Gauri Vaidya

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Summary: PhD candidate in Artificial Intelligence with expertise in end-to-end design, optimization, and deployment of machine learning workflows. Skilled in delivering actionable insights through advanced analytics and explainable AI techniques. Proven ability to lead cross-functional teams to deliver innovative, high-impact solutions, improving system performance and driving efficiency.

Education

10/2021 – present **Ph.D. in Artificial Intelligence**, *University of Limerick*, Ireland.
Specializing in hyperparameter optimization to enhance scalability and efficiency in real-world AI systems.

08/2016 – 10/2020 **Bachelors of Engineering in Computer Science and Engineering**, *Government College of Engineering, Aurangabad*, India, GPA: 9.38/10.0 (A+).

Research Experience

10/2021 – present **PhD Researcher**, *University of Limerick*, Ireland.
- Led pioneering research in hyperparameter optimization, reducing computational costs.
- Published in high-impact journals (e.g., Nature Scientific Reports, MDPI Algorithms).

11/2019 – 09/2021 **Research Intern**, *University of Limerick*, Ireland.
- Engineered a cryptographically secure pseudo-random number generator in collaboration with Intel. [paper]
- Developed a interoperable blockchain framework for secure electronic healthcare data sharing under the EU Horizon 2020 project. [paper]

Professional Experience

11/2020 – 10/2021 **Trainee Analyst**, *Principal Global Services*, India.
- Streamlined insurance frameworks by implementing automation tools, reducing processing time by 20%.
- Delivered customized solutions for diverse clients, achieving a 100% on-time project delivery rate through effective collaboration across technical and non-technical teams.

06/2018 – 07/2018 **Data Engineer Intern**, *EC Mobility*, India.
- Improved accuracy of semantic segmentation models for autonomous driving systems by 10% through advanced algorithm optimization.
- Conducted quality assurance and streamlined workflows in a collaborative team environment.

Teaching Experience

Fall 2024 **Teaching Assistant,** *CS4207 Advanced Programming Concepts & Practices*, University of Limerick, 72 students

Spring 2024 **Teaching Assistant,** *CS4116 Software Development Project*, University of Limerick, 60 students

Spring 2024 **Teaching Assistant,** *CS4222 Software Development*, University of Limerick, 180 students

Spring 2024 **Moderator,** *CS6163 Advanced Topics Seminars and Project*, University of Limerick, 60 students

Fall 2023 **Teaching Assistant,** *CS4221 Foundations of Computer Science*, University of Limerick, 190 students

Spring 2023 **Teaching Assistant,** *CS4116 Software Development Project*, University of Limerick, 60 students

Fall 2022 **Lecturer,** *Blockchain Technologies*, Maharashtra Institute of Technology, India, 60 students

Fall 2022 **Teaching Assistant,** *CS4221 Foundations of Computer Science*, University of Limerick, 200 students

Spring 2022 **Teaching Assistant,** *CS4116 Software Development Project*, University of Limerick, 60 students

Skills and Proficiencies

Soft Skills: Critical Thinking, Collaborative Problem-Solving, Effective Communication

Languages: Python, R, SQL, C

Libraries: TensorFlow, PyTorch, Scikit-Learn, Numpy, Pandas, Matplotlib, Seaborn, Plotly, Streamlit

Tools: Git, Bash, Latex, Microsoft Office

Methods: Single-cell multi-omics Analysis (Seurat, Harmony, DoubletFinder), Dimensionality reduction (t-SNE, PCA, hierarchical clustering), Statistical Analysis (Pearson/Spearman correlation, Student t-test, Wilcox rank sum test, ANOVA, Kruskal-Wallis)

Projects

01/2023 – 04/2023 **Immune cell profiling from single-cell RNA**.
- Investigated the integration of dimensionality reduction and annotation tools comparison to streamline multi-stage downstream processing, for patient immune profile analysis with Seurat v4.0 pipeline in R.

11/2019 – 09/2021 **Cryptographically pseudo random number generator**.
- Developed a secure random number generator using Grammatical Evolution (GE-CSPRNG), validated through NIST SP800-22 and Diehard tests for industry-grade security.

01/2022 – 04/2022 **Data Analysis and Forecasting**.
- Conducted data analysis using Machine Learning models (Regression, Artificial Neural Networks, ARIMA) and scenario modeling to propose effective strategies for reducing carbon emissions in road transport.

11/2019 – 09/2021 **Blockchain Framework for secure health data sharing**.
- Built a blockchain-driven knowledge graph framework to enhance security and interoperability in electronic health record systems, improving data access efficiency.

06/2019 – 01/2020 **Blockchain and Predictive Analytics**.
- Engineered a decentralized Electronic Health Record management system using Multichain, integrating machine learning for predictive analytics and early epidemic detection.

01/2019 – 03/2019 **Artificial Intelligence driven Solid Waste Management System**.
- Contributed to the development of an IoT-enabled solid waste management system, improving waste collection and recycling processes.

Awards and Grants

2023 *Runner-up, Thesis in Three Faculty Heat*, Among 15 participants; awarded €100.

2019 *Winner*, *Smart India Hackathon*, Best IoT-based waste management system among 20 teams; awarded €570.

Leadership

2016-2020 Class representative, Government College of Engineering Aurangabad, India

2019-2020 Technical Secretary, Computer Science and Engineering Department, Government College of Engineering Aurangabad, India

2020 Co-Head, Smart Aurangabad Hackathon, a national level hackathon

2018-2019 Ladies' Representative, Computer Science and Engineering Department, Government College of Engineering Aurangabad, India

2018-2020 Creative Head, College Magazine Team Catalyst

Outreach

2024 Three day hands on Machine Learning workshop, Government College of Engineering Aurangabad, India

2024 ISCB Tutorial

2024 Python Web Development Workhop, National Science Week

2024 National Scratch Competition

2023 Python Web Development Workhop, National Science Week

Volunteering

10/2020 – present **Technical Support**, *Vidyadaan Sahayyak Mandal*, India.

10/2020 – present **Organizer and Judge**, *Vidyadaan Sahayyak Mandal*, India.

10/2020 – present **Volunteer**, *Share a Book India Association*, India.

Presentations

2024 Peer Reviewed Abstract, Title, BioC

2024 Amsterdam

2023 BioC

2023 Hyperparameter, Lero [poster]

2022 Disruptive Digital Transformation with Sensible, Offline Poster Presentation, Sustainable Digital Health Innovation Conference, Galway, Ireland

Talks

2022 SHIELD: Do it the safe way, In-Person Workshop, Pycon Ireland

2022 Researching, Visualizations and Creating ML Models for Climate Change, Online Invited Talk, CVT Internship Outreach Program from Harvard

2022 AI-Assisted Smart Transport, Online Workshop, MGM University, India

Memberships

2023-present Culhane Lab, University of Limerick

2022-2023 International Society for Computational Biology

2022-2023 Women in AI, Ireland

Academic Service

2023 Reviewer, BIOC 2023

2019 Reviewer, ECCV 2022

Supervision

2024-present Rahul Alam, FYP, University of Limerick

Certifications

2023 Oxford Machine Learning Summer School [certificate]

2019 Improving Deep Neural Networks:Hyperparameter tuning, Regularization & Optimization [credential]

2019 Convolutional Neural Networks, *Coursera* [credential]

Publications

2024 O'Connor, A., Ryan, S. E., **Vaidya, G.**, Harford, P., Kshirsagar, M. *Hip Fracture Patient Pathways and Agent-based Modelling.* arXiv. [doi]

2024 Yao, Y., Kshirsagar, M., **Vaidya, G.**, Liu, J., Zhang, Y., Ryan, C. *Blockchain-Based Knowledge Graph for High-Impact Scientific Collaboration Networks.* Blockchain Technology for Secure Social Media Computing.

2023 Kshirsagar, M., **Vaidya, G.**, Yao, Y., Kasar, S., Ryan, C. *SENSIBLE: SEquestered aNd SynergIstic BLockchain Ecosystem.* Wiley Engineering Reports. [doi]

2023 **Vaidya, G.**, Kshirsagar, M., Ryan, C. *Grammatical Evolution-Driven Algorithm for Efficient and Automatic Hyperparameter Optimisation of Neural Networks.* MDPI Algorithms. [doi]

2022 **Vaidya, G.**, Ilg, L., Kshirsagar, M., Naredo, E., Ryan, C. *HyperEstimator: Evolving Computationally Efficient CNN Models with Grammatical Evolution.* ICSBT.

2022 Ryan, C., Kshirsagar, M., **Vaidya, G.**, Cunningham, A., Sivaraman, R. *Design of a Cryptographically Secure Pseudo Random Number Generator with Grammatical Evolution.* Nature Scientific Reports. [doi]

2022 Kshirsagar, M., Gupt, K. K., **Vaidya, G.**, Ryan, C., Sullivan, J. P., Kshirsagar, V. *Insights into Incorporating Trustworthiness and Ethics in AI Systems with Explainable AI.* International Journal of Natural Computing Research (IJNCR).

2022 Kshirsagar, M., **Vaidya, G.**, Rajguru, S., Jadhav, P., Kale, H., Shanmugam, N., Ryan, C.*DECART: Planning for Decarbonising Transport Sector with Predictive Analytics - An Irish Case Study.* SMARTGREENS.

2021 Yao, Y., Kshirsagar, M., **Vaidya, G.**, Ducrée, J., Ryan, C. *Convergence of Blockchain, Autonomous Agents, and Knowledge Graph to Share Electronic Health Records.* Frontiers in Blockchain. [doi]

2021 Bindra, P., Kshirsagar, M., Ryan, C., **Vaidya, G.**, Gupt, K. K., Kshirsagar, V. *Insights into the Advancements of Artificial Intelligence and Machine Learning, the Present State of Art, and Future Prospects: Seven Decades of Digital Revolution.* Smart Computing Techniques and Applications: Proceedings of the Fourth International Conference on Smart Computing and Informatics.

2021 Yao, Y., Kshirsagar, M., **Vaidya, G.**, Ryan, C. *Using a Bio-Inspired Model to Facilitate the Ecosystem of Data Sharing in Smart Healthcare.* Evo* 2021, Late-Breaking Abstracts.

2021 **Vaidya, G.**, Bindra, P., Kshirsagar, M., Tamane, S. C. *Privacy and Security Technologies for Smart City Development.* Security and Privacy Applications for Smart City Development.

2020 Nagori, M., Patil, A., Deshmukh, S., **Vaidya, G.**, Rahangdale, M., Kulkarni, C., Kshirsagar V. *Mutichain Enabled EHR Management System and Predictive Analytics.* Smart Trends in Computing and Communications

References

References will be made available on request.