Jonathan Choi

US Citizen | Phone Number: **201-577-8853 |** Email: **j.choi2947@rutgers.edu**

SKILLS

Programming Languages: Python, C++, C#, Java, JavaScript, R, HTML, Lua
Frameworks: Tensorflow, PyTorch, Scikit-learn, NumPy, Pandas, Librosa, Glob, Yaml, Wandb, Tqdm, Git
Technical/Programmatic: Machine Learning, Data Structures and Algorithms, App Development, Game Development
Interests/Hobbies: Sky Diving, Ski, Volleyball, Body-Building, Guitar, Clarinet

EDUCATION

Rutgers University-New Brunswick **Expected Graduation Date: May 2027**
SAS Honors Program New Brunswick, NJ

- **Bachelor's of Science in Computer Science**, concentration in Artificial Intelligence and Modeling/Simulations.
- **Related Coursework**: Computing in Python/Java, Object-Oriented Programming, Statistics, Applications, Mathematics, Artificial Intelligence, and Data Science.

PROJECTS

AI Research on Harmonic-Based Music Alignment | GitHub Code | Paper | **Sept 2022 - Dec 2023**
(PyTorch, Transformers, BertModel, Librosa, Pandas, Glob, Wandb, Tqdm, Linux, DTW, MSS)

- Developed an innovative alignment method using harmonics, achieving a 21% improvement in alignment accuracy (54,436 vs. 69,137) over traditional methods using Music Source Separation (MSS).
- Showcased the effectiveness of harmonic alignment for accurately synchronizing piano parts within complex full music mixes, including violin and cello, significantly enhancing overall audio coherence.
- Utilized BERT model architecture to capture musical context and improve alignment beyond Dynamic Time Warping.
- Presented evidence that further optimization of this approach could lead to significant advancements in AI-driven audio analysis.

Automated Music Retrieval | GitHub Demo | **Sept 2022 - Dec 2023**
(Python, Directories, Website Information Retrieval)

- Developed a Python script to automate the retrieval of MP3s and scores by inputting the name of a piece and composer.
- Accessed a vast database, retrieving up to 86,140 recordings from 2,038 performers and 774,949 scores from IMSLP.
- Implemented functionality to limit downloads based on specified storage capacity, optimizing usage up to a configurable number of gigabytes.

Stock Price Prediction Using Recurrent Neural Networks(RNNs) | GitHub Demo | **March 2024 - August 2024**
(Pandas, RNN, Tensorflow, NumPy, Matplotlib, Yahoo Finance API, Google Finance)

- Developed an RNN model for stock price prediction, incorporating stock symbol embeddings to enhance predictive accuracy for 50 top S&P 500 stocks, improving model interpretability and performance.
- Trained the model with a 90/10 train-test split, using 256 LSTM units and 50 epochs, producing accurate short-term forecasts for stocks such as AAPL, KO, and NFLX, demonstrating effective trend matching.
- Automated data retrieval from Google Finance, gathering up to 40 years of historical stock prices for multiple stocks, ensuring reliable and consistent input for time-series forecasting.
- Successfully matched stock price trends across multiple stocks, with predicted trends aligning closely to actual market movements, though exact value predictions varied slightly, indicating strong trend forecasting despite minor deviations in precision.

WORK EXPERIENCE

Head Coding Teacher **Sept 2021 - Aug 2024**
Prestige Institute Closter, NJ

- Led and instructed over 20 students in advanced programming, specializing in USACO competition training and game/app development.
- Designed and promoted engaging classes, significantly increasing enrollment and interest in coding education.

ACTIVITIES

Artificial Intelligence Club **Sept 2024 - Present**

- Participated in workshops, hackathons, and guest speaker events, contributing to a collaborative AI community with enhanced learning and networking opportunities.

Undergraduate Student Alliance of Computer Scientists(USACS) **Sept 2024 - Present**

- Actively contributed to committees enhancing technology, education, and community engagement, strengthening connections within the Computer Science field, and supporting professional growth.

OTHER

- **Eagle Scout**
- **President's Volunteer Service Award**
- **Congressional App Challenge Winner**