Isaac Zhang

Home addr: U2209/1 Grazier Lane
Belconnen, ACT 2617

Tel: (+61) 435045929
Email: u7344258@anu.edu.au

EDUCATION

Master of Machine Learning and Computer Vision
Australia National University
ANU College of Engineering, Computing and Cybernetics
GPA:6.5/7
Graduated with High Distinction on Master's Thesis

Aug 2021-Jul 2023

Bachelor of Science with Specialization in Computing Science
University of Alberta
Faculty of Science, Computing Science department
GPA: 3.0/4

Sep 2017-Jul 2021

RESEARCH & PROJECTS

First Author, WACV 2024 Acceptance: PMVC: Promoting Multi-View Consistency for 3D Scene Reconstruction

Jan-May 2023

In this paper, we underscore the vital role of multi-view consistency in 3D reconstruction, an aspect often neglected by leading contemporary methods. We show how supplementary priors can be deduced from RGB images, given they uphold multi-view consistency beyond mere photometric data.

- We propose multi-level cues that serve as intermediate image features, with the high level representing semantic information.
- Identified that the Signed Distance Function (SDF) and Multilayer Perceptron (MLP) frequently induce over-smoothing. To address this, we introduced an adaptive sampling method.
- Developed a novel semantic generation pipeline.
- Our result outperformance the current state-of-arts

Research Assistant, In-door 3D Reconstruction, Prof. Li Hongdong's Group

Aug 2022-Aug 2023

The goal of this research is to reconstruct a complete 3D scene or object shape from a set of photos and achieve the state-of-arts. We mainly focus on RGB images as inputs only, i.e., the 3D mesh can be reconstructed from any photos from smartphones cameras etc.

- Aided Prof. Li's group in replicating research focusing on the latest advancements in the 3D reconstruction field.
- Concentrated on Multiview reconstruction from 2D images to lend the model some physical interpretation, improving performance.Used the most classic method of extracting sparse point clouds and camera poses from Structure from Motion (SfM)
- Discovered that supplementing normal priors to the NeRF/NeuS model can exceed state-of-the-art outcomes.
- Explored different geometry expressions, such as substituting volume density of the NeRF model with SDF (NeuS).

Independent Research Project: Background Subtraction Algorithm

Jan-May 2022

This project, initiated independently, aimed to make the model distinguish between background and foreground motion patterns via mathematical modelling. The algorithm is applicable to moving cameras and demonstrates resilience to variations in lighting conditions.

- Devised a novel algorithm that functions independently of neural networks but achieves superior results.
- Applicable for both static and moving cameras.
- Stable and reliable model requiring only the initial frames for background detection across the entire scene.
- Applicable for background subtraction and tracking of moving objects.
- Ensures high confidence interval classification of each pixel using the epipolar constraint.

Team Leader, Online Ride-hailing Android App Project

Jan-Apr 2020

This project's primary goal was to create an online ride-hailing service that bridged the gap between drivers and users. We implemented a distance-based charging mechanism via Google Maps, ensured cloud data storage through Firebase, and introduced a driver-passenger rating system akin to Uber.

- Developed and managed the database, synchronizing network interactions between cloud data and the local user-end, and implemented QR code scanning and analysis.
- Led the team in designing UML diagrams according to use cases, ensuring alignment with user requirements.
- Defined the app's architecture and allocated tasks among team members.
- Oversaw the integration of all components, culminating in a functional ride-hailing app ready for deployment.

INTERNSHIP EXPERIENCE

Research Assistant, Super Map GIS Co., Ltd

Sep 2023-present

- Responsible for utilizing NeRFs and advanced neural rendering techniques to synthesize novel viewpoints and enhance visual experiences.
- Adopt SAM and LLMs on 3D segmentation.

Data Analyst, H3C Technologies Co., Ltd

Aug-Oct 2020

- Cleansed and processed data, and constructed models to extract valuable insights.
- Aided in making strategic decisions by organizing and visualizing data.

Front-end Developer, CIB Digital Financial Service Co., Ltd

Jun-Jul 2020

- Developed front-end webpages and back-end databases in accordance with company requirements.
- Contributed to the development of a banking operation system using Java.

EXTRACURRICULAR ACTIVITIES

Hackathon, Major League Hacking   Oct 2019

Participated in a 2-3 day intensive "marathon programming" project with a team of five, tasked with organizing, classifying, and compressing satellite images.

- Implemented the bag-of-words model to images: segmented each image into patches to extract SIFT points for each block as feature vectors.
- Stored all feature vectors and utilized K-means clustering to create a Vocabulary.
- Treated each image as a query, calculating the L2 distance between the query image vector and each cluster of Vocabulary, assigning the nearest cluster center as the class. Optimized Vocabulary construction time using PCA for vector dimension reduction and probability distribution for K-means initialization.

AWARDS & HONORS

Continuing International Award, 1st class	2018 - 2020
International Student Scholarship (Honor Entrance)	2017
Certificate of Course Representative	2022

Technical Skills

• Machine Learning Frameworks	- TensorFlow, Pytorch, NumPy, Pandas
• Development & Frameworks	- Flask, Vue, React, Android Studio, IntelleJ, VS Code, PyCharm
• Programing Languages:	- Python, Java, C, Lisp, SQL, JavaScript

Referees

Dr. HongDong Li, Tenured Professor, Australian National University (ANU)
Notable positions: ICCV 2021, ECCV 2020, CVPR 2021, CVPR 2022, ECCV 2022, and an Associate Editor for PAMI, and the ACCV 2022 General co-Chair
Contact: +61 0401 482 42 / hongdong.li@anu.edu.au