

Final Project

Deep Learning for Medical Image Analysis

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Final Project

- Medical image analysis is a field that utilizes computer vision and machine learning techniques to interpret and analyze medical images. It has evolved alongside advancements in medical imaging technologies such as X-rays, CT scans, MRI, and ultrasound, which could provide unique insights into different aspects of the human body.
- Tasks in medical image analysis encompass image segmentation, classification, lesion detection, and image reconstruction, etc.

Final Project

- Any topics related to **Medical Image Analysis** with **deep learning**.
 - Here are some examples:
 1. Cancer classification of pathology images;
 2. Tumor detection and segmentation;
 3. Foundation model pre-training;
 4. Multimodal learning for precision oncology;
 5. Explainable AI for disease diagnosis, etc.
- If you have any questions, feel free to discuss with us.

Requirements

- Everyone needs to finish the final project individually.
- Model evaluation on **more than one public datasets** is preferred.
- Everyone needs to accomplish an **up-to 8-page writing report (excluding references)** in CVPR template.
- Everyone needs to prepare an **oral presentation**.
- You are required to propose **novel ideas** to improve existing methods and make insightful conclusions.
- Submit the materials before **11:59pm, April 15, 2024**.

Grading Scheme (60 % score out of final grade)

- **Oral Presentation** (40pts): Everyone needs to make a presentation (15 mins oral presentation and 5 mins for Q&A). **Prestation skills and question handling capability** will be evaluated.
- **Source Codes** (20pts): Everyone needs to submit all source codes to Canvas (with a shell file). The **authenticity, correctness and cleanliness of source code** will be evaluated.
- **Writing Report** (40pts): Everyone is required to submit a writing report (pdf file) within 8 pages (excluding reference, appendix). The report should include **problem definition, motivation, contributions, model architecture, implementation details, dataset, experimental results, conclusion**, etc.

Public Resources

- **Dataset Websites:**

- [[Grand challenges](#)]: a very useful website for medical image analysis tasks. You need to register the competition to get the datasets.
- [[Kaggle](#)]: The world's largest community of data scientists.
- [[Stanford AIMI Shared Datasets](#)] You need to sign in the website to get the datasets.
- [[Google Dataset Search](#)] The data set search engine launched by Google can search data sets around the world.

Public Resources

- **HKUST GPU Resources:**

- ITSC provide [high-performance computing \(HPC\) service](#) to HKUST researchers.
- Currently ITSC has TWO high-performance computing clusters available to the university community.
- The [HPC2 cluster](#) is designed to cater for CPU-intensive computational jobs and jobs requiring GPU support.
- The [HPC3 cluster](#) is a contributed cluster by faculty members which is designed to cater both CPU-intensive computational jobs and jobs requiring GPU support.
- NVIDIA DGX SuperPOD system (TBD)

<https://itsc.hkust.edu.hk/services/academic-teaching-support/high-performance-computing/superpod>