Saandeep Depatla
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Education

PhD, Electrical and Computer Engineering
University of California, Santa Barbara — *Oct 2018 (expected)*
Research Focus: Wireless Sensing Systems
Advisor: Dr. Yasamin Mostofi

Master of Science, Electrical and Computer Engineering
University of California, Santa Barbara — **GPA: 3.98/4** — *June 2014*

Bachelor of Technology, Electronics and Communication Engineering
National Institute of Technology, Warangal, India — **GPA: 8.9/10** — *May 2010*

Research Projects

- **Counting Number of People Using WiFi**

  News Coverage: Gizmag, Huffington Post UK, PC World, ACM Tech News, GizModo, Science Daily, International Business Times UK, Tech Radar, and other outlets.

  In this project, a system to count the total number of people walking in an area based on the scattering effects of people on the surrounding WiFi links is developed. Several hardware setups are developed to count people in various areas. These include Raspberrypi-based setup for remote areas, Sonos speakers based setup for smart homes, and BLE-based setup (TI CC1350 chips) for IoT related applications. This system finds applications in smart homes, smart cities, and retail stores among several others. This system is further extended to work through walls.

  Tools Used : **C++** codes are developed in TI-RTOS (for BLE-based setup) to collect wireless measurements and **MATLAB** scripts are used for data processing.

- **Through Wall Imaging Using WiFi**

  News Coverage: BBC, Engadget, Gizmag, Daily Mail, Gizmodo, PC World, Headline and Global News, SD-Times, and other outlets.

  In this project, a system to image an area (including objects behind walls) using WiFi signals is developed. A pair of robots fitted with a WiFi transceiver travel in an area and collect WiFi measurements. By utilizing the electromagnetic scattering models to model the wave propagation, we model the received signal in terms of the objects in the area. We then use principles from compressive sensing to image the area including objects that are occluded by walls.

  Tools Used : **C++** is used to program the robots to move in an area, **MATLAB** scripts are used for data processing.

- **Pedestrian Speed Estimation Using WiFi**
  In this project, a system to estimate the walking speeds of people in multiple regions using WiFi links is developed. This system is tested in a local retail store to estimate the behavior patterns of customers.

  Tools Used : **MATLAB** and **Python** scripts are used for data processing.

- **Analytics using BLE and WiFi**
  Ongoing Project. In this project, we aim to develop a system based on IoT WiFi/BLE chips which can estimate occupancy dynamics.

  Skills Developed: Knowledge of BLE protocols and TI-RTOS embedded programming.

Publications

Journals/Magazines:

- S. Depatla, L. Buckland, and Y. Mostofi,"X-Ray Vision with Only WiFi Power Measurements Using Rytov Wave Models," IEEE Transactions on Vehicular Technology, special issue on Indoor Localization, Tracking, and Mapping, volume 64, issue 4, pp. 1376-1387, April 2015
- S. Depatla, A. Muralidharan and Y. Mostofi,"Occupancy Estimation Using Only WiFi Power Measurements," IEEE Journal on Selected Areas in Communications (JSAC), special issue on Location-Awareness for Radios and Networks, volume 33, issue 7, July 2015
- S. Depatla, C. Karanam, and Y. Mostofi,"Robotic Through-Wall Imaging," IEEE Antenna and Propagation Magazine, Special issue on Electromagnetic Inverse Problems for Sensing and Imaging, 2017
- S. Depatla and Y. Mostofi, "Passive Crowd Speed Estimation in Adjacent Regions With Minimal WiFi Sensing", Submitted to IEEE Transactions on Mobile Computing (TMC).

Conferences:

- S. Depatla and Y. Mostofi, "Crowd Counting Through Walls Using WiFi", in the proceedings of IEEE International Conference on Pervasive Computing and Communications (PerCom) 2018. (Acceptance rate: 19.3 %)
- S. Depatla and Y. Mostofi, "Passive Crowd Speed Estimation and Head Counting Using WiFi", to appear in the IEEE International Conference on Sensing, Communication, and Networking (SECON) 2018. (Acceptance rate: 23.2 %)
- B. Korany, S. Depatla, and Y. Mostofi, "Subspace-Based Imaging Using Only Power Measurements," to appear in the proceedings of the 10th IEEE Sensor Array and Multichannel Signal Processing Workshop, July 2018.

Patent:

- "System and method of occupancy estimation utilizing transmitted signals." U.S. Patent Application No. 15/087,554.

Work Experience

- **Scientist, Defense Research and Development Organization, India** *Nov 2010 - Jun 2012*
  While working at DRDO, I worked on a project to develop an antenna array for a Radar System. I was responsible for designing, developing, and evaluating the performance of an antenna element for active electronically scanning array radar system.
  Tools Used: HFSS, MATLAB.

- **Project Associate, IIT Madras, India** *May 2010 - Nov 2010*
  In this project, I successfully implemented the physical layer data chain of a 4G wireless testbed in assembly language on a Tigersharc Processor.
  Tools Used: VisualDSP++, MATLAB.

Computing Skills

Platforms: Linux, Windows
Languages: Proficient in C++ and Matlab, Coding experience in C and Python.

Relevant Courses

Wireless Communications (ECE 250)	Advanced Wireless Communications (ECE 594C)	
Information Theory (ECE 205)	Stochastic Processes (ECE 235)	
Principles of Optimization (ECE 271A)	Statistical Theory (PSTAT207ABC)	Real Analysis (MATH118AB)
Machine Learning (ECE 594E)	Statistical Decision Theory (PSTAT215B)	Matrix Analysis (ECE210A)