Vineet Sunil Gattani

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EDUCATION

Ph.D. in Electrical Engineering — **Tempe, AZ, USA**
Arizona State University — *2019 - present*

M.S. in Electrical Engineering — **Tempe, AZ, USA**
Arizona State University — *2017 - 2018*

B.Tech. with Honors in Electrical Engineering — **Hyderabad, India**
Indian Institute of Technology — *2011 - 2015*

PUBLICATIONS

Published

- Thaker, P., **Gattani, V. S.**, Tirukkonda, V., Saidi, P., Dasarathy, G., "Non-Stationary Bandits with Periodic Behavior: Harnessing Ramanujan Periodicity Transforms to Conquer Time-Varying Challenges," in IEEE International Conference on Acoustics, Speech and Signal Processing (2024).
- McGovern, M. E., Bruder, D., Rinker, T. J., and **Gattani, V. S.** "Assessment of Laser-Generated Ultrasonic Total Focusing Method for Battery Cell Foil Weld Inspection," in 34^{th} Research in Non-destructive Evaluation (2023). *Awarded Outstanding Paper recognition for Research in Nondestructive Evaluation by ASNT Awards and Honors Council.*
- **Gattani, V. S.**, Kota, J., and Papandreou-Suppappola, A., "Time-Frequency Separation of Matched-Waveform Signatures of Coexisting Multimodal Systems," in 52^{nd} Asilomar Conference on Signals, Systems, and Computers (2018).
- **Gattani, V. S.**, Vupparaboina, K. K., Patil, A., Chhablani, J., Richhariya, A., and Jana, S., "Semi-automated Quantification of Retinal IS/OS Damage in En-face OCT Image," in 69^{th} Computers in Biology and Medicine (2016).

Under review

- **Gattani, V. S.**, Zhang, J., Dasarathy, G., "Communication Efficient Federated Learning over Wireless Channels," submitted in Transactions on Machine Learning Research (Under review, TMLR, 2024).

Thesis

- **Gattani, V. S.**, Papandreou-Suppappola, A.,"Separation of Agile Waveform Time-Frequency Signatures from Coexisting Multimodal Systems", Master's Thesis, Arizona State University, 2018.

RESEARCH EXPERIENCE

Federated learning in band-limited networks

- Developed an algorithm Federated Proximal Sketching (FPS) to address challenges in large-scale federated learning (FL) over wireless multiple access channels (MACs).
- Established rigorous theoretical guarantees on convergence of FPS with high probability. Empirically demonstrated the robust performance of our proposed algorithm over various state-of-the-art FL algorithms.

Multi-armed bandits with missing information

- Online learning algorithms play a vital role in recommendation systems. With growing privacy concerns and limited user information available, the problem is challenging.
- To this extent, proposed and developed an algorithm to minimize regret by suggesting the optimal arm in presence of missing user information. Theoretical regret analysis showcases a meaningful dependence on the degree of missingness and underlying low-rank structure.

Comprehensive Framework for Assured ML in High-Stakes Domains

- With rapid progress in machine learning (ML), the unpredictable and non-decomposable nature of ML systems pose a significant hurdle, underscoring the urgent need to develop a new approach to quality assurance.
- The proposed framework is structured to provide actionable insights during model development and comprehensive oversight post-deployment. The actionable metrics that underlie the toolkit are theoretically-grounded in the field of active learning, meta learning and concepts from measurement theory.
- The framework is structured to serve as a 'co-pilot' for ML engineers and data scientists throughout the entire ML development pipeline, helping to bridge the gap between theoretical ML research and practical deployment.

WORK EXPERIENCE

Research and Development Intern

General Motors, Warren, MI *June 2020 - August 2020*

- Conducted scientific experiments using Laser Ultrasonics system to assess weld integrity. Proposed and developed signal processing techniques to analyze and separate different wave modes in thin metal welds.
- Conducted beam directivity experiment in solids under different conditions and analyzed guided wave modes generated in thin dispersive metals.

Signal Processing Quality Assurance Intern

Cirrus Logic, Mesa, AZ *May 2018 - November 2018*

- Conducted regression experiments to quantify new labs and collect data in real-life environments and acoustical laboratories (far-field lab, listening rooms, and anechoic chamber).
- Improved and maintained software for acoustical tests, software tests and regression tests.
- Generated software to interface to cloud-based servers such as automatic speech recognition engines (Alexa Voice Service).

SKILLS

Tools and Languages: Python, MATLAB

Course work: Real Analysis, Applied Probability, Convex and Large-scale Optimization, Statistical Machine Learning, Radar Signal Processing, Time-frequency Analysis