Haokai Xuan

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EDUCATION

• **University of Waterloo** *Sep. '24 - Apr. '29*
Bachelor of Computer Science, Honours Co-op, GPA: 3.61/4.00 Waterloo, Canada

EXPERIENCE

• **4AG Robotics** *Sep. 2025 – Present*
Computer Vision Intern Salmon Arm, Canada

  ◦ Implemented a grid search algorithm for hyperparameter tuning of YOLOX models to increase F1 score to 88%.
  ◦ Annotated 1800+ pictures of mushrooms through localization and classification to support supervised learning.

• **Waterloo Aerial Robotics Group** *Mar. 2025 – Aug. 2025*
Autonomy Member Waterloo, Canada

  ◦ Optimized distribution of pathing for task done by multiple drones.
  ◦ Calibrated IR camera hotspot detection to ensure absence of all false positives and negatives

SKILLS

• **Languages:** Python, C++, C, JavaScript, Java, Racket, MySQL, CSS, HTML
• **Frameworks:** Django, Flask, React, OpenCV, Pandas, ExpressJS
• **Tools:** Git, Linux Bash, NumPy, Matplotlib, Arduino, Flutter, Vim, GDB, Supabase, Axios

PROJECTS

• **Pianole: Wordle-inspired game for piano pieces. [🌐]** *Sep. 2025*
Tools: React, MySQL, ExpressJS, Axios [○]

  ◦ Engineered custom user-authentication with JSON Web Token and MySQL database.
  ◦ Automated daily game generation with Python script.
  ◦ Automated pruning of recent mystery songs using a MySQL trigger that prevents repetition within a short duration.

• **Elementle: Wordle-inspired game for element guessing. [🌐]** *Feb. 2024 - Jan. 2025*
Tools: HTML, CSS, JS, Python, Flask [○]

  ◦ 5k+ active users. Featured on ChemistryWorld.
  ◦ 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 [○]

  ◦ 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 [○]

  ◦ 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.

- **Flappy Arms: Flappy Bird remix with webcam. Control bird by doing push ups. [🌐]**   *Oct. 2024 - Jan. 2025*
  Tools: Python, Pygame, OpenCV   [⊙]
  - 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

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

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

CERTIFICATIONS

- **Neural Networks and Deep Learning**   *Sep. 2025*
- **Python Mastery**   *Aug. 2024*

ADDITIONAL INFORMATION

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