ANANT GUPTA

Senior Engineer, Qualcomm
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INTERESTS

Optimization, signal processing, wireless sensing and perception, Machine learning.

EDUCATION

University of California, Santa Barbara, USA G.P.A. 4.0/4.0 2014-2020
Department of Electrical and Computer Engineering (ECE)
PhD in ECE, Research Focus: Wireless Sensing March 2020
MS in ECE, Major: Communications and Signal Processing Dec 2016

IIT Kharagpur, India G.P.A. 8.45/10 2008-2013
Bachelor of Technology (Honors) in Electronics and Electrical Communication Engineering
Master of Technology (Dual Degree) – Telecommunication Systems Engineering

RESEARCH PROJECTS

Sensing and Inference using low cost mm-wave systems. Advisor: U. Madhow 2015-2020

- Geometry-Assisted data association for instantaneous localization with distributed millimeter wave sensors.
- Multi-objective optimization to construct large-effective aperture antennas using sparse array of subarrays.
- Enhanced accuracy and Super-Resolution algorithms for 2D FMCW radar systems.

Energy efficient MAC protocols for wireless sensor networks. Advisor: R Datta 2011-2013

- Designed energy efficient contention resolution protocols (SMAC) for centralized & ad-hoc sensor networks.
- Analyzed performance using a Discrete time Markov chain model and validated with simulations in NS2.

INDUSTRY EXPERIENCE

Qualcomm Inc., San Diego, USA: Senior Engineer, Modem Systems 2020-Present
System design and verification for maximum power exposure compliance in 5G NR devices.

Algorithm design for range detection & mutual coupling cancellation in 5G NR terminals. Summer 2017

***Stealth Startup*, San Francisco Bay Area, USA:** Engineering Intern Summer 2019
Perception for Autonomy
Explored state of the art signal processing algorithms for sensing and imaging applications in the RF domain. Benchmarking and proposing new system level solutions and features.

National Instruments R&D, India: RF Algorithm Software Engineer 2013-2014
Baseband signal processing algorithm design for OFDM-MIMO based 802.11n/ac WLAN.

Physical layer design for a NFC transmitter on FPGA. Summer 2012
Developed RF interface for testing NFC tags using NI RIO hardware and tested TX signals using Agilent MXA.

FPGA-PC hybrid implementation of fractional re-sampler for NI GPS toolkit. Summer 2011
Reduced the latency of generating composite GPS signals by resampling using polyphase filter banks on FPGA.

PUBLICATIONS & PATENTS

- **A. Gupta** and U. Madhow, "Efficient data association using joint Range-Doppler features for Multisensor-Multitarget State Estimation", IEEE Transactions on Signal Processing (to be submitted soon)
- **A. Gupta**, U. Madhow, A. Arbabian and A. Sadri, "Design of Large Effective Apertures for Millimeter Wave Systems using a Sparse Array of Subarrays", IEEE Transactions on Signal Processing, 2019.
- R. Rimini, **A. Gupta**, "Proximity detection using adaptive mutual coupling cancellation", U.S. Patent Application 15/984,233, filed May 2018. Patent Pending.
- **A. Gupta**, U. Madhow, A. Arbabian and A. Sadri, "On beam design for sparse arrays of subarrays using multi-objective optimization and estimation-theoretic criteria", 51st Asilomar Conference on Signals, Systems and Computers, 2017, Pacifc Grove, USA.
- **A. Gupta**, U. Madhow, and A. Arbabian, "Super-resolution in position and velocity estimation for short-range mm wave radar", 50th Asilomar Conference on Signals, Systems and Computers, 2016, Pacific Grove, USA.

TECHNICAL SKILLS

Programming Languages:	Python (*fluent*), C/C++ (*past experience*)
Engineering Tools:	MATLAB (*fluent*), PyTorch, LabVIEW, NS-2 (*past experience*)
Test and measurement:	NI PXI-based vector signal transceiver, Signal generator, Oscilloscope

COURSE PROJECTS

Truth-telling in Non-Monetary Mechanisms Fall 2018

- Investigated non-monetary mechanisms which utilize repeated games to extract truth from agents.

Multi-Agent Reinforcement Learning Fall 2015

- Investigated algorithms for learning and sequential decision making using Markov Decision Processes.

Machine learning approaches for Natural Language Processing Spring 2015

- Investigated the most informative features for use in Named Entity Recognition task.
- Evaluated the accuracy on the Spanish news text classification task of CoNLL 2002.

Massive MIMO Detection Algorithms. Winter 2015

- Investigated low complexity detection algorithms for Massive MIMO systems.

ACADEMIC DISTINCTIONS

Secured All India Rank of 962 ($< 0.27\%$) in IIT-Joint Entrance Examination 2008.
Secured All India Rank of 217 ($< 0.1\%$) in Graduate Aptitude Test in Engineering 2013 ECE.

POSITIONS OF RESPONSIBILITY

Science Project Advisor	Partners in Education, Santa Barbara	October, 2018
Teaching Assistant	Digital Communication course & lab, UCSB	Oct, 2014-March 2015
	Basic Electronics Lab, IIT Kharagpur	Jan-April, 2013
	Basic Network theory lab, IIT Kharagpur	July-Nov, 2012
Technical Head, Anadigix	Circuit design competition at IIT Kharagpur	January, 2011

GRADUATE COURSEWORK

Matrix Analysis & Computations
Digital Communication Theory
Optimal Estimation & Filtering
Stochastic Processes in Engineering
Adaptive Filter Theory
Machine Learning
Data Structures & Object Representation
Pattern Recognition
Game Theory
Error Correction Codes