TANWI MALLICK

Postdoctoral Appointee, Argonne Nation Laboratory, IL 60439

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RESEARCH INTEREST

Deep Learning, Machine Learning, High Performance Computing, Computer Vision, and Image Processing

WORK EXPERIENCE

Argonne Nation Laboratory, Illinois, USA   October 2018 - Present
Postdoctoral Appointee

· Working on scalable deep learning approaches for spatiotemporal forecasting

General Electric (GE) Oil and Gas, Bangalore, India   June 2018 - October 2018
Senior Data Scientist

· Worked on production oil forecasting in reservoirs and failure prediction of turbines using deep learning techniques

National Digital Library Project, IIT Kharagpur, India   June 2017 - April 2018
Research Consultant

· Worked on building graphical abstract from the figures and there labels in scientific research papers using Convolutional Neural Network

Durgapur Institute of Technology and Management, India   July 2010 - December 2011
Assistant Professor

EDUCATION

Indian Institute of Technology Kharagpur, India   *December 2011 - February 2018*
Doctorate of Philosophy
Department of Computer Science & Engineering
Thesis: A Framework for Modeling, Analysis and Transcription of Bharatanatyam Dance Performances

National Institute of Technology Durgapur, India   *June 2008 - June 2010*
Master of Technology
Department of Computer Science & Engineering

Jalpaiguri Government Engineering College, India   *July 2004 - June 2008*
Bachalor of Technology
Department of Computer Science & Engineering

AWARDS AND ACHIEVEMENTS

- Travel award: 14th Women in Machine Learning (WiML) Workshop co-located with NeurIPS, Vancouver, Canada, December, 2019.

- Selected to participate in the 2nd Heidelberg Laureate Forum as one of the 100 most qualified Young Researchers in Computer Science to meet a number of Turing Awardees. [September 21-26, 2014]

- The paper "Characterization of Noise in Kinetic Depth Images: A Review" as one of the 25 most downloaded papers for Apr.May14.

- One of the 7 finalist of Samsung Innovation Award 2014. In total 50 groups had participated for the award.

- Received TCS research fellowship [October, 2012 to June, 2017].

- Travel award from DST, Govt. of India for VISAPP 2015, and from Rajaghari Fund of IIT Kharagpur for 2nd Heidelberg Laureate Forum.

- Received GATE (Graduate Aptitude Test in Engineering) scholarship [2008-2010].

OUTREACH

- Talk - Graph-Partitioning-Based Diffusion Convolution Recurrent Neural Network for Large-Scale Traffic Forecasting, **AI & HPC Seminar**, **CELS Computing Coffee Hours**, and **Postdoc society e-seminar**,Argonne National Laboratory, 2020.

- Press release

    1. Bumper to bumper, Can AI and supercomputers solve Californias traffic? Science Node, 25 January, 2021.

    2. Can a national lab forecast traffic jams to prevent them in future? Federal News Network, 4 December, 2020.

    3. On the road to efficiency, Newswise, DOE science news source, 3 June, 2019.

- Feature Stories - Building a better traffic forecasting model, Argonne website, 12 November, 2020.

- Presentation - Graph-Partitioning-Based Diffusion Convolution Recurrent Neural Network for Large-Scale Traffic Forecasting, Transportation Research Board (TRB 2020).

- Poster Presentation - Scalable Diffusion Convolution Recurrent Neural Network for Large-Scale Traffic Forecasting, Women in Machine Learning, NeurIPS 2019.

- Invited participant - Department of Energy - AI for Science Townhall, Lawrence Berkeley National Laboratory, 2019.

- Invited talk - Diffusion Convolution Recurrent Neural Network for Traffic Forecasting, Argonne Physical Sciences and Engineering (PSE) AI in Science and Engineering Townhall Meetings, 2019.

- Poster Presentation - Learning to forecast entire California traffic within 3 hours, Postdoc symposium, Argonne National Laboratory, 2019.

- Tutorial lead - Diffusion convolution recurrent neural network for traffic forecasting, Argonne Training Program on Extreme-Scale Computing (ATPESC) 2019.

- Tutorial lead - Object detection using machine learning, Argonne Leadership Computing Facility (ALCF) AI4Science tutorial, Argonne National Laboratory, 2019.

FUNDING SUPPORT

- Accelerating graph convolution based deep learning framework for large scale highway traffic forecasting with SambaNova, LDRD-Expedition, Argonne National Laboratory, U.S. Department of Energy. Role: PI; Year: 2021-2021.

- High Performance Computing and Big Data Solutions for Mobility Design and Planning (DOE EERE/VTO); Year: 2018-2022.

PROFESSIONAL SERVICES

- Co-organizer - AI HPC Seminar Series, May 2020 to present, Argonne National Laboratory

- Reviewer of the conference - Super Computing (SC) 2019 , IEEE Students Technology Symposium 2014 , International Conference on Computational Intelligence and Networks (CINE) 2020

- Reviewer of the journal - The Journal of Supercomputing, The Institution of Engineers (India): Series B, Computer Animation and Virtual Worlds

- Chair, IEEE Women in Engineering Affinity Group Kharagpur Section (2015-16)

- Treasurer and Member of Management Team, IEEE Women in Engineering Affinity Group Kharagpur Section [2014-15]

TEACHING ASSISTANT

- Programming in C++ in NPTEL MOOCs [January, 2017 to March, 2017] and [July, 2016 to September, 2016]

- Object Oriented Analysis and Design (OOAD) in NPTEL MOOCs [July, 2016 to September, 2016]

- Student Volunteer at ACM SIGGRAPH 2015

- Advance Digital Image Processing and Computer Vision [Spring Semester, 2014 and 2015, IIT Kharagpur]

- Compiler Design [Autumn Semester, 2013 and 2014, IIT Kharagpur]

- Software Engineering [Spring Semester, 2013 and 2014, IIT Kharagpur]

- Image Processing [Autumn Semester, 2012, IIT Kharagpur]

PUBLICATIONS

Link to Google Scholar Citations profile: Google scholar citations

1. **Tanwi Mallick**, Prasanna Balaprakash, Erik Rask, and Jane Macfarlane. Graph-partitioning-based diffusion convolutionrecurrent neural network for large-scale traffic fore-casting, Transportation Research Record, Vol 2674, Issue 9, pp. 473-488, 2020.

2. **Tanwi Mallick**, Prasanna Balaprakash, Erik Rask, and Jane Macfarlane. Transfer Learning with Graph Neural Networks for Short-Term Highway Traffic Forecasting. Accepted in the 25th International Conference on Pattern Recognition (ICPR2020).

3. **Tanwi Mallick**, Mariam Kiran, Bashir Mohammed, Prasanna Balaprakash. Dynamic Graph Neural Network for Traffic Forecasting in Wide Area Networks. Accepted in the special session Machine Learning on Big Data (MLBD 2020), Big Data 2020.

4. **Tanwi Mallick**, Partha Pratim Das, and Arun Kumar Majumdar. Beat Detection and Automatic Annotation of the Music of Bharatanatyam Dance using Speech Recognition Techniques. arXiv preprint arXiv:2004.08269, 2020.

5. **Tanwi Mallick**, Partha Pratim Das, and Arun Kumar Majumdar. Posture and sequence recognition for Bharatanatyam dance performances using machine learning approach, arXiv preprint arXiv: 1909.11023, 2019.

6. **Tanwi Mallick**, Partha Pratim Das, and Arun Kumar Majumdar. Characterization, Detection, and Synchronization of Audio-Video Events in Bharatanatyam Adavus. Heritage Preservation. Springer, Singapore, pp 241-268, 2018.

7. Achyuta Aich, **Tanwi Mallick**, Himadri B.G.S. Bhuyan, Partha Pratim Das, and Arun Kumar Majumdar. NrityaGuru: A Dance Tutoring System for Bharatanatyam using Kinect. In Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2017), vol 841. Springer, Singapore, p 481-493, 2017.

8. Anindhya Sankhla, Vinanti Kalangutkar, Himadri B.G.S. Bhuyan, **Tanwi Mallick**, Vivek Nautiyal, Partha Pratim Das, and Arun Kumar Majumdar. Automated Translation of Human Postures from Kinect Data to Labanotation. In Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2017), vol 841. Springer, Singapore, pp 494-505, 2017.

9. **Tanwi Mallick**, Aakash Anuj, Partha Pratim Das and Arun Kumar Majumdar. Using Musical Beats to Segment Videos of Bharatanatyam Adavus. In Computer Vision and Image Processing (CVIP 2016), Proc. International Conference on (2017), pp. 581591, 2016.

10. **Tanwi Mallick**, Palash Goyel, Partha Pratim Das and Arun Kumar Majumdar. Facial Emotion Recognition from Kinect Data An Appraisal of Kinect Face Tracking Library. In Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2016), Proc. 11th Joint Conference on (2016): Volume 4: VISAPP, pp. 525532, 2016.

11. **Tanwi Mallick**, Ankit Khedia, Partha Pratim Das and Arun Kumar Majumdar. Fast Gait Recognition from Kinect Skeletons. In Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2016), Proc. 11th Joint Conference on. Volume 3: VISAPP, pp. 340347, 2016.

12. **Tanwi Mallick**, Aakash Anuj, Partha Pratim Das and Arun Kumar Majumdar. Segmentation of Videos of Adavus in Bharatanatyam Dance by Musical Beats. In Frontiers of Research Speech and Music (FRSM 2015), pp. 175180, 2015.

13. **Tanwi Mallick**, Rishabh Agrawal, Partha Pratim Das and Arun Kumar Majumdar. Omnidirectional Reconstruction of Human Figures from Depth Data using Mirrors. In Computer Vision Theory and Applications (VISAPP 2015), Proc. 10th International Conference on (2015), pp. 559566, 2015.

14. Aakash Anuj, **Tanwi Mallick**, Partha Pratim Das and Arun Kumar Majumdar. Robust Control of Applications by Hand-Gestures. In Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2015), Proc. 5th National Conference on (2015), pp. 14, 2015.

15. **Tanwi Mallick**, Partha Pratim Das and Arun Kumar Majumdar. Characterizations of Noise in Kinect Depth Images: A Review. IEEE Sensor Journal (2014), Volume 14, Issue 6, pp. 1731-1740, 2014.

16. **Tanwi Mallick**, Partha Pratim Das and Arun Kumar Majumdar. Study of Interference Noise in Multi-Kinect Set-up. In Computer Vision Theory and Applications (VISAPP 2014), Proc. 9th International Conference on (2014), pp. 173178, 2014.

17. **Tanwi Mallick**, Partha Pratim Das and Arun Kumar Majumdar. Estimation of the Orientation and Distance of a Mirror from Kinect Depth Data. In Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2013), Proc. 4th National Conference on (2013), pp. 14, 2013.

18. **Tanwi Mallick**, Gopa Bhaumik, Koyel Sinha Chowdhury, and Gautam Sanyal. Study & Analysis of. surveillance using Human Facial Expressions, Proc. International Conference on Systemic Cybernetics and Informatics (ICSCI 2010), pp 434-37, 2010.

19. Gopa Bhaumik, **Tanwi Mallick**, Koyel Sinha Chowdhury, and Gautam Sanyal. Analysis and Detection of Human Faces by using Minimum Distance Classifier for Surveillance, Proc. International Conference on Recent Trends in Information, Telecommunication and Computing (ITC 2010), pp 265-67, 2010.