COMP0197 CW2 – Instruction Document

Project Title: Weakly-Supervised Image Segmentation Using CAM, ViT, and Hybrid GraphCut

Repository: https://github.com/1756413059/comp0197-cw2-pt

1. Additional Installed Packages

In this project, the following three additional pip-installable packages are used beyond the default Conda environment:

Package Name	Version	Purpose
opencv-python	≥4.5.5	For GrabCut-based mask refinement
transformers	≥4.35	For loading pretrained ViT models
scikit-learn	≥1.0.2	For connected components, evaluation

Installation command:

```
pip install opencv-python transformers scikit-learn
```

2. Steps to Run the Code and Reproduce All Results

Environment Setup

1. Clone the repository:

```
git clone https://github.com/1756413059/comp0197-cw2-pt.git
cd comp0197-cw2-pt
```

2. Activate the provided environment:

```
conda activate comp0197-cw1-pt
```

3. Install the three required packages:

```
pip install opencv-python transformers scikit-learn
```

Running Experiments

Each script corresponds to one key segmentation method.

- Run CAM baseline: (include evaluation)

```
cd MRP
 PYTHONPATH=. python resnet_cam_unet/scripts/run_pipeline.py
```

- Run CAM + GrabCut hybrid:

```
 python main_grabcut.py
```

- Run CAM, Grad-CAM, Grad-CAM++ segmentation:

```
cd MRP/cam_comparison

python main.py
```

- Run ViT-based segmentation: (include evaluation)

```
 cd OEQ/ViT
 PYTHONPATH=. python main.py
```

- Run fully supervised U-Net:

```
cd MRP/supervised_baseline
PYTHONPATH=.   python main.py
```

- Evaluate all results:

```
 cd MRP/supervised_baseline
PYTHONPATH=.  python scripts/evaluate_supervised.py
```

Outputs (IoU and Dice) are printed to terminal and saved to results/.

3. Compatibility Assurance

✅ OS: Ubuntu 22.04
✅ Python: 3.11
✅ Framework: PyTorch only
✅ Evaluation tested with: Oxford-IIIT Pet dataset
✅ All required packages run successfully within the Conda environment