Luka Mdivani

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EDUCATION

Duke University & Duke Kunshan University (DKU) Dual Degree

Bachelor of Science in Data Science (by Duke Kunshan)   Kunshan, China

*Bachelor of Science in Interdisciplinary Studies (Subplan: **Data Science**) (by Duke)*   Durham, NC,USA

- Full Tuition Merit-Based Scholarship, Dean's List : Fall 2021. GPA: 3.67 / 4.00.
- Coursework: Machine Learning, Computer Vision, Data Structures and Algorithms, Data Analysis, Data Visualization, FinTech, NLP.

PROFESSIONAL EXPERIENCE

Ivy   Sep 2023- Present

Volunteer Machine Learning Engineer   London, U.K

- Developing a unified machine learning library, enabling seamless code migration across different frameworks.

Data+ Research - Computer Science Department at Duke University   May 2022- July 2022

Data Scientist Intern   Durham, U.S.A

- Performed Data processing for 300GB drone captured data: orthophotographs, contours and LiDAR digital surface models (DEM).
- Automated data analysis and visualization using Python scripts, reducing processing time from 2 weeks to 1 hour per archeological site.
- Trained and tested an U-Net image segmentation model to identify archaeologically important landscape features, achieving a precision-recall AUC of 0.25 (baseline 0.07).
- Created and documented an advanced methodology for data collection, labeling, analysis, and visualization pipeline.

Advanced Software Design - Computer Science Department at Duke University   Sep 2022- May 2023

Teaching Assistant   Durham, U.S.A

- Mentored 5 students per term in applying design patterns and writing clean and efficient code for advanced software engineering projects.
- Assessed functionality and quality of group projects, evaluating individual student contributions and team performance.
- Taught course concepts such as Inheritance Hierarchies, Encapsulation, Dependency Inversion, Lambda Expressions, Design Patterns, Unit Testing, and clean coding techniques.

RESEARCH EXPERIENCE & PROJECTS

Large Language Models For Recommendation Systems   May 2023-Present

Researcher   *(Remote)* Durham, U.S.A

- Fine-tuned a 7 billion parameter Large Language Model (LLaMa-7B) on the 100k and 10M Movielens datasets using the HuggingFace Transformers library to perform direct recommendation/rating prediction tasks
- Implemented Low-Rank Adaptation (LoRA) to freeze the pretrained model parameters and inject trainable low-rank matrices into the multi-head attention sub-layers. By utilizing this approach to provide updates to the query and value projection matrices, reduced the number of trainable parameters to less than 1%.
- Resulting fine-tuned model significantly outperformed baseline zero-shot and few-shot LLM modeling as well as several of the leading non-LLM based recommenders systems in direct recommendation tasks.

Data + X Project : Buddhist Futures in Films and Novels   Sep 2022-May 2023

Student Researcher   Durham, U.S.A

- Made custom scrapers to gather film and book reviews to gather data.
- Worked on a LSTM Recurrent Neural Network for Sentiment Analysis, created corresponding data visualizations on the gathered data.
- Performed semantics analysis using BERT on the collected review database,
- Attempted to use **Cross-Lingual Transfer Learning** and BERT to perform semantic analysis on ancient buddhist texts in **Sanskrit**.

Research in Feature-free Algorithm Selection for Function Optimization   May 2022-March 2023

Student Researcher, Duke Kunshan University   Durham, U.S.A

- Proposed a unique image classification based approach to the Algorithm Selection (AS) problem where the intervention of a field specialist for optimizing product pipelines.
- Built a CNN for image classification which extracts features from 3D function visualizations to perform AS, some results twice outperform traditional AS methods.

SKILLS

Programming Languages	Python, Java, C++, MATLAB, R and SQL.
Data Science/ML Skills	ETL, Data Visualization, Deep Learning, Regression, Statistics, Neural Networks, NLP.
Software Engineering Skills	Project Planning, Advanced Design Patterns, Git, OOP, Dependency Management,Unit Testing.
Data Science Libraries	NumPy, Pandas, SciPy, scikit-learn, Tensorflow, Seaborn, Matplotlib, PyTorch, OpenCV.
Analysis Software	Tableau, Excel.
Languages	English(*Fluent*), Georgian(*Native*), Chinese(Intermediate) and Russian(Fluent).