Chenxing Liu

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Education

Grinnell College **Grinnell, Iowa**

Bachelors of Arts in Computer Science *2021.09 -*

- **Concentration:** Statistics
- **Selected Coursework:** Object-Oriented Problem Solving, Data Structure & Algorithm, Computer Organization and Architecture, Software Design & Development, Automation, Formal Languages & Computational Complexity, Introduction to Data Science, Statistical Modeling, Applied Data Science

Research Experience

Elbica Lab, Grinnell College **Grinnell, Iowa**

Research Assistant *2022.06 - 2022.08*

- Studied moral reasoning to model the decision-making differences between human and non-human agents.
- Used Cinema 4D and Blender to create raw 3-D models from descriptions of images to reflect how humans encode and understand meaning and moral response into/from images, presented progress at weekly lab group meetings.

Applied Data Science, Grinnell College - Link **Grinnell, Iowa**

Course Embedded Research Assistant *2023.01 - 2023.05*

- Collaborated with Grinnell Anthropology Department in a team of three to analyze and model child fosterage data, focusing on predicting fosterage status based on a range of socio-economic, demographic, and behavioral variables.
- Systematically built and evaluated mixed-effects logistic regression models. Manually processing stepwise regression with varying predictor combinations, using the AIC for optimal model selection.
- Implemented parallel processing techniques for efficient computation during model evaluation, handling the computational complexity of evaluating numerous model combinations.
- Visualized modeling results to interpret and understand the importance and impact of individual predictors. Utilized ggplot2 to create detailed visualizations of fixed effects and odds ratios.

Pattern Learning and Mining(PALM) Lab, Southeast University **Nanjing, Jiangsu**

Research Assistant *2023.06 - 2023.08*

- Reviewed scholarly papers on the fundamental architectures of deep learning and computer vision, enhancing comprehension of deep learning algorithms and principles, including CNN, RNN, ResNet, and DDPM
- Developed a novel model based on the Diffusion Model using Pytorch, contributing to innovative research.
- Lead the model's ablation study, determining the significance and function of various model components.

Projects

GreenhouseGas Interactive Visualization - Link

- Developed a robust data visualization application and implemented user-friendly interactive controls, using R and Shiny to dynamically represent greenhouse gas emissions by countries.
- Instituted a clean and modern web interface design, ensuring an engaging user experience with dynamic hover effects and transparency settings.

Pure Waveforms Generator - Link

- Developed a command-line audio synthesis tool in C for generating custom waveform audio files in WAV format.
- Utilized dynamic memory management and file handling in C to efficiently create and write large waveform data.
- Ensured compatibility across various platforms and handled edge cases to improve robustness and user experience.

Contrastive Canonical Correlation Analysis (cCCA) Development

- Addressed the limitation of CCA by integrating principles from Contrastive Learning to emphasize differential features.
- Introduced concepts of target datasets and background datasets, allowing cCCA to maximize correlation and intra-view variance of target data while minimizing background data variance.
- Developed an algorithm and conducted experiments on an artificially synthesized dataset and two real datasets using Python, showcasing superior effectiveness of the cCCA algorithm.

Technical Skills

Languages: Python, Java, C++, C, JavaScript, HTML, CSS, SQL, R & Rshiny
Developer Tools: Git/GitHub, Visual Studio Code, Eclipse, Linux
Technologies/Frameworks: TensorFlow, PyTorch, Bootstrap
Machine Learning Algorithms: Supporting Vector Machine(SVM), Sentiment Analysis, Random Forests, K-means Clustering, Principal Component Analysis(PCA), Canonical Correlation Analysis(CCA)