Mr. Qihua Dong (His/He/Him)

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Github: https://github.com/dddraxxx

Education

Northeastern University, Boston, USA Sep 2023 - Now

- PhD in Computer Engineering under the supervision of Prof. Raymond Fu
- Interested topics: Multi-modal LLM, Computer Vision, Artificial Intelligence,

City University of Hong Kong, Hong Kong SAR, China Sep 2017 - Jul 2021

- BSc in Computer Science with Mathematics Minor; overall GPA 3.89/4.3 (Top 10% official proofed)
- Featured courses: Mathematical Analysis; Enhanced Calculus and Linear Algebra; Discrete Mathematics; Statistic Processes; Data Structures and Advanced Programming; Design and Analysis of Algorithms

Publications

- **Dong Qihua**, Qifeng Wu, Yizhou Wang, Yue Bai, Yun Fu. "Recognition, Localization and Segmentation: Advancing Semantic Insights with LVLMs in Challenging Tasks". Submitted to ***Proc. ICML**, 2024*
- **Dong Qihua**, Du Hao, Song Ying, Xu Yan, Liao Jing. "Preserving Tumor Volumes for Unsupervised Medical Image Registration". ***Proc. ICCV**, 2023*.
  Paper link: https://arxiv.org/pdf/2309.10153.pdf
- He Ruozhen*, **Dong Qihua***, Lin Jiayin, Rynson Lau. "Weakly-Supervised Camouflaged Object Detection with Scribble Annotations**"**. ***Proc. AAAI**, 2023*.
  Paper link: https://arxiv.org/pdf/2207.14083v2.pdf
- Du Hao*, **Dong Qihua*,** Xu Yan, Liao Jing. "Weakly-Supervised 3D Medical Image Segmentation using Geometric Prior and Contrastive Similarity". ***IEEE Transactions on Medical Imaging**, 2023*.
  Paper link: https://arxiv.org/pdf/2302.02125.pdf
- Liang Yongqing*, **DONG Qihua***, Zhang Congyi, Junli Zhao, Wang Wenping, Li Xin. "Skull-to-Multi-Faces: Geometry-constrained Face Generation and Exploration". Ongoing.
- Du Hao*, **Dong Qihua*,** Xu Yan, Liao Jing. "TDFormer: Top-Down Token Generation for 3D Medical Segmentation". Ongoing.
- Du Hao, **Dong Qihua**, Xu Yan, Liao Jing. "MECCA: Multi-Modal 3D Medical Image Segmentation with Modality-Aware Encoding and Cyclic-Clustering Attention". Ongoing.

*: The authors with * contributed equally to the work

Honours and Scholarship

2021	**First class honor**, Bachelor's degree of City University of Hong Kong, HK
2019	**Bronze Medal**, The 2019 **ICPC** Asia Nanchang Regional Contest, Jiangxi Normal University, China
2017 - 2021	**Dean's List**, City University of Hong Kong, HK
2017 - 2021	**Full Tuition Scholarship**, City University of Hong Kong, HK

Research Experience

Multi-modal LLM in visual referring, understanding and grounding Oct 2022 – Jan 2023

- Supervisor: Prof. Raymond Fu
- Research brief: Developed an innovative multi-modal large language model (LLM) capable of visual referring, where the model can identify and relate to objects within and cross images based on textual descriptions. Additionally, it excels in visual understanding, comprehending complex scenes and their elements in a cohesive and fine-grained manner. The model's grounding capability, which allows it to anchor textual descriptions to specific visual elements, facilitates a deeper understanding of the content and general applications.

Skull to 3D Face Reconstruction via 2D Generative Adversarial Model Oct 2022 – Jan 2023

- Supervisor: Prof. Wenping Wang
- Research brief: Designed a 2D generative model to provide new potential portrait of the given skull and reconstruct the 3D face model from the 2D face image; the reconstruction can be manipulated to render faces from different groups of people, increasing the flexibility of the model in forensic applications.

Preserving Tumor Volume in 3D Medical Image Registration Sep 2022 – Mar 2023

- Supervisor: Prof Jing Liao, Prof Yan Xu
- Research brief: Proposed a novel registration neural network that preserves the volume of tumors without the loss of alignment accuracy, allowing registration network to have wider clinical application. A new volume-preserving loss is designed specifically for the task.

Dynamic Transformer for 3D Medical Image Segmentation Jun 2022 – Nov 2022

- Supervisor: Prof Jing Liao, Prof Yan Xu
- Research brief: Designed an efficient and accurate transformer that adapts to medical image segmentation with dynamic token generation, in which only foreground-related tokens are further split and attended. Our method improves SOTA Dice scores of transformers on two popular datasets in medical images.

Weakly-Supervised 3D Medical Image Segmentation Framework Feb 2022 - May 2022

- Supervisor: Prof Jing Liao, Prof Yan Xu
- Research brief: Designed a new weakly supervised framework to segment medical images with bounding-box labels. The framework exploited the geometric prior of organs by using template organs in point-cloud form, which provides delicate shape guidance for segments. Besides, pretraining of the feature head was performed to learn contrasted features between objects and background. The work improves SOTA performance by 12.5% on Dice on two popular datasets in medical images.

Weakly-Supervised Camouflaged Object Detection Dec 2021 - Jun 2022

- Supervisor: Prof Rynson Lau
- Research brief: Proposed the first weakly-supervised task and dataset in camouflaged object detection. It contains the novel consistency loss that corrects an ignored bias in previous works. The feature loss leveraging semantic features to infer concealed objects. Our model outperforms SOTA methods on COD benchmarks with an average improvement of 11.0% on MAE.

Work Experience

Texas A&M University, TX, USA Oct 2022 – Jan 2023

- Supervisor: Prof Wenping Wang (https://engineering.tamu.edu/cse/profiles/Wang-Wenping.html)
- Position: Research Assistant (Remote)
- Responsibilities: Conducting research related to faces in computer vision and computer graphics.

City University of Hong Kong, Hong Kong SAR, China Aug 2021 – Aug 2023

- Supervisor: Prof Jing Liao (https://www.cityu.edu.hk/stfprofile/jingliao.htm)
- Position: Research Assistant (Full-time)
- Responsibilities: Engaging the research projects in computer vision, the primary research domain is 3D Medical Image Analysis and Weakly-Supervised Learning.

City University of Hong Kong, Hong Kong SAR, China Sep 2020- Feb 2021

- Supervisor: Prof Jianping Wang (https://www.cs.cityu.edu.hk/~jianwang/)
- Position: Student Research Assistant (Part-time)
- Responsibilities: Research works in computer science: the major research topics are related to system scheduling schemes for self-driving tasks.

Sik Sik Yuen, Hong Kong SAR, China Sep 2019- Jun 2020

- Position: Full-stack Programmer (Intern)
- Responsibilities: Mobile phone application development project including AI functions and web service.

Skills

- Computer languages Python, C++, Matlab, R, Javascript, Java, CSS
- Tools and library PyTorch, Numpy, Detectron2, Skimage, mmDet, Monai, Scikit-learn,
- English skills TOEFL 110 (Nov 2022); GRE 330 (+3.5)