**Sudarshan Adiga**
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## Summary


- Ph.D. student with research emphasis on machine learning, information theory, wireless communications.
- Three years experience with software development, automation, and validation at Bosch Engineering.
- Research interests and expertise: (1) Machine Learning for Change Detection, (2) Machine Learning decoders for 5G and beyond, (3) Generative Adversarial Networks, (4) Deep Learning based beam-forming for MIMO communications.
- Experienced in collaboration and communication with diverse individuals to achieve required work objectives.


## Education

Ph.D. in Electrical and Computer Engineering; GPA: 3.81 — Aug. 2019 – present
The University of Arizona, Tucson, AZ — Advisors: Dr. Ravi Tandon, Dr. Tamal Bose

M.S. in Electrical and Computer Engineering; GPA: 3.75 — Aug. 2017 – May. 2019
The University of Arizona, Tucson, AZ — Advisor: Dr. Ravi Tandon
*Thesis: Deep Learning for Generative Adversarial Networks and Change Detection*

B.E. in Telecommunication Engineering; GPA: 9.40/10.0 — Aug. 2011 – May. 2015
Ramaiah Institute of Technology, Bangalore, India

## Work Experience

**Graduate Research Assistant** — Tucson, AZ
*The University of Arizona* — August. 2017 - present

- Research interests are in the intersection of machine learning and wireless communications, with focus on: (1) Change Detection, (2) Channel coding for Ultra-Reliable Low Latency Communications, (3) Generative Adversarial Networks.
- **Current work:** Developing deep learning techniques to further enhance latency and reliability of Sparse Matrix Codes; and improving the performance of machine learning based decoders for Low-Density Parity Check codes.
- Developed a new methodology, supplemented with theoretical analysis, to perform unsupervised change detection in time-series data resulting in a minimum improvement of 22% in mis-detection rate over comparable methods [P1].
- Satisfied latency-reliability constraints of URLLC by designing Sparse Matrix Codes, a new Compressed Sensing based channel coding technique, achieving 20% gain in block-length compared to Polar Codes and Sparse Vector Codes [P2].
- Proposed three low-complex supervised deep learning based approaches to compute Singular Value Decomposition and beam-forming vectors utilizing the channel matrix [P3].
- Formulated evaluation metrics using information theory concepts to quantify mode collapse in GAN variants and a novel training methodology to overcome the mode collapse problem [P4].

**Graduate Teaching Assistant** — Tucson, AZ
*The University of Arizona* — Aug. 2019 - May 2020

- Led the lab sessions for Computer Programming for Engineering Applications course and coached students the basics of C programming including concepts like dynamic memory management, search and sort algorithms.

**Associate Software Engineer** — India/ Japan
*Bosch* — Sep. 2015 - Jul. 2017

- Performed automotive software development, test automation and integration as per client requirements.
- Automated intensive testing procedures used to evaluate 724 automobile software models under a challenging deadline.
- Saved 48 testing hours using suitable APIs for each diagnostic activity of automobile software.

**Intern** — Bangalore, India
*Bosch* — Feb. 2015 - Jun. 2015

- Evaluated 21 automobile software models for code conversion effects and performed code changes per standards.

## Technical Skills

- **Programming:** Python, Matlab, C/C++
- **Software Frameworks:** Tensorflow, Pytorch, Keras
- **Libraries:** Pandas, Numpy, Scikit-learn
- **Tools:** Git, Weka, Simulink Design Verifier, GAIO, MC-Verifier

## Awards

- Best Undergraduate Project Award (Spring 2015)
- Best Poster Award at ECE Graduate Poster Symposium at the University of Arizona (Spring 2019)

## Publications/ Pre-prints

P1. **S. Adiga**, and R. Tandon,
"Unsupervised Change Detection using DRE-CUSUM,"
submitted to IEEE International Symposium on Information Theory (ISIT), Espoo, Finland, July, 2022.

P2. **S. Adiga**, R. Tandon and T. Bose,
"Sparse Matrix Codes: Rate-Reliability Trade-offs for URLLC,"
Conference on Information Sciences and Systems (CISS), Princeton, NJ, March 2022.

P3. T. Peken, **S. Adiga**, R. Tandon and T. Bose,
"Deep learning for SVD and hybrid beamforming,"
IEEE Transactions on Wireless Communications, Volume: 19, Issue: 10, Oct. 2020.

P4. **S. Adiga**, M.A. Attia, W.T. Chang, and R. Tandon,
"On the Tradeoff Between Mode Collapse and Sample Quality in Generative Adversarial Networks,"
Global Conference on Signal and Information Processing (GlobalSIP), Anaheim, CA, USA, November, 2018.

P5. N. Shivashankarappa, **S. Adiga**, R. A. Avinash, and H. R. Janardhan,
"Kalman filter based multiple sensor data fusion in systems with time delayed state,"
Signal Processing and Integrated Networks (SPIN), India, February, 2016.

P6. **S. Adiga**, H. R. Janardhan, B. Vijeth, and N. Shivashankarappa,
"Synergy of delayed states and missing data in Wireless Sensor Networks using Kalman Filters,"
Power and Advanced Control Engineering (PACE), India, August, 2015.

P7. V. Talasila, R. Pasumarthy, S.S. Babu, and **S. Adiga**,
"A Systems View of Pathological Tremors,"
Springer Systems Thinking Approach for Social Problems, January, 2015.

## References

1. Dr. Ravi Tandon - Associate Professor at University of Arizona
   Email: tandonr@arizona.edu
   Website: https://uweb.engr.arizona.edu/~tandonr/
   Relationship: Ph.D. Advisor at the University of Arizona

2. Dr. Tamal Bose - Department Head and Professor at the University of Arizona
   Email: tbose@arizona.edu
   Website: https://www.linkedin.com/in/tamal-bose-8054764/
   Relationship: Ph.D. Advisor at the University of Arizona