Dipanwita Thakur
Assistant Professor

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Overview

I have been an Assistant Professor(Research) of Computer Engineering at the University of Calabria, Italy, since July 2023. I am very passionate about research in federated learning-based healthcare systems. Over the past several years, I have developed several technologies and systems whose scientific outcome (as lead author) has appeared at flagship publications such as IEEE, Elsevier, and Springer. Moreover, I have had a lot of exposure to software-defined networking.

Core Skills

- Machine Learning
- Deep Learning
- MATLAB

- Python
- Mininet
- SDN

- IoT
- Java
- Android App

Career Summary

2023 – Present   **Assistant Professor (Research) of Computer Engineering**
DIMES, University of Calabria, Italy

Role outline

The primary role is research in the domain of Green Artificial Intelligence using federated learning. Currently, I am working on the Future Artificial Intelligence Research (FAIR) Project, funded by the Italian National Recovery & Resilience Plan (PNRR)

2008 – 2023   **Assistant Professor**
Banasthali University, Rajasthan, India

Role outline

The primary roles are teaching and research. I have published more than 20 research papers in various journals and conferences. I am taking the classes of B.Tech and M.Tech students. As of now, I have taken 25 different papers to teach. However, Discrete Mathematics, Theory of Computations, Compiler Design, Distributed Systems, Artificial Intelligence, and Machine Learning are some of the primary papers I used to teach. Various research projects are developed by the students under my supervision.

2007 – 2008   **Technical Support Engineer**
vCustomer India Pvt Ltd

Role outline

The primary role is to provide troubleshooting and technical support services to a wide range of internal and external clients for NETGEAR devices such as router, switches, access points etc.

2006 – 2007   **Project Trainee**
Centre for Development of Advanced Computing, Govt. of India

Role outline

I have worked with the Applied Artificial Intelligence (AAI) group to develop a multilingual chat server using Java. This project used machine translation for natural languages such as Bengali, Hindi, and Marathi.

Teaching Experience

Theory

- Artificial Intelligence and Machine Learning

- Artificial Intelligence
- Discrete Mathematics
- Theory of Computation
- Compiler Design
- Advanced Topics in Algorithms
- Advanced Database Management Systems
- Advanced Computer Architecture
- Computer Architecture & Organizations
- Microprocessors & Microcontrollers
- Operating Systems
- Internet & Web Technologies
- Distributed Computing
- Distributed Systems
- Computer Oriented Numerical Analysis
- System Analysis & Design
- Software Engineering
- System Testing
- Software Architecture & Project Management
- Computer Fundamentals & Programming

Laboratory

- Python Programming
- MATLAB
- Compiler Design (Lex, Yacc)
- Microprocessors & Microcontrollers
- Unified Modeling Language
- Operating System Lab
- Java Programming

Supervision

- M.Tech Thesis - 04
- B.Tech Minor Project - 40
- B.Tech Major Project - 03

Research Interest

Smart Healthcare
Pattern Recognition
Artificial Intelligence and Machine Learning
Software Defined Networking

Patents

Thakur, D., 2022, A SYSTEM USING CONVOLUTIONAL AUTO-ENCODER LONG SHORT-TERM MEMORY NETWORK FOR SMARTPHONE-BASED HUMAN ACTIVITY RECOGNITION, published by IPR, Government of India.

Publications

Journal

1. **Thakur, D.**, Guzzo, A. and Fortino, G. "Attention-based Multihead Deep Learning Framework for online activity monitoring with Smartwatch Sensors ", in IEEE Internet of Things Journal, vol. 10, no. 20, pp. 17746-17754, 15 Oct.15, 2023,doi: 10.1109/JIOT.2023.3277592.

2. **Thakur, D.** and Biswas, S., "Online Change Point Detection in Application With Transition-Aware Activity Recognition", IEEE Transactions on Human-Machine Systems, vol. 52, no. 6, pp. 1176-1185, Dec. 2022, doi: 10.1109/THMS.2022.3185533.

3. **Thakur, D.** and Biswas, S., 2022, "Attention-Based Deep Learning Framework for Hemiplegic Gait Prediction With Smartphone Sensors", IEEE Sensors Journal, vol. 22, pp. 11979-11988, June 2022, doi: 10.1109/JSEN.2022.3172603.

4. **Thakur, D.** and Biswas, S., 2022, "Guided regularized random forest feature selection for smartphone based human activity recognition", Journal of Ambient Intelligence and Humanized Computing, vol. 14, pp. 9767–9779, April 2022, doi:10.1007/s12652-022-03862-5.

5. **Thakur, D.** and Biswas, S., 2022, "An Integration of feature extraction and Guided Regularized Random Forest feature selection for Smartphone based Human Activity Recognition", Journal of Network and Computer Applications, vol. 204, pp. 103417, August 2022, doi:10.1016/j.jnca.2022.103417.

6. **Thakur, D.**, Biswas, S., Ho, E. S. L. and Chattopadhyay, S. "ConvAE-LSTM: Convolutional Autoencoder Long Short-Term Memory Network for Smartphone-Based Human Activity Recognition," in IEEE Access, vol. 10, pp. 4137-4156, 2022, doi: 10.1109/ACCESS.2022.3140373.(SCI)

7. **Thakur, D.** and Biswas, S., Feature fusion using deep learning for smartphone based human activity recognition. Int. j. inf. tecnol. 13, 1615–1624 (2021). https://doi.org/10.1007/s41870-021-00719-6 (Scopus)

8. **Thakur, D.** and Biswas, S., Smartphone based human activity monitoring and recognition using ML and DL: a comprehensive survey. Journal of Ambient Intelligent Humanized Computing 11, 5433–5444 (2020). https://doi.org/10.1007/s12652-020-01899-y. (SCIE)

9. **Thakur, D.** and Khatua, M. (2020). Multi-domain virtual network embedding with dynamic flow migration in software-defined networks. Journal of Network and Computer Applications. 162. 102639. 10.1016/j.jnca.2020.102639. (SCIE)

10. Priyanka Kumari, **Dipanwita Thakur**. "Load Balancing in Software Defined Network", "International Journal of Computer Sciences and Engineering, Volume 5 – Issue 12 (2017). Journal indexed in: Indian Citation Index, ROAD: the Directory of Open Access scholarly Resources, Research Gate, A UGC Recognized Journal, Google Scholar, IARC-Impact factor, Academia Database, DPI Digital Library.

11. Priyanka Saxena, **Dipanwita Thakur**. "Complexity Analysis of Clique Problem", International Journal of Computer Science Engineering (IJCSE), Vol. 5 No.01 Jan 2016. Journal indexed in: Google Scholar, Bielefeld Academic Search Engine (BASE), CiteSeerX, SCIRUS, DOAJ, ProQuest, Cornell's University Library, SciRate, ScientificCommons, DBLP.

12. Shilpa Nupur, **Dipanwita Thakur** "Comparative Study of Replication Techniques for Distributed Applications", International Journal of Computer Applications, Volume 59 - Number 17(2012). Journal indexed in: DOAJ, Google Scholar, Informatics, ProQuest CSA Technology Research Database, NASA ADS, Scientific Commons (Univ. of St Gallens), University of Karlsruhe, Germany, Georgetown University Library, and Washington University.

13. **Dipanwita Thakur**, G.N. Purohit "A Comparative Study on Software Architectural Styles for Network based Applications", International Journal of Computer Applications, Volume 47 - Number 20(2012). Journal indexed in: DOAJ, Google Scholar, Informatics, ProQuest CSA Technology Research Database, NASA ADS, Scientific Commons (Univ. of St Gallens), University of Karlsruhe, Germany, Georgetown University Library, and Washington University.

14. Kamna Gauri, **Dipanwita Thakur** "Design and Analysis of Software Architecture with Unified Modeling Language", International Journal of Advanced Research in Computer Science, Volume 3, No. 3(2012). Journal indexed in: CrossRef, ICI, COPERNICUS, EBSCO, DOAJ, Google Scholar, UGC Approved.

15. Kamna Gauri, **Dipanwita Thakur**. "Comparative Performance Evaluation of Software Architectural Styles with UML", International Journal of Advanced Research in Computer Science, Volume 3, No. 1(2012). Journal indexed in: CrossRef, ICI, COPERNICUS, EBSCO, DOAJ, Google Scholar, UGC Approved.

16. Kamna Gauri, **Dipanwita Thakur**. "Comparative Performance Evaluation of Software Architectural Styles" International Journal of Software Engineering, International Research Publication House, Volume 3, Number 1 (2012), pp. 15-23.

Accepted Journal:

1. **Thakur, D.** and Guzzo, A. and Fortino, G., 2022, "A Feature Fusion Method Integrating Gradient Boosted Feature Selection and Deep Learning for Performance-Aware Physical Activity Recognition ", accepted for publication in Human-centric Computing and Information Sciences, September 2022. (Accepted, In Press).

2. **Thakur, D.** and Biswas, S., "Permutation Importance based Modified Guided Regularized Random Forest in Human Activity Recognition with Smartphone ", accepted for publication in Engineering Applications of Artificial Intelligence, December 2023. (Accepted, In Press).

3. **Thakur, D.** and Pal, A., "Subsampled Randomized Hadamard Transformation based Ensemble Extreme Learning Machine for Human Activity Recognition ", under review in ACM Transactions on Computing for Healthcare, November 2023. (Accepted, In Press).

Conference

1. **D.Thakur**, A. Guzzo and G. Fortino, "Energy Aware Federated Learning with Application of Activity Recognition", The 21st IEEE International Conference on Pervasive Intelligence and Computing (PICom 2023), 14-17 Nov 2023, Abu Dhabi, UAE.

2. **D.Thakur**, S. Roy, S. Biswas, E.S.L. Ho, S. Chattopadhyay, S. Shetty, "A Novel Smartphone-Based Human Activity Recognition Approach using Convolutional Autoencoder Long Short-Term Memory Network", IEEE 24th International Conference on Information Reuse and Integration for Data Science (IEEE IRI'23), August 4 - August 6, 2023. Bellevue, WA, USA, , 2023, pp. 146-153, doi: 10.1109/IRI58017.2023.00032.

3. **D. Thakur**, A. Guzzo and G. Fortino, "t-SNE and PCA in Ensemble Learning based Human Activity Recognition with Smartwatch*", 2021 IEEE 2nd International Conference on Human-Machine Systems (ICHMS), 2021, pp. 1-6, doi: 10.1109/ICHMS53169.2021.9582455.

4. **D. Thakur** and S. Biswas, "Optimization of hyperparameters in Convolutional Neural Network for Human Activity Recognition", in Proc. of the ICMISC 2021, Lecture Notes in Networks and Systems, vol 237, pp. 535-546, Springer, Singapore, March 28-29, 2021.

5. **D. Thakur** and S. Biswas "Smartphone based Human Activity Pattern Identification using Unsupervised Learning", in Proc. of the ICDSA 2021, Lecture Notes in Networks and Systems, vol 287, pp. 549-559, Springer, April 10-11, 2021.

6. **D. Thakur** and S. Biswas, "A Novel Human Activity Recognition Strategy using Extreme Learning Machine Algorithm for Smart Health", in Proc. of the IEMIS 2020, Emerging Technologies of Data Mining and Information Security, Advances in Intelligent Systems and Computing, vol 1286, pp.215-222 Springer, July 2nd - 04th, 2020.

7. **D. Thakur** and M. Khatua, "Cellular Learning Automata-based Virtual Embedding in Software-Defined Networks", in Proc. of the ICCCN 2018, Lecture Notes in Networks and Systems, vol 46, pp. 173-182, Springer, March 29-30, 2018.

8. R. Kesharwani and **D. Thakur**, "Unsupervised Change Detection in Remote Sensing Images Using Multi-View Learning", in Proc. of the ICICICT 2019, IEEE, pp. 239-246, July 5-6, 2019,

9. **D. Thakur**, "A Novel Load Balancing approach in Software Defined Network", 2019 4th International Conference on Information Systems and Computer Networks (ISCON 2019), IEEE, pp. 455-460, November 21-22, 2019.

Book Chapter

1. **D. Thakur** and S. Biswas, "Machine Learning in Sustainable Healthcare", Advanced Computational Techniques for Sustainable Computing, M. Rathi and A. Sinha, Taylor & Francis Group, LLC/CRC Press, USA, 2020.

2. **D. Thakur** and S. Biswas and A. Pal, "Human Activity Recognition Systems based on Audio/Video data using Machine Learning and Deep Learning", Internet of Things based Smart Healthcare, Suparna Biswas, Chandreyee Chowdhury, Biswaranjan Acharya, Chuan-Ming Liu, Springer Nature, 2021.

Poster

- **D. Thakur** and S. Biswas, "An Adaptive Human Activity Recognition using Smartphones", 4th Regional Science & Technology Congress (Southern Region), WB, 23rd – 24th December, 2019.

Education

2019 - 2023   **Ph.D.** (Mulana Abul Kalam Azad University of Technology, West Bengal, India)   Formerly known as West Bengal University of Technology West Bengal, India

2005 - 2007   **M.Tech. in Software Engineering** (Banasthali Vidyapith, Rajasthan, India)

2004 - 2007   **MCA** (Indira Gandhi National Open University, Govt. of India)

2003 - 2005   **B-Level Master's Diploma in Computer Applications** (NIELIT, Govt. of India)

2000-2003   **A-Level, Advanced Diploma in Computer Applications** (NIELIT, Govt. of India)

1997-1999   **Post Graduate Certificate on Science Journalism & Media Practice** (DST, Govt. of India)

1994 - 1997   **B.Sc. Mathematics** (University of Calcutta)

Awards

- Dr. B.C. Roy Memorial Scholarship for outstanding results in Madhyamik Pariksha (10th Board), 1992.

- Student Science Seminar, Organized by Department of Sports & Youth Services, Govt. of West Bengal, 1990.

Professional Activities

- Senior Member, IEEE.

- Member, ACM.

- Reviewer, Information Fusion, Elsevier.

- Reviewer, IEEE Sensors Journal.

- Reviewer, IEEE Access Journal.

- Reviewer, IEEE Internet of Things Journal

- Reviewer, IEEE Transactions Human-Machine Systems.

- Reviewer, Engineering Applications of Artificial Intelligence, Elsevier.

- Reviewer, Journal of Ambient Intelligence and Humanized Computing, Springer.

- Member, Technical Program Committee, 29th ACM SIGKDD Conference on Knowledge Discovery & Data Mining, August 6-10, 2023, Long Beach, California, US.

- Member, Technical Program Committee, 21st International Conference on Intelligent Systems Design and Applications, 2022, Machine Intelligence Research Labs: Auburn, WA, US.

- Member, Technical Program Committee, 22nd International Conference on Intelligent Systems Design and Applications, 2021, Machine Intelligence Research Labs: Auburn, WA, US.

- Member, Technical Program Committee, International Workshop on Fair and Interpretable Learning Algorithm, IEEE BigData 2020, Atlanta, Georgia, US.

- Member, Technical Program Committee, IEEE International Workshop on Data Analytics for Smart Health, IEEE BigData 2020, Atlanta, GA, US.

- Member, Technical Program Committee,, 3rd International Conference on Data Science and Applications (ICDSA 2022), Kolkata, India.

- Reviewer, International Conference on Mobile Networks and Wireless Communication (ICMNWC 2021), Tumkur, India.

Collaborative Research

- Working with Prof. Giancarlo Fortino, Full Professor at University of Calabria, Italy & CEO at Sensyscal S.r.l. & IEEE Fellow in the domain of Smartwatch based Human Activity Recognition.

- Working with Dr. Antonella Guzzo, Associate Professor at University of Calabria, Italy in the domain of Smartwatch based Human Activity Recognition.

- Working with Dr. Edmon S. L. Ho, Associate Professor, Northumbria University, UK, in the domain of Human Activity Recognition.

- Working with Dr. Arindam Pal, Senior Research Scientist at Data61 in Commonwealth Scientific and Industrial Research Organization (CSIRO) and a Senior Research Fellow at Cyber Security Cooperative Research Centre (CSCRC), in the domain of Machine Learning.

- Working with Prof. Samiran Chattopadhyay, Professor, Institute for Advancing Intelligence, TCG Centres for Research and Education in Science and Technology, Kolkata, India and Department of Information Technology, Jadavpur University, Kolkata, India.

- Working with Dr. Manas Khatua, Assistant Professor, IIT Guwahati, Assam, in the domain of Software Defined Networking.

- Working with Dr. Suparna Biswas, Associate Professor, Maulana Abul Kalam Azad University of Technology, West Bengal, in the domain of Human Activity Recognition.

Professional Certification

- NPTEL-AICTE certification course of Internet of Things

- NPTEL-AICTE certification course of programming in C++

- NPTEL-AICTE certification course in Discrete Structures

- NPTEL-AICTE certification course in Machine Learning

- NPTEL-AICTE certification course in Deep Learning

- Coursera certification course of Specialization in Deep Learning

- Coursera certification course in Machine Learning

- edX certification course in Python in Research.

Career Development Program

- "Hands-on training on Super Computer DGX A100", February 8th – 12th, 2021, organized by Banasthali University, Rajasthan, India.

- "Artificial Intelligence & Machine Learning", June 21st -25th, 2021, organized by Sir Padampat Singhania University, Udaipur in association with IEEE Rajasthan subsection.

- "Preach What you Practice Session-I (Episode-III)", June 26th, 2021, organized by MAKAUT, West Bengal, India.

- "Education 4.0 - Role of Educational Technologies", July 15th – 18th, 2021, Organized by IEEE student section, Pune, India.

- "Automated Labeling and Iterative Learning", July 21, 2021, Organized by MathWorks.

- "International Symposium on History & Future of Transistors", Dec. 23rd – 30th , 2021, Organized by IEEE EDS, Delhi Chapter.

- "AI and Data Science", May 30th, 2020, Organized by IEEE, Bangalore Section.

- "Art and Challenges of Writing Papers" for IEEE Transactions, June 8th, 2020, Organized by IEEE, Bangalore Section.

- "The Future of World Electronics and Possible Roles India Can Play", June 9th, 2020, Organized by IEEE, Bangalore Section.

- "IEEE Collabratec: Uniting the IEEE Global Technical Community", June 10th, 2020, Organized by IEEE, Bangalore Section.

- "Defect Assisted Atomic Orbital Overlap Engineering in 2D materials Resulting in High Performance Transistors", June 11th, 2020, Organized by IEEE, Bangalore Section.

- "A Step towards enkindling Atma Nirbharata in our youths in Higher Educational Institutes", June 12th, 2020, Organized by IEEE, Bangalore Section.

- "Wireless Sensor Network Recent Trends", June 19th, 2020, Organized by Seacom Engineering College, West Bengal.

- "Recent Advances on Machine Learning & Its Application", June 23-27, 2020, Organized by Amity Institute of Information Technology, Amity University, Kolkata.

- "Deep Learning using Tensorflow", July 01-06, 2020, Organized by Soft Computing Research Society in collaboration with the Islamic University of Science & Technology, Awantipora.

- "Advances in Signal Processing and Machine Learning", July 20-26, 2020, Organized by MHRD-Institution Innovation Council, DDUC Chapter, Deen Dayal Upadhyaya College, University of Delhi (Under the aegis of DBT Star College Program); Department of Electronic Science, University of Delhi & National Academy of Sciences India (NASI) – Delhi Chapter and supported by IEEE Electron Device Society (EDS), Delhi Chapter.

- "Wireless AI: A New Sixth Sense to Deciphering our World", August 30th, 2020, organized by MHRD-Institution Innovation Council, DDUC Chapter, Deen Dayal Upadhyaya College, University of Delhi (Under the aegis of DBT Star College Program); Department of Electronic Science, University of Delhi & National Academy of Sciences India (NASI) – Delhi Chapter and supported by IEEE Electron Device Society (EDS), Delhi Chapter.

- TEQIP-III sponsored Workshop on "Recent Trends in Machine Learning and IoT", 17 -21 June, 2019, Organized by NIT, Durgapur.

- Google Android Developer Fundamentals Faculty Training Program organized by Google during August 21-25, 2017.

- Faculty development program on "Innovation and Recent Trends in Data Analytics" organized by AICTE during December 26-31, 2016.

- Sensitization Workshop on Technological Empowerment of Women organized by Banasthali University during March 14-15, 2016.

- Training in "IBM Rational SEED for quality program" organized by IBM during January 08-11, 2013.