Zixin (Charlie) Guo

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SUMMARY OF SKILLS AND INTERESTS

- Proven data modeling and project management skills through multiple collaborated projects
- Proficient in Python (PyTorch, Numpy, OpenCV, Pandas, TensorFlow, Keras), Java, Git and Excel
- Innovative, passionate, result-oriented, attention to details, team player, fast learner with leadership skills
- A good amount of experience in utilizing Linux Server
- Researching on the cutting-edge computer vision applications, including both 2D (classification/detection) and 3D vision (object reconstruction/generation) tasks

WORK EXPERIENCE

Computer Vision Research Intern, Noah's Ark Lab, Huawei Technologies, Toronto

05/2023 - Present

- Initiated and led a detailed survey on editing tasks, focusing on the innovative application of Diffusion Models
- Responsible for the deployment of 3D scene editing task in a large real-world setting, using various 2D and 3D computer vision methods, such as Segment Anything (SAM), ControlNet, and 3D Gaussian Splatting (3DGS)
- Collaboratively authored and significantly contributed to a CVPR 2024 submission (under review) on Diffusion-based texture generation and editing for 3D Objects. Spearheaded the editing component and led various experimental efforts, including comprehensive ablation studies.

Computer Vision Engineer Intern, CV Lab, JD AI Research, Beijing

05/2021 - 09/2021

- Worked in a team of 8 to research and explore computer vision algorithms by gathering key ideas from various research papers and sharing key findings through weekly learning presentations
- Liaised with both internal and external stakeholders on experimental design and model performance to seek optimal solutions for existing business problems
- Implemented and designed ambiguous research topics into actual imaged prediction model using PyTorch
- Effectively translated and communicated complex research concepts and findings to team members
- Proposed a method on Self-Attention defect detection and applied for patent as the first author

Summer Intern, Institute of Computing Technology, Chinese Academy of Science

07/2018 - 12/2018

- Collaborated with team members efficiently to complete assigned projects and prepare presentations
- Designed and applied machine learning methods to solve existing issues and compare against benchmark model

RESEARCH EXPERIENCE

CSC494H1: Computer Science Project, DGP Lab, University of Toronto, Canada

01/2023 - 05/2023

- Designed and implemented Denoising Diffusion Models to generate neural 3D representations under the supervision of Prof. David Lindell
- Worked with other DGP members to replicate, research, and explore neural representation related computer vision problems and report the progress through weekly meeting presentation

PAST PROJECTS

3D Editing with 3D Gaussian Splatting (3DGS) and Neural Radiance Field (NeRF)

- Adopted the SAM on a reference view for editing region segmentation, propagated the segmentation mask to additional views through depth estimation, and performed 3D semantic mask reconstruction to accurately localize edited regions within the 3D scene
- Leveraged various editing techniques, such as ControlNet, Instruct-Pix2Pix, and null-text inversion for smooth and view-consistent editing, and reinforced with Score Distillation Sampling (SDS) to significantly diminish view discrepancies, culminating in a flawlessly edited 3D reconstruction

Smart Oilfield

- Discussed extensively with oil and gas experts for acquiring professional knowledge and annotating a large set of anomalous and normal videos captured at *PetroChina North China Oilfield*
- Adapted and trained state-of-the-art computer vision and deep learning models as backbone on the annotated images and videos for abnormal or violation activity recognition at construction site, such as PPE wearing, use of mobile phone, fire and smoking detection, and illegal trespassing.
- Deployed the trained models on Atlas 500 AI Edge Station with embedded Docker environment, and tested with live stream from security camera as the input, ONNX Runtime and OM model for hardware acceleration, and output stream achieved at 30 FPS being casted to monitoring platform

Distraction Alarmer

- Collected 1500+ images of focused and distracted eyes to train a Convolutional Neural Network to predict attention paid to the surroundings, achieving an accuracy rate of 80%
- Established a multi-processing platform for sound and detection algorithm to appear simultaneously
- Communicated effectively with team members to distribute workload and collaborate through GitHub

Global Mean Sea Level Prediction

- Acted as the project team lead and allocated the workload evenly into data collection, preparation, modelling, and visualization
- Leveraged Python Pandas and NumPy packages to manipulate and clean the dataset for exploratory data analysis and data modeling
- Utilized data analysis and visualization packages (Matplotlib) to translate complex data into actionable insights and extract meaningful conclusions

Ready for Departure

- Collect real-world flight route, airport and ticket price data and constructed graph data structure with node representing airport and edge representing the flight between airport terminals
- Applied A* Search Algorithm to find the optimal flight routes (based on different cost/distance heuristics) between any two specified departure and arrival terminals

EDUCATION and HONORS

Bachelor of Computer Science, University of Toronto	09/2020 – Present
Computer Science and Data Science Specialist with Cumulative GPA 3.98/4.0	
Dean's List Scholar	
Star Intern Certificate for Self-Attention Defect Detection by the Vice President Dr. Tao Mei of JD.com	2021
3 rd Place in Open-World Image Classification Challenge at CVPR2021 Workshop	2021
Top 2% on CCC, University of Waterloo	2020
Top 3% on Euclid Contest and CSMC	2019

PUBLICATIONS

Zixin Guo, Ruizhi Yang. "A Channel Attention and Feature Manipulation Network for Facial Expression Recognition," the 3rd International Conference on Signal Processing and Machine Learning, 2023 (Oral Presentation)