

# Ningxiao Ren

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## TECHNICAL SKILLS

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**Programming Languages:** Python, C++, MATLAB, Verilog  
**Machine Learning:** PyTorch, Numpy, Scikit-learn, Pandas, Matplotlib  
**Software & Hardware:** Git, Linux, FFmpeg, OpenCV; FPGA, Oscilloscope, 3D Printer

## EDUCATION

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**University of British Columbia** September, 2020 - May, 2022  
Master of Engineering (M.Eng.) in Electrical and Computer Engineering, 86.7%

**University of British Columbia** September, 2015 - May, 2019  
Bachelor of Applied Science (B.A.Sc.) in Electrical Engineering, 81.8%

## TECHNICAL PROJECTS

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**An Exploration of Point Transformer** September, 2021 – December, 2021

- Reimplemented point transformer blocks introduced in the paper, *Point Transformer* by Zhao et al.
- Created a point cloud dataset by sampling points from each CAD object in ModelNet10
- Constructed a network based on the LSGAN architecture with point transformer blocks
- Conducted an ablation study on the vector self-attention layer to show the improvements

**Automatic Music Generation using Deep Learning** September, 2021 – December, 2021

- Created a custom dataset of event-based music representations with monophonic MIDI music files
- Constructed a simplified GPT2 model with less transformer encoder blocks
- Evaluated generated audios with pitch entropy and pitch-class entropy measurements
- Generated plausible audios and better understood transformer-based networks

**Hierarchical Multimodal Fusion and Multitask Learning for Scene Perception in Autonomous Driving** January, 2021 – April, 2021

- Implemented multimodal fusion with RGB images and Lidar point clouds
- Applied multitask learning including 2D and 3D object detection to increase our model precision
- Used MMDetection3D toolbox to build our model architecture
- Failed to show a good result but learned a lot about multimodal and multitask learning

**Parking signs detection using Faster-RCNN and YOLOv4** January, 2021 – April, 2021

- Created a custom dataset of street parking signs in British Columbia, Canada including
- Trained Faster-RCNN and YOLOv4 on our dataset and tested both with images and videos
- Compared the performances of both models in terms of mAP
- Better understood the differences between one-stage and two-stage object detectors

**Exploration of Gatys' Neural Style Transfer (NST)** September, 2020 – December, 2020

- Understood and reimplemented Gatys' NST
- Explored the method for choosing content and style layers in a pre-trained VGG19
- Implemented NST via other pre-trained CNN, such as, ResNet50
- Gained a better understanding on NST and concluded the drawbacks of using ResNet50 for NST

**No-Reference Visual Quality Using Deep Learning** September, 2020 – December, 2020

- Compressed and reconstructed images in the dataset with HEVC standard using FFmpeg
- Scored and classified reconstructed images into five levels of quality via the VMAF metric
- Trained and validated a modified DenseNet using reconstructed images and corresponding levels
- Gained experience of dealing with a data-driven project

## TECHNICAL WORK EXPERIENCE

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**Intel of Canada**, Vancouver, BC

**January, 2018 – August, 2018**

***Silicon Validation Engineer***

- Validated communication protocols such as SPI and I2C for pre-silicon ASIC design
- Wrote C++ test codes to test the emulated communication blocks on FPGA
- Worked with colleagues and further developed technical skills and communication skills

**Hillmar Industries**, Delta, BC

**September, 2017 – December, 2017**

***Electrical Assistant***

- Organized and managed mechanical engineering files with Autodesk Vault
- Worked with senior engineers to analyze case files and determine their priorities
- Gained work experiences in an industrial company

## OTHER WORK EXPERIENCE

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**House Construction**, Burnaby, BC

**November, 2019 – June, 2021**

***Builder Assistant***

- Collaborated with a house designer and a structural engineer to design a house building plan
- Managed a working schedule for teams to work in separated time slots amid COVID-19
- Gained management experiences and improved communication skills

**Subway**, Vancouver, BC

**July, 2014 – January, 2016**

***Sandwich artist***

- Organized and completed multiple tasks independently during busy hours
- Communicated with customers to make satisfying sandwiches
- Improved communication skills

**Britannia Sushi**, Vancouver, BC

**July, 2012 – May, 2013**

***Chef Assistant***

- Managed cooking priorities for multiple dishes during busy hours
- Collaborated with coworkers to complete tasks smoothly
- Gained teamwork experiences of working in a very fast paced environment

## INTERESTS

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- Travelling
- Reading novels
- Swimming
- Cooking