Atul Bansal

5th Year Doctoral Student
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Education

Carnegie Mellon University — Pittsburgh, PA
- *PhD Candidate in Electrical and Computer Engineering; GPA: 4.00/4.00* — *Aug 2019 – Present*
  Advisors: Prof. Swarun Kumar and Prof. Bob Iannucci

Indian Institute of Technology, Kharagpur — Kharagpur, India
- *M. Tech. and B. Tech.(Honors) in Electronics and Electrical Communication Engineering* — *Jul 2014 – May 2019*
  Advisors: Prof. Gautam Saha

Publications

1. **Battery-free Wideband Spectrum Mapping using Commodity RFID Tags**, *Mohamed Ibrahim,* ***Atul Bansal****, Kuang Yuan, Swarun Kumar, Peter Steenkiste, ACM MobiCom 2023*
2. **OwLL: Accurate LoRa Localization using the TV Whitespaces**, ***Atul Bansal****, Akshay Gadre, Vaibhav Singh, Anthony Rowe, Bob Iannucci, Swarun Kumar, ACM/IEEE IPSN 2021*
3. **Poster: Does Ambient RF Energy Suffice to power Battery-free IoT?**, ***Atul Bansal****, Swarun Kumar, Bob Iannucci, ACM MobiSys 2020*

Research Projects:

- **OwLL: Accurate LoRa Localization** — Carnegie Mellon University
  Prof. Swarun Kumar and Prof. Bob Iannucci — *Jul 2020 - Oct 2020*
  - Developed an accurate LoRa localization system using frequency hopping in ISM and TV whitespace bands
  - Low power consumption using a smart frequency selection algorithm to minimize the number of frequencies hopped
  - Median 9 m error in both Line of Sight and Non-Line of Sight situations tested across an area of 66000 sq.m
- **RFIMap: Wideband Spectrum Sensing using RFID** — Carnegie Mellon University
  Prof. Swarun Kumar — *Aug 2022*
  - Developed a wideband spectrum mapping system using commodity RFID tags by extracting channel information from reflected RFID signals across multiple frequencies
  - Performed accurate localization of any transmitter by trilaterating using the obtained channel information across multiple frequencies
  - Obtained a median error of 3.19 dB in signal power estimation across all frequencies in a 3D room

Internships

- **Office of the CTO** — Microsoft Azure for Operators
  Manikanta Kotaru and Victor Bahl — *Jun 2022 - Aug 2022*
  - Worked on developing a novel system based on 5G ORAN protocol stack with many applications.
  - Performed simulations to confirm validity and then finally created a basic bare bones demo of the whole system on a 5G testbed
- **IntuWition: WiFi based material sensing** — Carnegie Mellon University
  Prof. Swarun Kumar — *May 2017 - Jul 2017*
  - Used the change in the polarization of WiFi signal on reflection with different objects to classify different materials present in the environment
  - Developed a working localization system on a drone to localize the different objects present in the environment
- **Distributed BLE Localization and Tracking using RSSI** — University of Alberta
  Prof. Ioanis Nikolaidis — *May 2018 - Jul 2018*
  - Designed a distributed system with moving BLE nodes that can localize and track each other
  - Used Advertising packets to transmit RSSI information across all BLE nodes to perform localization and tracking

Scholastic Achievements

- Awarded Travel Grant to attend MobiCom 2023 at Madrid, Spain
- Awarded the Ben Cook Presidential Graduate Fellowship - 2022-23
- CMU ECE Department Recognition Award for Exemplary Qualifying Exam Performance, Fall 2021
- Awarded CIT Dean Fellowship 2019
- Kishore Vaigyanik Protsahan Yojna (KVPY) 2013-14 scholar

Programming Skills

- **Languages:** C, C++, Python, MATLAB
- **Softwares and Tools:** EAGLE, LTSpice, Visual Studio Code, mbed, Arduino, OpenCV, Wireless Toolboxes

Teaching Experience

- **Computer Networks** — Carnegie Mellon University
  Teaching Assistant — *Aug 2021 - Dec 2021*
- **Computer Networks** — Carnegie Mellon University
  Teaching Assistant — *Jan 2021 - May 2021*
- **Digital Signal Processing Laboratory** — Indian Institute of Technology Kharagpur
  Teaching Assistant — *Jan 2019 - May 2019*
- **Basic Electronics Laboratory** — Indian Institute of Technology Kharagpur
  Teaching Assistant — *Jul 2018 - Nov 2018*