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# Practices on Visual Computing I - Template for Project Idea

## Project Name

Reasoning segmentation for natural disasters damage assessment via large language model

### Description

This project aims to develop a complex reasoning segmentation model to conduct rapid fine-scale flood damage assessments leveraging the capability of the Large Language Model (LLM) to reason and comprehend user intentions. The reasoning segmentation aims to output a segmentation mask given a complex and implicit query text. For this project, using the after-disaster satellite images, given the implicit query text instruction (e.g., which areas have the largest damage level after floods?) to the model, the model could output binary segmentation masks of the input satellite image showing areas with the largest damage levels.

Students are expected to be marvel at semantic segmentation, and large language model in order to develop the model to achieve the above-mentioned research tasks: reasoning complex and implicit text queries jointly with the image, and producing segmentation masks.

Some useful references are listed as below:

Lai, X., Tian, Z., Chen, Y., Li, Y., Yuan, Y., Liu, S., & Jia, J. (2023). Lisa: Reasoning segmentation via large language model. *arXiv preprint arXiv:2308.00692*.

Kaur, N., Lee, C. C., Mostafavi, A., & Mahdavi‐Amiri, A. (2023). Large‐scale building damage assessment using a novel hierarchical transformer architecture on satellite images. *Computer‐Aided Civil and Infrastructure Engineering*.

### Datasets

The xBD data set is publicly available at https://xview2.org/ dataset. Students can use this famous dataset to train the model.

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### Contributor of the Project Idea

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