

PALLAVI BAGGA

London, United Kingdom | <https://www.linkedin.com/in/pallavibagga/>

Summary

Dedicated Data Scientist and versatile AI Researcher with expertise in data interpretation, leveraging machine learning and predictive analytics for innovative solutions. Demonstrates a proven track record of driving innovation through independent research and collaborative teamwork, resulting in successful project outcomes and insightful data-driven presentations. Contributions to peer-reviewed publications further underscore professional capabilities. Proficient in algorithm optimization, model development, data infrastructure, and adept at analytics to address complex challenges in diverse domains including multi-agent systems, autonomous negotiation, computer vision, medical imaging, deep reinforcement learning, and generative AI. Committed to continuous professional development, showcasing adaptability and proficiency with the latest tools and technologies.

Experience

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| Data Scientist
Moorfields Eye Hospital NHS Foundation Trust | 11/2022 to Current
London, UK |
| <ul style="list-style-type: none">Play a key role in the development, enhancement, and optimization of predictive models using sophisticated analysis techniques for Geographic Atrophy and the Eye2Gene project focusing on inherited retinal diseases. Utilize advanced image processing, registration techniques, deep learning, and Generative AI to significantly improve diagnostic models for patients. Conduct comprehensive data analysis for clinical trials in partnership with renowned pharmaceutical companies. Implement robust data collection and management best practices to optimize data quality and reliability. Curate datasets and utilize GitHub for version control and collaborative code sharing, leading to significant improvements in predictive models. Manage and contribute to product development in a data-intensive environment, guiding strategic decisions with data-driven insights. | |
| Digital Fellow in AI and ML
Barts Health NHS Trust | 11/2021 to 11/2022
London, UK |
| <ul style="list-style-type: none">Played a pivotal role in an NIHR-funded project automating the Cardiac MRI planning process by performing image processing and developing deep-learning based segmentation trained on scans obtained from in-house MRI scanners. Ensured compliance with industry best practices for data security and privacy during all stages of data processing. | |
| Teaching Fellow
Royal Holloway, University of London | 11/2020 to 10/2021
Egham, Surrey, UK |
| <ul style="list-style-type: none">Delivered teaching activities, labs, including tutorials and lectures in courses such as Data Science, Data Analytics, Artificial Intelligence, Python Programming, Machine Learning, Experimental Designs, and Databases; Contributed to developing teaching materials to ensure content and methods meet learning objectives; Participated in the assessment process and provide effective, timely and appropriate feedback enhancing students' progress; Supervised undergraduate and post-graduate annual research projects. | |
| Teaching Assistant
Royal Holloway, University of London | 11/2017 to 10/2020
Egham, Surrey, UK |
| <ul style="list-style-type: none">Engaged in teaching and assessment activities, including labs and tutorials of courses such as Data Science, Artificial Intelligence, Python Programming, Deep Learning, Experimental Design and Analysis, and Databases; Contributed to developing teaching materials to ensure content and methods meet learning objectives. Facilitated student projects enhancing their coding and debugging skills. Supervised undergraduate and post-graduate annual research projects, focusing on the application of analytics and the development of key metrics for student evaluation. | |
| Assistant Professor
Lovely Professional University | 01/2017 to 07/2017
Punjab, India |
| <ul style="list-style-type: none">Designed and taught courses such as Programming foundation, Computer Networks, Data Structures, C++, Databases; Managed student and departmental records; Collaborated with faculty to design courses that meet university requirements; Supported projects, providing hands-on coding and debugging experience for students. Assessed students' exams and provide timely feedback for their learning. | |

Education

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| Ph.D. Computer Science
Royal Holloway, University of London | 12/2021
Egham, UK |
| M.Tech. Computer Science & Engineering
DAV University | 07/2016
Punjab, India |
| B.Tech. Computer Science & Engineering
Punjab Technical University | 07/2014
Punjab, India |

Online Courses & Certifications

- <https://www.linkedin.com/in/pallavibagga/details/certifications/>

Core Skills

Programming Languages & Technologies:	- Python, Java, C/C++, HTML/CSS, SQL, Prolog, R, Matlab, Flutter/Dart
Development Tools and Environments:	- Object-oriented Programming - Amazon Web Services (AWS), Docker, Git, Github, Anaconda, Linux/Unix, Microsoft Visual studio, SageMaker, Spyder, NetBeans, Eclipse
Data Management & Visualization:	- Agile Methodology, Notion, Trello - Tableau, Data Visualization, Weka, Proficient in Report Writing
Software & Applications:	- Big Data, Data Mining, API, Analytic tools
Specialized AI/ML Techniques:	- Microsoft office, Adobe Photoshop, Corel Draw - Image Processing, Image Segmentation, Classification, Regression, Clustering, Natural Language Processing (NLP), Deep Neural Networks, Reinforcement Learning, Encoders - Evolutionary Methods, Nature-Inspired optimization, Multi-Criteria Decision-Making, Multi-objective Optimization, Anomaly Detection, Natural Language Processing (NLP) - Generative Adversarial Networks (GANs), Deep Reinforcement Learning (DRL), Large Language Models (LLMs), BERT, Transformers - Scikit-learn, TensorFlow, PyTorch, OpenCV, SimpleElastix, Numpy, Pandas, Scipy, Keras - Expertise in data encoding, advanced algorithms for weight optimization, and automated testing frameworks to ensure robust AI models
Systems & Architecture:	- Feature Engineering, Training, Testing, Inference, Agile Development - Distributed System, Mobile Agent Systems, Multi-Agent Systems, Distributed Computing, Cloud Computing
Strategic Analysis & Evaluation:	- Impact Evaluation, E-commerce application, medical application, Prototyping - Computational Neuroscience

Soft Skills

Leadership & Management:	- Confident Strategy Thinker, Initiative-driven, Mentorship
Collaboration & Communication:	- Teamwork, Effective Communicator, Presentation skills
Adaptability & Innovation:	- Multi-tasking, Innovative, Flexible, Versatile
Analytical Thinking:	- Critical thinking, Logical Reasoning, Attention to Detail, Data-Driven Decision-Making
Problem Solving:	- Analytical, Creative, Punctual, Efficient Time-Management, Creative

Projects

- **Geographic Atrophy (GA) Prediction and Progression Analysis (2022 - present):** Enhancing production pipelines by integrating advanced ML algorithms, significantly boosting the accuracy of predictive models, associated with age-related macular degeneration in 24-month clinical trials. Demonstrating the effectiveness of these technologies in enhancing diagnostic accuracy by impact evaluations, leading to a substantial increase in product deliverables, while employing sophisticated data visualization methods to report clinical trial results effectively. Adhering to stringent data governance practices to ensure the security and integrity of patient information. Focusing on customer-centered outcomes, ensuring that project results meet clinical needs and enhance patient care. This project is conducted in partnership with Apellis Pharmaceuticals Ltd, showcasing a collaborative approach to addressing critical healthcare challenges.

- **Eye2Gene Project for Inherited Retinal Diseases (2022 – present):** Utilizing advanced deep learning models, including U-Net, CNN, Inception, ResNet, nnU-Net, for the segmentation of features including fovea within Autofluorescence imaging modalities. Additionally, employing DC GANs and conditional GANs for generating Autofluorescence (FAF) images to aid in diagnostic feature extraction for genetic disorders. Ensure stringent quality control measures and utilize best practices in statistical analysis and data interpretation to guarantee reliability and improve model accuracy and predictive power. This project aims to extract critical diagnostic features from eye images to facilitate genetic disorder identification and is funded by NIHR.

- **Automatic Cardiac MR planning (2021-2022):** Worked towards building a deep learning model to automate the planning process for Cardiac Magnetic Resonance (MR) imaging. This innovation streamlined the imaging workflow, reducing manual intervention and increasing efficiency and consistency in capturing essential cardiac diagnostics information. This project was funded by NIHR.

- **Agent Learning for Automated Negotiation (2017 - 2021):** Conducted an extensive literature review of existing negotiation algorithms and reinforcement learning techniques, gaining a comprehensive understanding of the field and identifying innovative areas. Engineered a sophisticated deep reinforcement learning-based negotiation agent using an actor-critic algorithm, which demonstrated low latency in decision-making and high adaptability in dynamic negotiation scenarios. This agent autonomously negotiated on behalf of users over multiple issues with unknown opponents, effectively managing complex negotiations. The success of this agent was showcased through a proof of concept that led to several peer-reviewed publications. Rigorous experiments were designed and executed to validate model predictions and enhance the accuracy of the models. Additionally, Large Language Models (LLMs) were utilized to provide explainability for the negotiation strategies, enhancing the transparency and understanding of the automated decisions made by the agent.

- **Mobile Agents Platform Security (2015- 2016):** Engineered a robust machine learning model aimed at securing mobile agents' platforms by preventing the entry of malicious agents. Functioning akin to antivirus software, this model significantly enhances the security and integrity of mobile agent systems, safeguarding data and operations against cyber threats. Leveraged advanced analytics to derive actionable insights from complex data, significantly enhancing project outcomes.

- **Customized Enterprise Resource Planning (2014):** Created a tailored Enterprise Resource Planning (ERP) system, leveraging Java and NetBeans IDE, to streamline and optimize business processes.

- **Attendance Management System (2013):** Developed an intuitive Java-based Attendance Management System using NetBeans IDE, designed to automate and simplify the tracking of attendance; Developed and optimized complex SQL Queries for data fetching and manipulation to streamline different processes in a data-driven organization.

- **Fee Management System (2012):** Built a comprehensive Fee Management System in Java with NetBeans IDE, facilitating the efficient handling of financial transactions and billing operations; Utilized SQL Queries extensively for data manipulation and transformation, significantly enhancing the decision-making process.

Research Publications

- **Google Scholar Link:**

<https://scholar.google.com/citations?user=we5GfgIAAAJ&hl=en&oi=ao>

Research Talks and Poster Presentations

- <https://pallavibagga.com/presentations/>

Accomplishments

- Awarded Moorfields Eye Charity Grant for ARVO conference held in Seattle 2024
- Awarded Full-funded PhD Computer Science Scholarship at Royal Holloway University of London 2017
- Qualified the Graduate Aptitude Test in Engineering (GATE) CS 2014, CS 2016 and CS 2017
- 1st Rank (Aggregate) in M.Tech CSE, DAV University, India in 2016
- 4th Rank (Aggregate) in B.Tech CSE, Punjab Technical University, India in 2014
- Secured a Merit Rank in the 9th NIIT National IT Aptitude Test, 2013
- Gold Medalist in B.Tech CSE 4th semester, Punjab Technical University, 2012
- Merit Position (8th rank in District Jalandhar, 32nd Rank in State Punjab) in 12th class, 2010
- Gold Medalist in 3rd International Mathematics Olympiad, 2009

Professional Service

- Associate Fellow of the Higher Education Academy, UK (**AFHEA, Ref: PR172297**)
- Reviewer in Journals of Neurocomputing, Information Sciences, Expert Systems with Applications, Applied Soft Computing, Sustainable Production and Consumption, Engineering Applications of Artificial Intelligence, Automated Software Engineering and Translational Vision Science & Technology (**ORCID: 0000-0001-5226-1948**)