Adwait Dongare

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Works on systems using multi-modal sensor fusion (combining vision, wireless signals and motion) for spatial computing and understanding. Built production sensing systems for precise location awareness and environmental understanding running on 1.5B+ devices. Experience with many stages of spatial pipelines: system design, sensor fusion algorithms, specialized TinyML models, synthesis pipelines for 3D training data, and real-time spatial processing under physical constrains. PhD in ECE from CMU. 3 US patents, best paper awards (IPSN, RTAS), DARPA SubT finalist.

Foundation models for the physical world require grounding beyond internet-scale text and image data. I am interested in the intersection of spatial computing and physical AI: building the sensor fusion pipelines, synthetic environment generators, and real-time deployment infrastructure that enable foundation models to understand and interact with the physical world. I am excited to build the next generation of physical AI - for robotics, mixed reality or automomous systems - using spatial understanding from diverse modalities that capture physical interactions, material properties, and environmental dynamics.

Education

Carnegie Mellon University: Pittsburgh, PA - PhD in Electrical and Computer Engineering, 2014-2020 Thesis: Distributed signal processing and optimization for wireless sensor networks. Advised by Prof. Anthony Rowe. Research focused on multi-node coordination, real-time systems, and physical layer algorithms.

Indian Institute of Technology Bombay: Mumbai, India - BTech in Engineering Physics with minor in Electrical Engineering, 2010-2014

Stanford University (Professional Education) - Reinforcement Learning, Fall 2025

Work Experience

Apple: Cupertino, CA

Senior Software Developer - 2023 - Present | **Software Developer** - 2020 - 2023

- Architected real-time software stack for ultra-wideband spatial sensing chip, managing hardware interfaces, power optimization, and multi-device coordination—demonstrating end-to-end systems capability from silicon to ML models, deployed on 1.5B+ devices
- Built production ML infrastructure for edge deployment including multi-model scheduling, memory optimization, and privacy-preserving execution under strict power/latency constraints
- Led multi-modal perception team (5-10 engineers) building 3D spatial understanding from vision + wireless + motion sensors; architected synthetic data pipeline generating millions of physical scenarios for sim-to-real transfer
- Developed physics-informed ML models for RF-based spatial sensing, combining learned representations with wireless signal propagation physics—essential work that enabled productization and launch of the Apple HomePods.

Software Engineering Internship - Summer 2019
Prototyped distributed UWB localization algorithms that evolved into production wireless sensing systems and one granted patent.

Software Engineering Internship - Summer 2015
Developed system firmware for low-power always-on processors on iOS and watchOS devices.

Texas Instruments: Dallas, TX

Design Engineering Internship - Summer 2017
Benchmarked new oscillator technology for microcontrollers with integrated radios; identified novel use-cases and productization strategies for emerging wireless applications.

Technical Skills

Systems Programming & Real-time Development: Languages (Python, C/C++, Objective-C, Swift), Specializations (Embedded, Firmware, iOS/macOS, Low-power, Real-time, Secure ML deployment)

Machine Learning & Multi-Modal Perception: Reinforcement Learning, TinyML, Synthetic data generation and training pipelines, On-device ML deployment, Privacy-preserving ML systems, Multi-modal sensor fusion, RLHF, Human factors research

ML Frameworks & Tools: PyTorch, CoreML, LLM APIs and agents

Wireless Sensing & Spatial Intelligence: Radio technologies (UWB, BLE, WiFi, LoRa), Signal processing techniques (Coherent Combining, Clock Synchronization), ML for RF optimization

Simulation & 3D Tools: Physics simulation (MuJoCo), CAD (Fusion 360, FreeCAD, OpenSCAD), 3D rendering (Blender, Unreal Engine)

Research & Awards

Patents: 3 granted US patents in spatial sensing, multi-device localization, and wireless coordination systems (2020-2023)

Publications: 7 peer-reviewed papers in real-time systems, embedded sensing, and wireless networks (Google Scholar)

Select Awards: Best Paper (IPSN 2018), Best Presentation (RTAS 2017), Hsu Chang Memorial Fellowship (CMU 2016-2017)

Research Experience: PhD research on distributed sensing and optimization at CMU WiSeLab; DARPA Subterranean Challenge (autonomous robotics competition: 4th overall, 1st in tunnel circuit, runners-up in urban circuit)