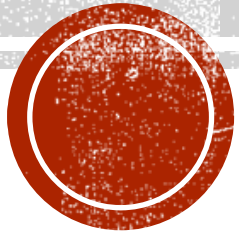
PANOPTIC SEGMENTATION USING DETR



- Aman Kumar (R19112026)
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OBJECTIVES

- To train a model which takes any image as input and gives panoptic segmentation for construction materials and COCO classes.

CONCEPTS TO BE EXPLORED

Image components	Mask images
Convolution	Kernels, Weights, Activations, Layers
Neural Networks	Backpropagation
Normalization	Regularization
DETR	RESNETS
Object Detection	Panoptic Segmentation

TECHNOLOGIES

PyTorch

Google Colab to train the models

Python – for preparing Dataset

Matplotlib/OpenCV – for Visualization

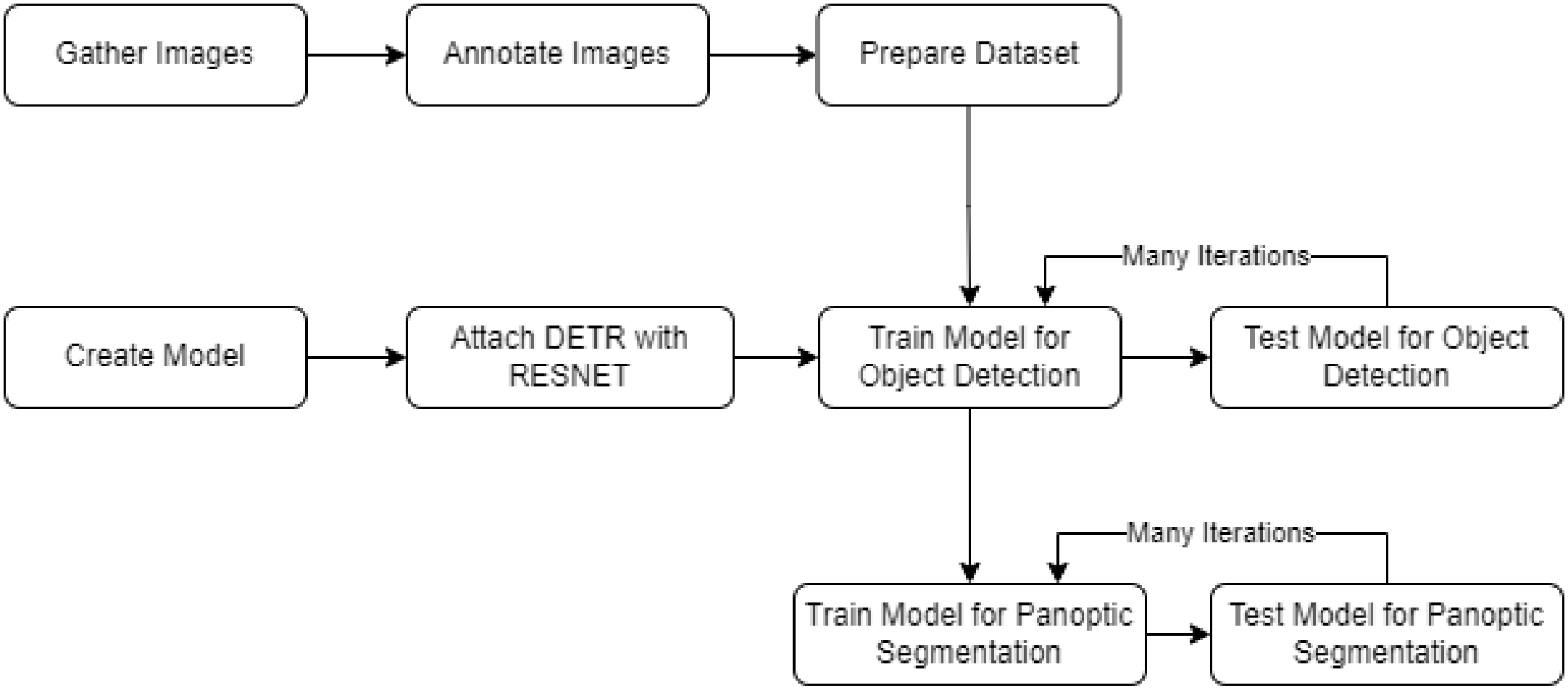
INITIAL PLAN - 1

- To train model to detect the construction materials and also COCO classes
- But in COCO classes, we have around 180 classes, which when added with 50 construction classes is very high for model to distinguish these many objects with our small dataset.
- So, since COCO has 2 categories – things (countable objects like person, car, chairs, etc,.) and stuff (non-countable stuff like sea, sand, mountain, forest) – we have decided to group all things classes under one single umbrella called misc. and all stuff classes will be represented by their super-category (e.g.: sea, river, lake, rain – all these will be predicted as water)

INITIAL PLAN - 2

- We are annotating only construction materials, for COCO classes annotation following method is used:
  - Since there are lot of COCO classes, it will become difficult for us to annotate them also for model to learn them with small set of images.
  - So, we will be passing our images to a pre-trained model (trained by Facebook on COCO dataset) and the predictions of that model, will be ground truth for our model.
  - This way, for COCO classes, there will be decrease in accuracy, but it gives us a chance to leverage other famous models in our project pipeline.

WORKFLOW


Gather Images
Annotate Images
Prepare Dataset
Many Iterations
Create Model
Attach DETR with RESNET
Train Model for Object Detection
Test Model for Object Detection
Many Iterations
Train Model for Panoptic Segmentation
Test Model for Panoptic Segmentation

TEAM TARGET

- To gather and annotate as many images as possible by end of this week.
- At the end of this week, we will start working on compiling the dataset.
- Feed the dataset to model for object detection and try out different transformations and behaviour of model on those transformations
- Train the same model for panoptic segmentation and evaluate model on different metrics and transformations.

INDIVIDUAL TARGETS – AMAN KUMAR

a. Dataset Annotation
b. Dataset Creation
    i. Images
    ii. JSON for Panoptic Segmentation
    iii. Mask images
c. Build Model for Object Detection
d. Train Panoptic Segmentation Model

INDIVIDUAL TARGETS – ANUBHAV KANDIYAL

a. Dataset Annotation
b. Dataset Creation
    i. Images
    ii. JSON for Object Detection
c. Train Object Detection Model
d. Build Model for Panoptic Segmentation

CURRENT STATUS

1. The images are gathered and final annotation process is going on.
2. By the end of next week, we will have the dataset ready to feed to our model. (Tentative)

THANK YOU

- AMAN KUMAR (R19112026)
- ANUBHAV KANDIYAL (R19112020)