Ankur Aditya

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RESEARCH INTERESTS

RF/Wireless Sensing, 3D Computer Vision and Metamaterial Absorbers.

EDUCATION

University of Massachusetts (UMass), Amherst   **Sept '22 - Present**
Doctor of Philosophy (MS/PhD), Computer Science   CGPA: 3.5/4
Relevant Courseworks: Neural Networks, Intelligent Visual Computing, Advanced Algorithms.

Indian Institute of Technology Kanpur (IIT-K), Kanpur   **Jan '21 - May '22**
Doctor of Philosophy (MS/PhD), Electrical Engineering   CGPA: 8.67/10
Transferred to UMass Amherst for continuation of Ph.D.
Relevant Courseworks: MIMO Wireless Communications, Detection and Estimation Theory.

International Institute of Information Technology (IIIT), Bhubaneswar   **Aug '16 - June '20**
Bachelor of Technology (B.Tech), Electronics and Telecommunication Engineering   CGPA: 9.06/10
Relevant Courseworks: Antenna and Wave Propagation, Mobile Communications.

PUBLICATIONS

- X. Chen, **Ankur Aditya**, Z. Lei, D. Ganesan. 2023. Curtain-Net: Enabling precise beamforming with a deformable antenna array on a fabric substrate. In The 21st ACM Conference on Embedded Networked Sensor Systems (SenSys '23), November 12–17, 2023, Istanbul, Turkiye. ACM, New York, NY, USA, 13 pages.

- **Ankur Aditya** et al., D2RF: Beamforming with Flexible Antenna on a Textile Substrate (**Under Review**).

EXPERIENCE

Research Assistant, CICS UMass   **Amherst, MA, USA**
Advisor: Prof. Deepak Ganesan   *Jan '24 - Aug '24*

- **Project 1: Real-Time Few-Shot 3D Reconstruction for Resource-Limited IoT Systems**
  - The project aims to achieve real-time 3D reconstruction by optimizing both the training and rendering times of a scene.
  - Proposed Depth-Aware Compression (DAC), which balances image compression and quality using a combination of Sub-Sampling (SS) and JPEG compression, resulting in enhanced rendering times.
  - Introduced the fusion of LiDAR sensors with the Gaussian splatting model and divided background and foreground tasks for faster convergence, leading to improved training time.
- **Project 2: D2RF: Beamforming with Flexible Antenna on a Textile Substrate (Under Review)**
  - Developed D2RF, a novel approach for beamforming with deformable antenna arrays on textile substrates, achieving up to 2x improvements in beamforming performance and over 20x enhancement in larger-scale simulations.
  - Built a comprehensive D2EM library that maps antenna deformations to electromagnetic (EM) characteristics.
  - Utilized state-of-the-art KNN and ResNet models for rapid prediction of EM characteristics of bent antenna, significantly faster than traditional EM simulators like HFSS and MATLAB.

Research Assistant, CICS UMass   **Amherst, MA, USA**
Advisor: Prof. Deepak Ganesan   *Jan '23 - May '23*

- **Project: Curtain-Net: Enabling precise beamforming with a deformable antenna array on a fabric substrate**
  - Explored the challenges posed by deformable antenna arrays on fabric substrates like curtains that result in curtain curvature and induce antenna rotation and bending.
  - Developed CurtainNet, a fabric-based antenna array that delivers over $12dB$ of beamforming gain and extends coverage radius by up to $20m$.
  - Pioneered new directions in fabric-based wireless antenna arrays, enabling innovative solutions for indoor localization, beamforming, through-wall sensing, and long-range remote communication.

Teaching Assistant, CICS UMass   **Amherst, MA, USA**
Courses:
- Introduction to Computation (Fall'24)
- Reasoning Under Uncertainty (Fall '22 and Fall '23)
- Scalable Web Systems (Summer '23)
- Introduction To Data Science (Summer '23)

Research Intern, EE IIT-K   **Kanpur, UP, India**
Advisor: Prof. K. V. Srivastava   *Dec '19 - June '20*

- **Project: Design of Microwave Absorbers with Transmission Band using Frequency Selective Surfaces**
  - Pioneered a novel rasorber design with an integrated transmission band, leveraging a simple four-resistor circuit to achieve an ultra-thin profile of $5.57mm$ and peak insertion loss of just $0.167dB$ at $13.16GHz$, opening up new possibilities for applications in stealth and radomes.

SKILLS

- **Programming Languages:** ⋄ Python ⋄ MATLAB
- **Frameworks:** ⋄ PyTorch ⋄ NumPy ⋄ Open3D
- **Antenna Simulation Tools:** ⋄ Ansys HFSS ⋄ CST Microwave Studio
- **Other Tools:** ⋄ GNU Radio ⋄ Blender ⋄ PyRealSense ⋄ Git ⋄ LaTeX