization : Deep-learning system to provide sub-meter accurate device localization in complex indoor environments.

All these works have been published at tier-1 robotics and systems communities.

Skills: Machine learning, wireless and hardware systems development, signal processing, robot localization and mapping (SLAM), firmware development, C++, Python

Mar '18 – Jan '19 **Undergraduate Researcher**,
Advisor: Avideh Zakhori

Devising compute-efficient methodologies to stitch pointclouds
Developing building-scale 3D pointcloud generation using Intel RealSense camera and Google ARCore.

Skills: Pointcloud processing, image processing, android programming, Java, Python

Work Experience

June '23 – Sept '23 **PhD Intern**, Apple
Team: Cellular systems engineering

Simulated modulation schemes to allow communication under large Doppler velocities

Prototyped end-end camera + radar framework for radar-centric sensing

Developed ML models to classify radar signals and improve user-computer interactions

Skills: Machine learning, signal processing, wireless sensing, system development and prototyping, Python

May '17 – Aug '17 **Optical Engineering Intern**, Irixi Technologies

Designed a testbed for PAM-4 signaling to enable 400G optical communications.

Worked on Python/C++ simulations for PAM-4 signaling.

Skills: Optical communications, signal processing, experimental prototyping and testing, Python, machine learning

Publications

- (**Sensys '23**) **Arun, A.**, Saruwatari, S., Shah, S., & Bharadia, D. (2023). XRLoc: Accurate UWB Localization for XR Systems. Proceedings of the 21st ACM Conference on Embedded Networked Sensor Systems. 2023.
- (**Hotmobile '23**) Ayyalasomayajula, R., **Arun, A.**, Sun, W., and Bharadia, D. (2022). Users are Closer than they Appear: Protecting User Location from WiFi APs. Proceedings of the 24th International Workshop on Mobile Computing Systems and Applications. ACM, 2023.
- (**pre-print**) **Arun, A.**, Hunter, W., Ayyalasomayajula, R., and Bharadia, D.. (2022). ViWiD: Leveraging WiFi for Robust and Resource-Efficient SLAM. arXiv preprint arXiv:2209.08091. (*under submission*)
- (**RAL + ICRA '22**) **Arun, A.**, Ayyalasomayajula, R., Hunter, W., and Bharadia, D. (2022). P2SLAM: Bearing based WiFi SLAM for Indoor Robots. IEEE Robotics and Automation Letters.
- (**IMWUT '21**) Zhao, M., Chang, T., **Arun, A.**, Ayyalasomayajula, R., Zhang, C., Bharadia, D. (2021). ULoc: Low-Power, Scalable, and cm-Accurate UWB-Tag Localization and Tracking for Indoor Applications. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, 5(3), 1-31.
- (**Mobicom '20**) Ayyalasomayajula R., **Arun A.**, Wu C., Sharma S., Sethi A., Vasisht D., Bharadia D. (2020). Deep Learning based Wireless Localization for Indoor Navigation. The 26th Annual International Conference on Mobile Computing and Networking. ACM, 2020.
- (**NSDI '20**) Ayyalasomayajula R., **Arun A.**, Wu C., Rajagopalan S., Ganesaraman S., Seetharaman A., Jain I., Bharadia D. (2020). LocAP: Autonomous millimeter accurate mapping of WiFi infrastructure. In 17th USENIX Symposium on Networked Systems Design and Implementation (pp. 1115-1129).

Presentations, Posters, Demos

- (**Invited Talk**) "Leveraging WiFi for Robust and Resource-Efficient SLAM", ECE-Computer Engineering and Systems Group (CESG), Texas A&M University, College Station, TX, 05/12/2023
- (**IPSN '23**) **Arun, A.**, Hunter, W., & Bharadia, D. (2023, May). *Demo Abstract*: Accessible WiFi sensing leveraging Robot Operating System. In Proceedings of the 22nd International Conference on Information Processing in Sensor Networks (pp. 356-357).
- (**Invited Talk**) "Leveraging WiFi for Robust and Resource-Efficient SLAM", CSE-Allen School Robotics Colloquium, University of Washington; Microsoft Research; and Google Research, Seattle, WA 12/02/2022
- (**Mobisys '22**) **Arun, A.**, Chang, T., Yu, Y., Ayyalasomayajula R., Bharadia D. *Demo*: Real-Time Low-Latency Tracking for UWB tags. In Proceedings of the 20th Annual International Conference on Mobile Systems, Applications, and Services
- (**Sensys '20**) **Arun, A.**, Gupta, A., Bhatka, S., Komatineni, S., & Bharadia, D. (2020, November). *Poster*: BluBLE, space-time social distancing to monitor the spread of COVID-19. In Proceedings of the 18th Conference on Embedded Networked Sensor Systems (pp. 750-751).
- (**NSDI '20**) **Arun A.**, Wu C., Ayyalasomayajula R., Jain I., and Bharadia D. *Poster*: Towards CSI enabled Closed-loop WiFi based SLAM. In 17th USENIX Symposium on Networked Systems Design and Implementation"

Teaching, Mentorship and Services

Aug '21 – present **Research Mentor for highschool students**, Polygence.

July '19 – present **Research mentor for undergraduate students**, UC San Diego. I have had the pleasure to mentor multiple students during the course of my PhD, notably Chenfeng Wu, Minghui Zhao, Tyler Chang and William Hunter, who have gone on to co-author papers within our group.

Jan '18 – May '19 **EE16B Undergraduate Student Instructor**, EECS Dept., UC Berkeley.

Aug '17 – May '19 **Peer Advisor**, Engineering Student Services (ESS), UC Berkeley.

Aug '21 – Present **Conference Reviewer**: ICRA, IROS; **Journal Reviewer**: IEEE RA-L, ACM IMWUT