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# Deepa Tilwani

## Education

2022–Present **Ph.D. in Computer Science and Engineering**, *University of South Carolina*, Columbia, SC, USA
GPA: 3.6/4.0

2019–2022 **M.Tech in Computer Science and Engineering**, *The LNM Institute of Information Technology*, Jaipur, Rajasthan, India
Thesis: *Predicting Familial Likelihood of Autism Spectrum Disorder in Infancy Using ECG*

2014–2018 **B.Tech in Computer Science and Engineering**, *Govt. Women Engineering College*, Ajmer, Rajasthan, India

## Skills

Programming Languages: Python, PyTorch, Keras, TensorFlow, Scikit-learn, NumPy, Pandas, CUDA, GIT, C

Tools: Seaborn, Matplotlib, Jupyter, Git, Docker, Matlab, GPU

Methodologies: Machine Learning, Deep Learning, Knowledge Graphs, NeuroSymbolic AI, Signal Processing (EEG, fMRI/MRI, ECG), Large Language Models (LLMs), Reterival Augmentation Generation (RAG)

Soft Skills: Team Leadership, Project Management, Communication Skills, Cross-Functional

## Work Experience

2022–Present **Graduate Research Assistant**, *Artificial Intelligence Institute, University of South Carolina*, Columbia, SC, USA

- Leading research projects focused on leveraging large language models (LLMs) for search and attribution.
- Led a project on *ECG Recordings as Predictors of Very Early Autism Likelihood: A Machine Learning Approach* that resulted in *Trainee Best Research Presentation Winner in SCAND Symposium*.
- Developed an open source dataset for attribution evaluation *REASONS: A benchmark for REtrieval and Automated citationS Of scieNtific Sentences using Public and Proprietary LLMs.*.
- Collaborated with a multidisciplinary team *to develop machine learning benchmarks for neuroimaging data*.

2021–2022 **Visiting Research Scholar**, *Artificial Intelligence Institute, University of South Carolina*, Columbia, SC, USA

- Facilitated research within a multidisciplinary neuroscience team by contributing AI expertise, helping to bridge the gap between computational methods and neurocognitive studies.
- Provided valuable insights to support the development of AI tools for analyzing neuroimaging datasets.
- Gained substantial experience in neuroimaging data (EEG, MRI) processing and analysis, collaborating with neuroscience experts to refine research goals and methodologies.
- Studied emerging trends in AI, machine learning, and deep learning, including their applications in neuroscience, leading to enhanced understanding and expertise in both fields.

2020–2021 **Remote Research Intern**, *Artificial Intelligence Institute, University of South Carolina*, Columbia, SC, USA

- Collaborated on experiments exploring the interaction between ECG and machine learning, assisting in developing new research methodologies.
- Assisted in designing experiments that tested AI models' effectiveness in predicting Autism likelihood from ECG.

## Publications

Journal Articles

- Dalal, S., **Tilwani, D.**, Gaur, M., Jain, S., Shalin, V., & Sheth, A. (2024). A Cross Attention Approach to Diagnostic Explainability Using Clinical Practice Guidelines for Depression 2024. **Accepted to IEEE Journal of Biomedical and Health Informatics (IF: 7.7)** [Pre Print].
- **Tilwani, D.**, Venkataramanan, R., & Sheth, A. P. (2024). Neurosymbolic AI Approach to Attribution in Large Language Models. **Accepted to IEEE Intelligent Systems 2024 (IF 5.6)** [Pre Print].
- **Tilwani, D.**, Bradshaw, J., Sheth, A., & O'Reilly, C. (2023). ECG Recordings as Predictors of Very Early Autism Likelihood: A Machine Learning Approach. *Bioengineering*. [Paper]
- O'Reilly, C., Oruganti, S. D. R., **Tilwani, D.**, & Bradshaw, J. (2023). Model-Driven Analysis of ECG Using Reinforcement Learning. *Bioengineering*. [Paper]

Conference Proceedings

- Porwal, S., Patel, K. C., **Tilwani, D.**, & Bansal, S. K. (2021). A Comparative Study and Tool to Early Predict Diabetes Using Machine and Deep Learning Techniques. *Emerging Trends in Data-Driven Computing and Communications*. [Paper]

Posters

- **Tilwani, D.**, O'Reilly, C. Exploring Neural Dynamics: A Long Short-Term Memory for Brain Effective Connectivity Analysis in EEG. Discover USC, 2024. [Poster]
- **Tilwani, D.**, Goswami, R., O'Reilly, C., Riccardi, N., Yang, X., Shalin, V., Shinkareva, S., Sheth, A., & Desai, H. R. (2023). Predicting Language Outcomes from MRI Post-Stroke: A Machine Learning Approach. *Organization for Human Brain Mapping*, Montreal, Canada. [Poster]
- **Tilwani, D.**, O'Reilly, C., Bradshaw, J., & Sheth, A. (2023). Interpretable Machine Learning for Predicting the Likelihood of Autism from Infant ECG Recordings. *SCAND Research Symposium*, Columbia, SC. [Poster, Trainee Best Research Presentation Winner]

Under Review

- **Tilwani, D.**, Saxena, Y., Mohammadi, A., Raff, E., Sheth, A., Parthasarathy, S., & Gaur, M. (2024). REASONS: A benchmark for REtrieval and Automated citationS Of scieNtific Sentences using Public and Proprietary LLMs. **(ACL ARR Metareview score 4, Under Review WWW 2025)**
- **Tilwani, D.**, O'Reilly, C., Riccardi, N., Shalin, V., Shinkareva, S., Sheth, A., & Desai, H. R. (2024). Predicting Language Ability from MRI in Post-Stroke Patients: An Advanced Machine Learning Approach.
- **Tilwani, D.** and O'Reilly, C. Benchmarking Deep Jansen-Rit Parameter Inference: An in Silico Study. arXiv e-prints (2024): arXiv-2406.
- Mohseni, S., Mohammadi, S, **Tilwani, D.**, Ndawula, G. K., Vema, S., Saxena, Y., Raff, E., Gaur, M. Can LLMs Obfuscate Code? A Systematic Analysis of Large Language Models into Assembly Code Obfuscation.

## Awards and Achievements

- 2024 EMNLP Diversity and Inclusion Travel Award
- 2023 Trainee Best Research Presentation Winner ($100), SCAND Symposium.
- 2023 Research Symposium Third Place Poster Award ($200), University of South Carolina.
- 2021 Jayana Clerk Fellowship ($15000), AIISC.
- 2020 2nd Prize ($100), LINZ Ars Festival - BR41N.IO Hackathon.
- 2020 2nd Prize ($300), BR41N.IO: Brain-Computer Interface Designers Hackathon.
- 2016 1st Place, Poster Presentation on AR and VR Technology, GWECA.
- 2015 3rd Place, Coding Challenge: Toast to Code - C Language, GWECA.
- 2012 Silver Prize, National Science Olympiad (NSO).

## Advising and Mentoring

- Yash Saxena, Galgotias University, Sept 2023- Sept 2024. Project: "REASON: Reference and Assertions for Consistent Evaluation of Factual/Non-Factual Sentences".
- Nethra Gunti, IIIT SriCity, 2022. Project: "Phase Shift Analysis in Autism Spectrum Disorder: A Video-Based Study of Parent and Object Interactions".
- Sai Durga Rithvik Oruganti, University of South Carolina, 2022. Project: "Phase Shift Analysis in Autism Spectrum Disorder: A Video-Based Study of Parent and Object Interactions".

## Selected Media Coverage

- **USC 2024 Newsletter** Pioneering AI to transform autism diagnosis.

## Teaching Experience

- Teaching Assistant, SCINBRE Machine Learning in Python Workshop 2024, University of South Carolina.
- Instructor, Introduction to Machine Learning, AIISC High School Summer Camp, 2024.
- Instructor, Introduction to Python, AIISC High School Summer Camp, 2023.
- Teaching Assistant (2019-2021), The LNM Institute of Information Technology: Computer Networks, Data Structures, DBMS, and Advanced Programming Labs.

## Community Service

Conference Reviewer
- THE WEB CONFERENCE 2025 (WWW).
- CIKM, KG-STAR Workshop, 2024.
- KDD, KIL Workshop, 2024.

Journal Reviewer
- Neurosymbolic Artificial Intelligence, 2024.
- ACM Computing, 2024.
- Scientific Reports, 2024.
- Data Mining and Knowledge Discovery, 2024.
- Frontiers in Psychiatry, 2023.
- Frontiers in Neuroimaging, 2023.
- MDPI, Advanced NLP and Machine Translation, 2023.

Program Committee
- KG-STAR, CIKM 2024
- KIL, KDD 2024
- KIL, KDD 2023

Voluntary Work

- Web and Publicity Chair, KG-STAR Workshop CIKM 2024: Organized events, managed communications, and enhanced visibility of the workshop.
- Coordinator, AIISC Retreat, 2023: Organized the institute's retreat, ensuring participation and facilitating collaborations.
- Session Moderator and Publicity Chair, ACM KDD Workshop on Knowledge-infused Learning, 2023: Moderated discussions and Q&A sessions.
- Coordinator, AIISC High School Summer Camp, 2023: Led the planning and execution of the camp, including scheduling and recruitment of instructors.
- Student Member, AAAI (2022-Present).