LOUIS LARSEN

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EDUCATION

Princeton University   **Princeton, NJ**
Bachelor of Arts (A.B.) in Computer Science   May 2024
- Minor in Music Performance and Composition
- Relevant Courses: Machine Learning, Algorithms and Data Structures, Programming Systems

SKILLS

- **Programming Languages**: Python, Java, C, ARM Assembly Language, JavaScript, SQL, Go, Git
- **Artificial Intelligence/Machine Learning**: Computer Vision, Transformers, CNNs, PyTorch
- **Software Development:** Algorithm Optimization, Parallel Computing, GUI Development
- **Web Development**: Full-Stack Programming, Webserver Setup & Deployment, HTML, CSS, Flask
- **Music**: Drum Set, Keyboards, Composition, Songwriting, Engineering/Production

ACADEMIC PROJECTS

The Development of a Drum Identification and Transcription Tool   September 2023 – May 2024
Undergraduate Thesis   *Advisor: Dr. Adam Finklestein*
- Developed a novel approach to Automatic Drum Transcription (ADT) using a combination of CNNs and a 2-layer Hierarchical Encoder-Decoder Transformer
- Analyzed drum audio along the frequency and time axes, improving transcription accuracy and achieving state-of-the-art results, scoring 35% better than previous ADT models

The Great Princeton Raccoon Invasion   September 2023 – December 2023
Computer Graphics Final Project   *Professor: Dr. Adam Finklestein*
- Created a 3D single-player game with a team of 3 implementing a complete physics engine featuring collisions, gravity, and spatial sound, providing a realistic and immersive gaming experience

The Development of a CNN for the Classification of Drum Sounds   February 2023 – May 2023
Junior Year Independent Work   *Advisor: Dr. Brian Kernighan*
- Designed and implemented a CNN to classify sub-instruments of a drum set, including kick drums, snare drums, tom drums, and cymbals, achieving a testing accuracy of 94%

Academic Work Time Estimator   February 2023 – May 2023
Advanced Programming Techniques Final Project   *Professor: Dr. Robert Dondero*
- Collaborated with a team of 4 to design a website that helped Princeton students estimate weekly coursework hours for informed course selection

PROFESSIONAL EXPERIENCE

Research Assistant   June 2024 – August 2024
Olin College of Engineering   *Boston, MA*
- Expanded the existing AI-based music generation program developed with Dr. Diana Dabby by creating a GUI to improve usability and accessibility for non-technical users
- Built and deployed a server for efficient communication between the GUI and AI algorithm.
- Improved the efficiency of the underlying code, reducing processing time by 90%

AI Programming Intern   June 2023 – August 2023
Olin College of Engineering   *Boston, MA*
- Collaborated with Dr. Diana Dabby to develop a program which incorporated chaos theory and AI algorithms to generate diverse variations of popular songs, optimizing both musicality and randomness

CAMPUS ACTIVITIES

Stage Manager   *Princeton University Rock Ensemble*
Percussion Section Leader   *Princeton University Orchestra*
Pit Orchestra Percussionist   *Princeton Triangle Club, Princeton University Players*
Employer Engagement Student Assistant   *Princeton Center for Career Development*