Mr. Haoran MAO

Expected Research Area: Computer Graphics, 3D Reconstruction

Mobile Phone: 86-15623278960 E-mail: haoran_mao@163.com WeChat: DDG8960

Education Background

09/2023-10/2024 **The Hong Kong Polytechnic University** **GPA: 3.45/4.3**
Major: Metaverse Technology
Degree: Master of Science

09/2017-06/2021 **Huazhong Agricultural University** **GPA: 3.27/4.0**
Major: Information Management and Information System
Degree: Bachelor of Management

Certificates & Skills

Certificates: CET-6, IELTS 6.5, NCRE Level II of Python
Skills: Python, C#, Unity3D

Internship & Project Experience

03/2024-07/2024 Group Project of Metaverse Project I & II The Hong Kong Polytechnic University

- **Enabling Metaverse Tourism with Neural Rendering**
  - Introduction: The project involves 3D Gaussian splatting (3DGS), a strong technique for real-time radiance field rendering. Some challenges to address are how to ensure the scalability of a large scene while maintaining rendering details that enable one-to-one scale VR experiences (i.e. VR walking).
  - Design and develop the main functions of VR application in Unity3D.
  - Deploy the environment of 3DGS and do the reconstruction of the scene.
  - Investigate how Stable Diffusion model can be applied in 3DGS to make surface details in the built scenes more precise, such as the algorithms of upscaling and inpainting.
  - Investigate how Large Language Model and digital avatar can be applied in VR application to enhance the user experience.

09/2023-11/2023 Group Project of COMP5424 Extended Reality The Hong Kong Polytechnic University

- **Design and Development of Horror Puzzle Themed Game: Terror Carriage**
  - Introduction: The project is the development of a VR Game.
  - Implemented two virtual locomotion techniques (joystick and arm swinging), interaction system and backpack system.
  - Integrated and tested the game. Made a questionnaire to get feedback from the volunteers and optimized the game.
  - Made the demonstration video and trailer video.

08/2022-04/2023 Assistant Algorithm Engineer Shenzhen Autocruis Technology Co., Ltd (Wuhan Branch)

- **Object Detection of Gestures**
  - Introduction: The function is a part of OMS (Occupancy Monitoring System), aims to identify the position of the passengers' hands and classify into the right gestures, such as "one", "two", "five", "good", "rock", "ok" and so on. The dataset contains over 140,000 pictures.
  - Processed the annotated data and converted labels format. Trained and optimized the models for deep learning. Used Yolov5-m as the backbone and the accuracy reached 97.8% on mAP@.5 and 87% on mAP@.5:.95.
- **Regression Task of Hand Key Points**
  - Introduction: The function is based on gesture detection, aims to achieve some functions by locating 21 key bone points on each hand and tracking their position changes. For instance, showing "five" gesture with horizontal movement means switching car music, and showing "one" gesture and drawing a circle means adjusting volume. The dataset contains over 70,000 pictures.
  - Trained and optimized the models for deep learning. Used ReXNetV1 as backbone and the model was stable in most cases.
- **Classification of Open Eyes and Closed Eyes**
  - Introduction: The function is a part of DMS (Driver Monitoring System), assists in judging whether the driver is tired by the state of his/her eyes, include class of "open", "close" and "unknown". The dataset contains over 220 thousand pictures.
  - Trained and optimized the models for deep learning. Used Resnet18, EfficientNet_b0 and Yolov5s-cls as the backbones and the accuracy of model reached 99.8% on test set at last.