**Assignment 3 — SeqTrack Setup, Training, and Checkpoint Management  
Team Number: 8  
Course: Image Processing — Level 4  
Date: 15 October 2025**

**1) Selected Classes and Dataset Sizes**

**I trained on two LaSOT classes using the Hugging Face datasets loader with a fixed seed for reproducibility:**

* **airplane: 60 samples**
* **coin: 60 samples  
  Total: 120 samples**

**Notes:**

* **The *airplane* class is fixed, as required.**
* **I switched the second class to *coin* (instead of *bicycle*) to better balance motion and appearance variation in the small sample regime.**

**2) Environment Setup (What I Actually Used)**

**Everything was set up following SeqTrack’s original structure, then I added what I needed for dataset loading, logging, and checkpoint management.  
I exported the final setup into requirements.txt so it’s fully reproducible.**

**Core**

* **PyTorch ≥ 1.9.0 (CPU build)**
* **torchvision ≥ 0.10.0**
* **torchaudio ≥ 0.9.0**
* **numpy ≥ 1.21.0**
* **pandas ≥ 1.3.0**
* **matplotlib ≥ 3.4.0**

**SeqTrack Extras**

* **PyYAML ≥ 6.0**
* **easydict ≥ 1.9**
* **cython ≥ 0.29.0**
* **opencv-python ≥ 4.5.0**
* **pycocotools ≥ 2.0.0**
* **jpeg4py ≥ 0.1.4**
* **lmdb ≥ 1.2.0**
* **scipy ≥ 1.7.0**
* **visdom ≥ 0.1.8**
* **timm ≥ 0.4.0**
* **yacs ≥ 0.1.8**

**Dataset + Tooling**

* **datasets ≥ 1.8.0 (LaSOT loader)**
* **transformers ≥ 4.12.0**
* **tqdm ≥ 4.62.0**

**Install flow I used:**

1. **Integrated the SeqTrack codebase.**
2. **Installed core + SeqTrack dependencies.**
3. **Added dataset and logging dependencies.**
4. **Locked versions into requirements.txt.**

**3) What I Changed in Training (and Why)**

**Key Hyperparameters**

* **Seed: 8 (team number, reproducible across Python/NumPy/PyTorch [+ CUDA ])**
* **Epochs: 5 (keeps runtime short while showing training progress)**
* **Patch size: 1 (explicit change required by the assignment)**
* **Batch size: 8 (best fit for my memory limits)**

**Dataset Pipeline**

* **Loaded the LaSOT dataset via Hugging Face.**
* **Filtered to exactly two classes: *airplane* (fixed) and *coin* (chosen replacement).**
* **Final training size: 120 samples total (60 per class).**

**Training Loop + Logging**

* **Trained for 5 epochs total with progress bars.**
* **Logged detailed progress every 50 samples.**
* **Tracked Loss and IoU metrics.**

**Used the required ETA/time logging format:**

* **"Epoch X : Y / total\_samples,**
* **time for last 50 samples : X:XX:XX hours,**
* **time since beginning : X:XX:XX hours,**
* **time left to finish epoch : X:XX:XX hours"**

**Dual logging to console and file (training\_log.txt).**

**Why these choices**

* **Seed = 8 for deterministic results and easy grading.**
* **Patch size = 1 to match assignment requirements.**
* **Small batch and limited epochs make it practical even on low-resource machines, while still showing correct behavior and checkpoint handling.**

**4) Actual Training Logs**

**Below are the real logs captured from my run on a system with NVIDIA GeForce RTX 3060 Laptop GPU (CUDA:0):**

**2025-10-15 16:49:48,985 - INFO - === Assignment 3 SeqTrack Training Started ===**

**2025-10-15 16:49:48,985 - INFO - Seed: 8, Epochs: 5, Patch Size: 1**

**2025-10-15 16:49:49,096 - INFO - Using device: CUDA:0 - NVIDIA GeForce RTX 3060 Laptop GPU**

**2025-10-15 16:49:50,064 - INFO - Initializing training...**

**2025-10-15 16:49:51,889 - INFO - Real SeqTrack model initialized successfully**

**2025-10-15 16:49:52,256 - INFO - Training on 120 samples**

**2025-10-15 16:49:52,256 - INFO - Selected classes: ['airplane', 'coin']**

**Epoch 1 completed - Loss: 1.1203, IoU: 0.4737**

**Epoch 2 completed - Loss: 1.0618, IoU: 0.4737**

**Epoch 3 completed - Loss: 1.0525, IoU: 0.4737**

**Epoch 4 completed - Loss: 1.0497, IoU: 0.4737**

**Epoch 5 completed - Loss: 1.0484, IoU: 0.4737**

**2025-10-15 16:50:58,949 - INFO - Training completed successfully in 0:01:08**

**2025-10-15 16:50:58,949 - INFO - Checkpoints saved in: checkpoints/**

**2025-10-15 16:50:58,949 - INFO - Log file: training\_log.txt**

**Summary of Results**

* **Device Used: CUDA:0 — NVIDIA GeForce RTX 3060 Laptop GPU**
* **Runtime: ~1 minute 8 seconds total**
* **Final Loss: 1.0484**
* **Final IoU: 0.4737**
* **Checkpoints saved for each epoch (1–5)**
* **Log file generated: training\_log.txt**

**5) Checkpoints — Local and Hugging Face**

**Local Saving**

* **Checkpoints were saved at the end of each epoch.**
* **Directory: assignment\_3/checkpoints/**
* **Files created:**
  + **epoch\_1.ckpt**
  + **epoch\_2.ckpt**
  + **epoch\_3.ckpt**
  + **epoch\_4.ckpt**
  + **epoch\_5.ckpt**
* **Each file contains:**
  + **model state**
  + **optimizer state**
  + **epoch number**
  + **loss**
  + **IoU**
  + **seed = 8**
  + **patch\_size = 1**
  + **dataset info**
  + **timestamp**

**Hugging Face Upload**

* **Current status: epoch\_1.ckpt uploaded and visible.**
* **Hugging Face Repository:**[**https://huggingface.co/hossamaladdin/Assignment3/tree/main**](https://huggingface.co/hossamaladdin/Assignment3/tree/main)
* **Remaining checkpoints and logs will follow the same upload process using huggingface\_hub.**

**6) GitHub Repository (Source + Deliverables)**

**Everything needed to reproduce or grade the project is in the GitHub repo — including the integrated SeqTrack code, modified scripts, logs, dataset loader, and checkpoints folder.**

**GitHub Repository:**[**https://github.com/HossamAladin/Assignment\_3.git**](https://github.com/HossamAladin/Assignment_3.git)

**Notable Files/Folders:**

* **SeqTrack/ → integrated base code**
* **seqtrack\_train.py → customized training script**
* **dataset\_loader.py → loads and filters LaSOT classes**
* **requirements.txt → full environment dependencies**
* **training\_log.txt → detailed training log**
* **dataset\_summary.md → dataset info**
* **checkpoints/ → local outputs (epoch 1–5)**

**Team 8  
Image Processing — Level 4  
Assignment 3: SeqTrack Setup, Training, and Checkpoint Management**

**Links:**

* **Hugging Face:** [**https://huggingface.co/hossamaladdin/Assignment3/tree/main**](https://huggingface.co/hossamaladdin/Assignment3/tree/main)
* **GitHub:** [**https://github.com/HossamAladin/Assignment\_3.git**](https://github.com/HossamAladin/Assignment_3.git)

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