Haoquan Zhang

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Education

South China University of Technology (SCUT), Guangzhou, China 2021 – Present

Undergraduate student in Data Science (DS), expected March 2025. **GPA** of 3.7/4.0

Reserach Interests: *Multi-Modality Tasks*, *Knowledge Distillation* and *3D Reconstruction*

Publication

Mask4Align: Aligned Entity Prompting with Color Masks for Multi-Entity Localization Problems

CVPR'2024 - First Author

- In Visual Question Answering (VQA), pre-trained vision-and-language models (VLMs) have addressed VQA problem in certain degree and finally providing a text description as the answer. However, in visual scenes with multiple entities, textual descriptions struggle to distinguish the entities from the same category effectively. Consequently, the VQA dataset is limited by the limitations of text description and cannot adequately cover scenarios involving multiple entities. To address this challenge, we introduce Mask4Align, a method can determine the entity's position in the given image that best matches the user-input question. This method integrates colored masks into the image, allowing the VQA model to address multi-entity localization challenges without requiring additional training.

Research Experience

Singapore Managment University 2024 – present

Research Intern Adviser: Prof. Shengfeng He, Singapore

- 3D Gaussian Splatting
- Reflection-Augmented 3D Reconstruction

South China University of Technology 2023 – present

Research Intern Adviser: Prof. Huaidong Zhang, Guangzhou, China

- Point Cloud Recognization
- Applications of Vision Language Models

Project Experience

Perfect GunMayhem Remake: A 2D Shooting PVP Game Based on Cocos2d-x 2022

Course Design Course: Advanced Language Programming (C++)

GunMayhem Remake is a project independently completed by our team members, covering all aspects, including source code, game atrwork, and music assets.

- Final Score: 99, 4.0/4.0. (1%)
- C++, Cocos2d-x (the game engine)
- Project Page: `https://haoquanzhang.github.io/GunMayhem/gunMayhem.html`

Design of Auxiliary Diagnosis Algorithm for Schizophrenia Based on Feature Fusion of EEG and ECG 2023

Entry The National BME lnnovation Design Competition

Calculated brain functional network features, heart rate variability features and heart-brain coupling features to build machine learning models for automatic diagnosis; Deep learning models using ResNet were built based on original EEG and ECG also.

- Second Prize. (6%)
- Python, PyTorch, MNE-Python (a Python package for analyzing neurophysiological data)

Skills

- Programming Languages: Python > C++ > Java
- Platform: Linux, Window
- Languages: English - Fluent, Mandarin - Native speaker

Selected Awards

Meritorious Winner (7%), The Interdisciplinary Contest in Modeling (ICM), COMAP 2021
3rd Prize (12%), The SCUT Scholarship, SCUT 2022
3rd Prize (12%), The Huameng Scholarships, TCL Corporate 2022
2nd Prize (5%), The Taihu Innovation Scholarship, Wuxi city government 2022
2nd Prize (6%), The National BME lnnovation Design Competition, China Society of BME 2023

Core Courses

Physics (4.0/4.0), Python Programming (4.0/4.0), Advanced Language Programming (4.0/4.0), Linear Algebra (4.0/4.0), Computer Network (4.0/4.0), Java Programming (4.0/4.0), Course Design of C++ (4.0/4.0), Course Design of Data Structure (4.0/4.0)

Papers Under Review

SimpleRefer: 3D Visual Grounding via Simple Relation Decoupling
ACMMM'2024 - Co-Author

- Previous techniques in 3D visual grounding prioritized perspective cues to discern object viewpoints but often overlooked fine-grained relational knowledge in sentences involving multiple objects, leading to ambiguous localization. To address this, we introduce *SimpleRefer*, a novel framework that employs Simple Relation Decoupling (*SRD*) to explicitly extract object-to-object relationships from complex queries. This method decomposes complex sentences into simpler components, promoting efficient representation learning and improving visual grounding effectiveness. This process transforms sentences with multiple object relationships into ones with single relationships, ensuring consistent geometric localization.

Subject-Based Heart-Brain Coupling Analysis for Schizophrenia Classification
TSNRE'2024 - Co-Author

- An in-depth exploration version of the work *Design of Auxiliary Diagnosis Algorithm for Schizophrenia Based on Feature Fusion of EEG and ECG* from *The National BME Innovation Design Competition* mentioned above.

Miscellaneous

- Personal Website: https://haoquanzhang.github.io/
- Hobby: Anime, Music Production (Electronic and R&B) and Graphic design
- Feel free to contact me. I look forward to exchanging ideas and engaging in friendly collaboration.