Abhishek Aich

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RESEARCH INTERESTS

Computer Vision, Deep Learning, and Sparse Signal Optimization
- Specific Interests: Video Reconstruction, Continual Learning, Person Re-identification

EDUCATION

University of California, Riverside, CA, USA
- Ph.D. in Electrical and Computer Engineering — Sep 2018 – Present
  - Adviser: Dr. Amit K. Roy-Chowdhury
  - GPA: 3.82 / 4.00

National Institute of Technology, Tiruchirappalli, Tamil Nadu, India
- M.S. in Electronics and Communication Engineering — 2016 – 2018
  - Thesis: Exploiting Sparsity for Direction of Arrival Estimation Algorithms in Linear Array
  - Adviser: Dr. P. Palanisamy
  - GPA: 8.80 / 10.00

Biju Patnaik University of Technology, Rourkela, Odisha, India
- B.Tech. in Electronics and Communication Engineering — 2011 – 2015
  - Thesis: Target Tracking using Parametric Spectral Estimation Methods
  - GPA: 9.02 / 10.00

RESEARCH EXPERIENCE

Graduate Student Researcher — Sep 2018 – Present
- University of California, Riverside — CA, USA
  - Group: Video Computing Group
  - Supervisors: Dr. Amit K. Roy-Chowdhury
  - Focus: Computer Vision and Deep Learning.

Research Scholar — Feb 2016 – Apr 2018
- National Institute of Technology, Tiruchirappalli — Tamil Nadu, India
  - Group: Signal and Image Processing Lab.
  - Supervisor: Dr. P. Palanisamy
  - Focus: Array Signal Processing, Compressed Sensing.

Research Assistant — May 2014 – Aug 2015
- Silicon Institute of Technology, Bhubaneswar — Odisha, India
  - Supervisor: Prof. Utpal K. Dash
  - Focus: Array Signal Processing.

TEACHING EXPERIENCE

Teaching Assistant — Sep 2019 – Mar 2020
- University of California, Riverside — CA, USA
  - Under-Graduate Course: Senior Design Project (Computer Vision) (EE175A/EE175B)
  - Supervisor: Dr. Amit K. Roy-Chowdhury

Teaching Assistant — Jan 2018 – Apr 2018
- National Institute of Technology, Tiruchirappalli — Tamil Nadu, India
  - Graduate Course: Digital Signal and Image Processing Lab. (EC610)
  - Supervisor: Dr. P. Palanisamy

SELECTED PUBLICATIONS

[1] Abhishek Aich*, Akash Gupta*, Rameswar Panda, Rakib Hyder, Salman Asif, and Amit Roy-Chowdhury, "Non-Adversarial Video Synthesis with Learned Priors," IEEE CVPR, 2020. (* joint first authors)

[2] Akash Gupta, Abhishek Aich, Kevin Rodriguez, G. Venugopala Reddy, and Amit Roy-Chowdhury, "Deep Quantized Representation for Enhanced Reconstruction," ISBI 2020 Workshop, 2020.

[3] Abhishek Aich, and P. Palanisamy, "A novel CS beamformer root-MUSIC algorithm and its subspace deviation analysis," in *IEEE Region 10 Conference (TENCON)*, Penang, Malaysia, pp. 1404-1408, 2017.

[4] Abhishek Aich, and P. Palanisamy, "On application of OMP and CoSaMP algorithms for DOA estimation problem," in *IEEE International Conference on Communication and Signal Processing (ICCSP)*, Chennai, India, 2017. (*Oral*)

[5] Abhishek Aich, and P. Palanisamy, "A strict bound for dimension of measurement matrix for CS beamformer MUSIC algorithm," in *IEEE Region 10 Conference (TENCON)*, Singapore, pp. 2602-2605, 2016. (*Oral*)

PROJECTS

Video Generation from Learned Priors Jul 2019 – Nov 2019

- Supervisor: Dr. Amit K. Roy-Chowdhury

- **Goal**: Generate short video clips without pixel inputs.
- Designed a generative network to generate the realistic videos using learnable latent vectors, using non-adversarial approach.
- Introduced a novel triplet condition on the latent vectors to get good latent vector representation of video frames.

Multi-View video frame prediction using STAR-GAN Mar 2019 – Jun 2019

- Supervisor: Dr. Amit K. Roy-Chowdhury

- **Goal**: Predict missing frames in one camera view using other reference camera views.
- Designed a STAR-GAN based model to predict missing frames in one camera by using view-parallel frames from other reference cameras.
- Introduced a novel cycle consistency based loss for learning a weighted relationship between missing frame and corresponding reference frames from other cameras.

Continual Learning in Person Re-ID systems Jan 2019 – Mar 2019

- Supervisor: Dr. Amit K. Roy-Chowdhury

- **Goal**: Design a global Person-ReID system to work for different places without forgetting previous data distribution
- Designed a deep generative network based model to allow a Person Re-ID system to continuously learn different scenarios (in this case, different datasets) without forgetting past person identities in different conditions.

AWARDS & SCHOLARSHIPS

- **Deans Distinguished Fellowship Award**, University of California, Riverside 2018 – 2019
- **MHRD Scholarship**, Govt. of India 2016 – 2018
- **Scholar's Club**, Silicon Institute of Technology, Bhubaneswar 2012 – 2015
  - For being in the Top 3 of the Electrical and Communication Engineering Department
- **e-Medhabruti Scholarship**, Govt. of Odisha 2012 – 2015

TECHNICAL SKILLS

- **Programming Skills**: Python, MATLAB
- **Deep Learning Libraries**: PyTorch
- **Scientific Computing Libraries**: numpy, scipy, sciKit-learn, matplotlib
- **Others**: LaTeX, MS Office, OpenCV, Jupyter

GRADUATE COURSES

• Introduction to Deep Learning • Adv. Computer Vision • Machine Learning • Information Theory • Convex Optimization • State and Parameter Estimation Theory • Stochastic Processes • Sparsity, Structure, and Inference • Math. Methods for EE • Adv. Digital Signal Processing

PROFESSIONAL ACTIVITIES

Conference Reviewer:
IEEE TENCON 2016, IEEE TENCON 2017
Journal Reviewer:
IEEE Transactions on Signal Processing, Taylor & Francis International Journal of Electronics Letters, IET Signal Processing