Jianing Cai

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Summary

- **Languages**: Python, C++, Java, C#, R, SQL, Assembly, HTML, Javascript, CSS
- **Tech Skills**: OpenGL, Unity, Machine Learning, Linear Algebra, Topic Modeling, Object-Oriented Programming, JUnit testing, Web Scrapping, Topic Modeling, Web Scrapping, Applied Linear Model, Applied Time Series, D3, Tableau, Adobe Illustrator, After Effect, ArcGIS, MS Office
- **Personal Website**: https://jianingc0913.github.io/

Education

University of Virginia | Charlottesville, Virginia | Expected Graduation Date: **May 2024**
Degree: B.A in *Computer Science* and *Mathematics*; Minor in *Data Science*
GPA: Computer Science 3.97/4.0, Overall 3.83/4.0;

Professional Experience

Data Science Researcher | Biocomplexity Institute at UVA | Arlington, Virginia | May 2023- present
Investigated Data Usage of U.S. State Data Centers per Census Bureau Demands
- Use BeautifulSoup to do web scrapping on State Data Centers to collect data products and data sources in each state and save in csv files; collect and convert State Constitutions from pdf documents into txt files
- Apply SentenceTransformer based on BERT to encode textual information, then utilized UMAP algorithm to reduce dimensionalities and employed HDBSCAN to do topic modeling analysis to generate broad topics in all fifty State Constitutions; presented the findings to Census Bureau
- Build an interactive website to present our research findings; currently composing a journal article and technical report for the results

Related Project

Discord Chatbot | University of Virginia | Charlottesville, Virginia | Sep 2023- Dec 2023
- Trained a chatbot from scratch using Keras and NLTK tokenizer and lemmatizer; used BoW representation to parse English corpus from daily conversation
- Integrated with a CSV file as external data source to train the chatbot with special information in making cocktails
- Employed Flask to build and deliver a custom API in the PythonAnywhere cloud on the Discord Channel; the chatbot can answer questions, interact with users, and give recipes of a cocktails based on user requests

Movie Genres and Economy Cycles | University of Virginia | Charlottesville, Virginia | Aug 2023 - Oct 2023
- Led a team to analyze the top 10 highest-grossing movies' genres from 2000-2023, aiming to uncover relationship between movie genres and economy recession
- Utilized BeautifulSoup to scrap movie scripts from IMDB website; conducted topic modeling using BERT to cluster most frequent topic groups for each year from the scripts; employed R and Tableau to visualize the trends of genre changes and economy recessions
- Fitted linear models examining the relationship between movie genres and economy recession; conducted t-test for inference to verify the hypothesis

Brain Tumor Identifier | University of Virginia | Charlottesville, Virginia | Jan 2023- May 2023
- Led a team using machine learning to train model from patients' brain tumor X-ray images. The model can identify if the patient has brain tumor when giving an X-ray image as input
- Conducted Principal Component Analysis to reduce the dimensionalities, and trained models using Support Vector Machine (SVM) and Feed Forward Neural Network as classifiers
- Tuned hyperparameters such as activation functions, hidden layer size, and learning rate to enhance accuracy and efficiency.

Hoo's Listening Database | University of Virginia | Charlottesville, Virginia | Jan 2023- May 2023
- Led a team to build a music sharing platform for the UVA community, in which users could retrieve, add, update, delete, sort, and 'like'; employed multiple attributes into the database
- Designed the database by drafting E-R Model and using 3NF and BCNF to break into proper tables; utilize Figma to design user interfaces on multiple screen scales
- Set up the database and prepare the query using SQL on the phpMyAdmin platform; extract data using Spotify API by writing Python scripts; deploy the database onto Google Cloud

Delivery Driver Mini Game | Self Learned | Charlottesville, Virginia | Nov 2022- Dec 2022
- Utilized Unity to build a local 2D game in which user can use keyboard input to manipulate the car on the screen to delivery packages to designated customer in a neighborhood. User need to be cautious to prevent bumping into obstacles such as trees and rocks.
- Wrote C# files to setup the car's speed, acceleration, turning speed, delivery status changes, and camera following; employed Collider 2D and Rigidboay 2D to enable collision effect

Burley Middle School Restoration Project | Charlottesville, Virginia | May 2022 - Jun 2022
- Used ArcGIS to draft two multiple-layered interactive maps of the Burley Middle School terrain which presented disparities in solar radiation and land contours from drone images
- Delivered suggestions by embedding the maps into StoryMap to summarize a report advocating installing solar panels around the baseball field based on Geospatial Analysis

Meme Generator | University of Virginia | Charlottesville | Aug 2021-Dec 2021
- Developed a meme generator which takes in image and context input from user to output a customized meme
- Practiced Object-Oriented programming such as building constructors, comparator, customized methods; implemented LinkedList, AVL Tree, Minheap and HashMap by hand to optimize asymptotic runtime
- Built a GUI with Swing to take commands from users, then created GUI window with JFrame, JPanel, etc. to allow users to type in text and upload images
- Tested the software from a unit, integration, and system perspective with JUnit5 testing

Leadership

Vice Chair of Publicity and Information Department at CSSS | Apr 2022- Apr 2023
- Led a team of 10 to promote activities of CSSS and maintain social media account on Instagram
- Employed Adobe After Effect to edit videos and used Canva to design posters; held workshops of Adobe After Effect, Canva, Xiumi for team members