Haokai Xuan

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LinkedIn | GitHub

Waterloo, Canada + Wherever I'm needed.

Education

- **University of Waterloo** *Sept. '24 - Apr. '29*
  Computer Science Waterloo, Canada
  - GPA: 3.92/4.00
  - Autonomy Member @UWARG.

Projects

- **Elementle: Wordle-inspired game for element guessing. [🌐]** *Feb. 2024 - Jan. 2025*
  Tools: HTML, CSS, JS, Python, Flask [GitHub]
  - Developed flask back-end to generate mystery element seeded on current date.
  - Created JSON storage for all recent mystery elements thus delaying element repetition.
  - Drove a 175% increase in average player count by implementing a python twitter bot to post previous day's guess distribution and mystery element.

- **The Riffler: Guitar-Playing Robot [🌐]** *Feb. 2025*
  Tools: Python, Arduino, PyGuitarPro, PySerial [GitHub]
  - Pitched final product for 400+ hackers as top 5 finalist.
  - Built automated guitar tab parser and developed live simulation for sending commands from parsed music to Arduino using PySerial.
  - Contributed to hardware implementation.

- **AI Impossible Tic Tac Toe: Your preposterous line of three. [🌐]** *Jan. 2025*
  Tools: Python, Pygame [GitHub]
  - Inspired by Harvard's CS 50 AI course.
  - Implemented minimax algorithm for AI to always win or tie.
  - Optimized algorithm to find quickest win and prune unnecessary computations with alpha-beta pruning algorithm.
  - Integrated visuals using pygame and developed reusable buttons using OOP.

- **Theorem Solver: Calculator for computing mathematical theorems. [🌐]** *Jan. 2025*
  Tools: HTML, CSS, JS, Python, Flask, LaTex [GitHub]
  - Wrote all algorithms to compute the results of mathematical theorems with given input from user.
  - Implemented POST method and handling of input.

- **Flappy Arms: Flappy Bird remix with webcam. Control bird by doing push ups. [🌐]** *Oct. 2024 - Jan. 2025*
  Tools: Python, Pygame, OpenCV [GitHub]
  - Implemented OOP for bird and pipes.
  - Developed window resizing for different webcams and mapping of face position to bird height.
  - Implemented exponential smoothing on bird height for improved game experience.
  - Exported .exe for distribution, refer to above link to read more.

Honors and Awards

- **Valedictorian** *Jun. 2024*
  Fredericton High School [🌐]
  - Wrote and delivered speech for 400+ graduates.
  - Selected by committee of principal and English teachers, and 25+ student nominations.

- **Senior Award of Excellence for Piano** *May 2024*
  Fredericton Music Festival [🌐]
  - Adjudicator's choice in piano for music festival.
  - Performed RCM level 10 and RCM ARCT pieces.

- **CAP Exam** *May 2024*
  Canadian Association of Physics at the University of British Columbia
  - Provincial 3rd place.

- **RCM Music Exam** *Dec. 2023*
  Royal Conservatory of Music
  - First class honors in level 8 for piano.

- **UNB High School Programming Competition** *Apr. 2022*
  University of New Brunswick [🌐]
  - Provincial 2nd place.

Activities and Leadership

- **Waterloo Aerial Robotics Group** *Mar. 2025 - Present*
  University of Waterloo Design Team
  - Autonomy Member

- **Music Ensembles (Concert Band, Jazz Ensemble, Glee Piano Comp., Pit Band)** *Sept. 2020 - May 2024*
  Fredericton High School
  - Instruments: Piano, Clarinet.
  - Awards: Musical Leadership (2023), Director's Award (2024).

- **Air Cadets** *Sept. 2019 - May 2024*
  Royal Canadian Air Cadets
  - Flight Sergeant, Instructor, Mini-band 2IC
  - Awards: Instructor of the year (2024).

Skills

- **Programming Languages:** Python, C++, C, JS, Java, Racket
- **Web Technologies:** Django, Flask, CSS, HTML
- **Database Systems:** SQLite, JSON
- **Data Science & Machine Learning:** OpenCV
- **Cloud Technologies:** PythonAnywhere
- **DevOps & Version Control:** Git
- **Other Tools & Technologies:** Linux, LatTex, MuseScore

Additional Information

Languages: English (Fluent), Chinese (Fluent), French (Conversational)
Interests: Self-improvement, Fitness, Music