**Stefan Zorcic**

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**EDUCATION**

**University of Waterloo**  Waterloo, ON

* Bachelor of Computer Science **(GPA: 3.98)** *Expected Graduation: May 2028*

**EXPERIENCE**

**Software Developer** August 2023 - Present

WATonomous Autonomous Software Division*Waterloo, ON*

* Designed and trained a convolutional neural network in Python3 with TensorFlow to detect traffic lights in an input image and determine signal value with an out of sample accuracy of 95%.
* Subscribed to ROS2 nodes to collect data from sensors (LIDAR, Camera, Radar) and verified data with foxglove.
* Containerized all code with Docker and integrated it into the main codebase on Github.

**Undergraduate Theoretical Computer Science Research Assistant** August 2023 - Present

University of Waterloo, Department of Computer Science  *Waterloo, ON*

* Created and tested various discrete finite automata with output for verification of properties in a various series.
* Coded a simulation in Python3 to test various proposed morphism techniques for values under 10000.
* Developed proof techniques using automata theory and the Walnut software.

**PUBLICATIONS**

* Coauthored “**Power-free Complementary Binary Morphisms**” submitted for publication in the *Journal of Combinatorial Theory Series A,* December 11, 2023*.*
* Special Acknowledgement for “**Proof of Irvine’s Conjecture via Mechanized Guessing**” posted on the *Cornell Archives,* November 27, 2023*.*

**RELEVANT SOFTWARE PROJECTS**

**Hurricane Formation Machine Learning Detection**

* *Honorable Mention at NASA Toronto Youth Space Apps Hackathon*
* Created a Python3 script to determine hurricane formations in an opensource NASA database with 87% accuracy.
* Designed a convolution neural network from the TensorFlow library to preform image segmentation.
* Utilized the cv2 library to preform image preprocessing on training data.

**AI Paraplegic Mouse Interface**

* *Winner of Best Education Hack at the Ignition Hacks Hackathon*
* Developed a python script to allow paraplegics who are unable to have fine control over their mouse for an extended period of time to interface with their computer through their camera.
* Integrated the cv2 and pyautogui library with a AI face detection model under the MIT creative commons license to perform the logic of the python script.

**Tweets NLP Sentiment Detection**

* Developed a python script to determine the sentiment of tweets in a public database with a 94% accuracy.
* Integrated Scikit-learn’s MLP classifier model to preform natural language processing.
* Preformed data preprocessing using the NLTK and string module in python to tokenize the training data.

**Live Emotion Deep Learning Detection**

* Developed several models to predict the emotion probability vector (anger, contempt, disgust, fear, happiness, neutrality, sadness, surprise) of a face in an image with a 92% test data accuracy in classification.
* Designed and trained several custom convolutional neural networks from the TensorFlow library.
* Utilized the cv2 library to preprocess training data from an opensource Kaggle dataset.

**SKILLS**

Python, C++, Java, C, Docker, Git, Bash, TensorFlow, Scikit-learn, NumPy, Pandas, PyTorch, PyAutoGui, Linux, SQL