

LEA BRODY-HEINE

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EDUCATION

University of St Andrews

MSc Computer Science, Concentration in AI | GPA: First Class Honors

St Andrews, Scotland

Graduated: 2024

Brown University

Bachelor of Arts | GPA: 4.0

Providence, RI

Graduated: 2023

TECHNICAL SKILLS

Programming Languages and Frameworks: Python, Java, JavaScript, HTML, C++, CSS, Bootstrap, Node.js, Express, RESTful APIs, Open APIs, MongoDB, Vue.js, React, Angular, SAT4J, LogicNG, Anaconda

Tools and Technologies: pandas, scikit-learn, TensorFlow, PyTorch, Azure, AWS, data pipelines, Data Visualization, Data Analytics, Artificial Intelligence, Machine Learning, LLMs, CNN, GAN, UX/UI Design, Git, GitHub, D3.js, Bash, Jupyter Notebook, Miro, Jira, Asana, Tableau, Figma, Docker, containers, Kubernetes

Methodologies and Other Skills: Object-Oriented Programming, Agile, Scrum, Kanban, DevOps, UML, Data Structures, Microservices, Cross-Functional Collaboration, DevOps, Product lifecycle management, continuous integration (CI/CD), unit testing

MASTER'S DISSERTATION

Machine Learning for Pathology in Mast Cell Diseases

University of St Andrews

Jan 2024 – Present

Scotland, UK

- Developed machine learning models to analyze tabular data and intestinal biopsy stains for mast cell disease research, employing generative AI to augment data and improve model training.
- Leveraged a GPU PC, Docker, and containers to process complex programs efficiently.
- Employed YOLO v8 and computer vision to employ object detection for identifying and counting mast cells, spindle-shaped mast cells, and mast cell clusters in biopsy images.
- Constructed over 20,000 augmented CSV files from microbiome data, representing normal and i-MCAS microbiomes, then used K-means clustering to identify key bacterial differences. This model can be used for further research in idiopathic mast cell activation syndrome.
- Designed tools for researchers and clinicians to input their data and derive meaningful insights, facilitating further studies and discoveries.

EXPERIENCE & PROJECTS

Software Engineer, Independent Contractor

GSI Water Solutions, Inc

May 2024 – Current

Bend, OR

- Develop a comprehensive document search system to access project proposals stored on the company's server, reducing search time by at least 60%.
- Conduct requirements analysis and system design, ensuring the architecture meets stakeholder needs.
- Execute document indexing and search functionality using Python and relevant libraries, enabling faster document retrieval.
- Design an intuitive user interface and integrate the system with existing server infrastructure.
- Perform iterative testing, feedback sessions, and secure access controls to enhance system reliability and security.
- Lead entire product lifecycle from initial requirements gathering to final deployment and user training.

Scrum Master, Agile Methodology

MSc Project, University of St Andrews

Sept 2023 – Nov 2023

Scotland

- Led the end-to-end development of a product, ensuring a user-centric design throughout the software development lifecycle.
- Managed cross-functional Agile sub-teams to deliver iterative feature enhancements, driving project success and user satisfaction.

Game Development

MSc & BA Projects, University of St Andrews, Brown University

Mar 2023 – Apr 2024

Scotland, Providence, RI

- Designed a Java-based game server for "Woodland Diplomacy," enforcing game mechanics, HTTP server functionality, and JSON communication.
- Constructed "Prospector," an online multiplayer game using JavaScript, Node.js, and Express, with RESTful API integration.
- Produced the front end for a game called Superhero Escape in Brown University's teaching language, Pyret.

Artificial Intelligence & Machine Learning Development

MSc Projects, University of St Andrews

Jan 2024 – May 2024

Scotland

- Designed and constructed 5 logical agents using the LogicNG and SAT4J java libraries, employing strategies such as (SPS), (SATS), and (PROBS).
- Developed a machine learning model to forecast water pump status in Tanzania, utilizing scikit-learn, pandas, numpy, and Optuna for hyperparameter optimization.
- Implemented AI search algorithms for a flight route planner, optimizing paths using uninformed search (DFS, BFS, Iterative Deepening) and informed search (A*, Best-first search, SMA*) based on Euclidean distance heuristics.
- Built and evaluated machine learning models to predict flight disruptions using Python, Jupyter Notebook, and scikit-learn classifiers. Performed data cleaning, feature engineering, and model fine-tuning on a large-scale Kaggle dataset.
- Developed multiclass classification models to anticipate patient outcomes, focusing on data imputation and handling unbalanced data in Python, emphasizing practical application and client presentation.

Full Stack Web Development

MSc Projects, University of St Andrews

Jan 2024 – May 2024

Scotland

- Programmed a full stack web application using MongoDB, Node.js, Express, and Vue.js. Integrated RESTful APIs, chart.js, and open APIs.
- Built a single-page web application for trivia quizzes using JavaScript, HTML, CSS, and open APIs for dynamic question fetching and score tracking.