

# Zeren Shen

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## EDUCATION

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### University of Toronto

Sep 2021 - Nov 2022

Master of Engineering, Mechanical and Industrial Engineering - Emphasis in Analytics

### University of Waterloo

Sep 2016 - Apr 2021

Bachelor of Mathematics, Major in Statistics and Actuarial Science, Minor in Computer Science

## PROFESSIONAL EXPERIENCE

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### Machine Learning Engineer

May 2023 - Nov 2024

ThinkGenAI Lab Inc.

Toronto, Canada

#### Piano Gesture Correction Exoskeleton Glove Project

- Led the design and implementation of a gesture correction algorithm for an exoskeleton glove, leveraging a conditional diffusion model integrated with the MANO hand model using PyTorch and Python.
- Engineered a solution that uses minimal fingertip data to produce precise 3D hand joint data, enhancing gesture accuracy and enabling real-time feedback.
- Achieved a 25% improvement in piano hand gesture accuracy, significantly elevating the user experience.

#### Golf Posture Analysis Project

- Developed an algorithm using a Spatio-temporal Transformer neural network to capture relationships within 3D joint data from single RGB videos on GPUs, enabling accurate assessment and optimization of golf postures.
- Implemented real-time classification of motion sequences, delivering practical insights to athletes regarding posture precision and movement patterns.
- Improved golf posture accuracy by 37%, enhancing athletes' performance and training quality.

### Machine Learning Research Assistant

Sep 2021 - May 2022

Laboratory for Extreme Mechanics & Additive Manufacturing, University of Toronto

Toronto, Canada

- Utilized TensorFlow and Keras to implement image segmentation models for accurate detection and tracking of pores in the metal 3D printing process using X-ray imaging, achieving a MeanIoU score of 0.93.
- Designed a solution for tracking harmful bubbles during the 3D printing process in industrial production, resulting in a 15% improvement in bubble detection and analysis.

## PROJECT EXPERIENCE

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### Dialogue Toy Robot

May 2024 - Nov 2024

- Spearheaded the development of an AI-powered dialogue robot for children, integrating STT (Speech-to-Text), GPT, and TTS (Text-to-Speech) to enable natural voice interactions.
- Developed a voice interaction pipeline with APIs and prompt engineering for emotion-based responses.
- Optimized system latency by adopting streaming techniques, reducing response time by 50%.

### Generated Pokemon Project

Mar 2023 - Jun 2023

- Developed diffusion models (DDPM and DDIM) from scratch to generate new Pokemon designs.
- Preprocessed a custom dataset of Pokemon images to improve training data quality and model performance.
- Fine-tuned hyperparameters and optimized training pipelines, achieving a 30% improvement in output diversity and a 25% reduction in model generation time.

## KEY SKILLS

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- Core Programming: Python, C++, NumPy, Pandas, Matplotlib, Bash.
- Machine Learning: TensorFlow, PyTorch, Keras, GANs, VAEs, Diffusion Models, OpenCV, Transformers, GPT.
- Dev Tools: Git, Docker, Jupyter, AWS, Microsoft Azure.