ZHANG SHUYUAN

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EDUCATION

- Imperial College London (2024 ~ 2025)
 - MSc Advanced Computing
- The University of Edinburgh (2020 ~ 2024)
 - BSc Computer Science (Honours)
 - Weighted average grade: 78 (First Class)

HIGHLIGHTS

COMPUTER VISION / COMPUTER GRAPHICS

- UoE Course: Computer Graphics: Rendering & Computer Graphics: Geometry and Simulation
 - Learn C++ from scratch and implement **Ray Tracing** with advanced features including texture, acceleration hierarchy based on BVH, path tracing, pixel sampling, lens/aperture sampling and light sampling
 - Mesh Reconstruction from point clouds, discrete analysis and parameterization
- UoE Bachelor Dissertation: Inverse Procedural Modeling: from Sketches to Buildings
 - Construct a procedural model for buildings based on Directed Acyclic Graphs (DAG)
 - Distort 3D models and render as a 2D sketch image; generate training data with parameter sampling
 - Encoder-decoder & Multi-task decoders that predict DAG parameters based on input sketch image
 - Develop Blender add-on as user interface

NATURAL LANGUAGE PROCESSING

- UoE Coursess: Foundations of Natural Language Processing & Natural Language Understanding, Generation and Machine Translation
 - N-gram, Bayesian probabilities, RNN, GRU, LSTM, Transformer and Attention mechanism
 - Group Project for the course *Machine Learning Practical*: Query-focused Summarization via GPT Prompting on Ambiguous QA
- Extracurricular Application:
 - N-gram probabilities from Chinese poetry and as a name-generator mod for the game Stellaris, with over 500 subscriptions.

LARGE LANGUAGE MODELS

- Application:
 - Prompt Engineering, Multi-agent systems, OpenAI API, Ollama API
 - Task breakdown for better performance and robustness via designing and implementing Multi-agent systems
 - Generate fine-tune data for low-resource tasks
 - Deployed on remote server QAnything to serve as a LLM backend with knowledge base

DIGITAL HUMANS

- Deployed on remote server, extended and contributed to the open-source metahuman framework Linly_Talker, working with QAnything as an extra method to generate speech text for digital humans
- Deployed on remote server GPT-SoVITS to fine-tune models for voice cloning
- · Deployed on remote server metahuman-stream as a real-time digital human streaming method

INTERNET OF THINGS

- UoE Course: Principles and Design of IoT Systems
 - Collect human activity data through wearable devices
 - Design, implement and train neural networks (CNN, RNN, LSTM with model ensembling) to identify activity and respiratory symptoms
 - Develop Android App to deploy trained models, connect to sensors via Bluetooth and classify human activities /respiratory symptoms in real-time

System Engineering

- Group Project: A domino-placing robot based on TurtleBot, Lego motors, 3D printed parts and an Android App for Bluetooth connection to the robot for the course *System Design Project*
 - Designed the domino-reloading and automatic placement mechanism
 - Designed and modelled the 3D printed parts
 - Wrote Python scripts to control the Lego motors
 - Coordinated Android App development
 - Designed and implemented the communication method between server, robot and the app

WORK EXPERIENCE

- HGTech R&D Intern (Summer 2024)
 - Worked on digital human topics, deployed various services on compute server directly or using docker containers, hosted locally a Streamlit-driven webpage to track service status
- VisionTalk Algorithms Intern (June 2024)
 - Improved LLM performance and robustness on chat generation and decision making via breaking down a complex task and designing/implementing a Multi-agent system
- GraphviX Lab, IPAB, UoE Summer Research Internship (Summer 2023)
 - Researched on topics of sketch-based inverse procedural modeling. Implemented shape grammars based on Blender geometry nodes and its APIs. Trained neural networks to inference shape parameters from sketches, and integrated above pipelines as a Blender plug-in. Some tech stacks are also part of my bachelor dissertation.
- UoE Tutor (2023)
 - A paid position delivering weekly tutorials for the course Reasoning and Agents, two hours per week
- EUFS Software Infrastructure (2022 ~ 2023/24)
 - Software Infrastructure team for Driverless Vehicle
 - * Maintained, refactored and extended eufs_cli, the command-line-interface tool in Python
 - $\cdot\,$ refactored 70 lines of repeated code for each command to 5 lines
 - $\ast\,$ Provide supporting functionalities around git, colcon and more
 - * Contributed to the server backend of EUFS-Testing-Application
 - * Update launch configurations of the self-driving race car under different tasks
- Wuhan Tianyu Information Industry Algorithms Intern (Summer 2021)
 - Carried out object detection tasks using OpenCV-Python and YOLOv5, trained models focusing on human and traffic analysis tasks. Wrote scripts to process large amount of ArUco codes. Collected, cleaned and augmented dataset for training