

How to increase our efficiency?

Efficiency Improvements:

- Sometimes we need to run the model multiple times to get good predictions due to random starting points or small data variations.
- When running all cells at once, some outputs like graphs don't appear immediately, so we have to rerun certain cells.
- Training could stop earlier once the model is learning well, to save time.
- Save graphs and results automatically so we don't need to rerun cells manually.
- Run predictions for multiple images at once instead of one by one to speed up inference.
- Use the same test samples each time for consistent comparisons.
- Use the GPU more effectively for faster training.
- Organize preprocessing, inference, and result plotting in reusable steps to save time in future runs.

Ways to Improve Predictions:

- We can provide more or varied training images to help the model generalize better.
- We can use data augmentation like rotation, flipping, zoom, brightness changes etc. to create more training examples.
- Fine-tune training settings like batch size, learning rate, or dropout.
- Consider improved U-Net versions like Attention U-Net, U-Net++ or pretrained encoders for better feature extraction.
- Post-process predicted masks as thresholding, smoothing to make them cleaner.

What is Hugging Face?

Hugging Face is a company and an open-source community that builds tools for machine learning and AI models. Their most famous product is the Transformers library, which gives easy access to thousands of pre-trained models for tasks like:

- Natural Language Processing (NLP): Text classification, Translation, Sentiment analysis, Chatbots etc.
- Computer Vision: Image classification, Object detection, Segmentation.
- Speech: Speech-to-text, Text-to-speech.
- Multimodal: Models that work on text + images together.

Why it's useful:

- Instead of training from scratch, someone can use powerful models like BERT, GPT, Stable Diffusion, CLIP, etc.
- Hugging Face hosts a huge collection of models like GitHub for Machine learning models.
- They also host public datasets one can directly use.
- With just a few lines of code, you can do complex tasks using the built in pipelines.