BKAI-IGH NeoPolyp Report

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1. **Transformation techniques**

A) Training Transformations:

- Horizontal Flip: Flips the image horizontally with a 50% probability to help the model generalize better by introducing mirrored versions of images.
- Vertical Flip: Flips the image vertically with a 50% probability, useful for cases where vertical symmetry might occur.
- Random Gamma: Adjusts the gamma value of the image, simulating changes in brightness and contrast with a 20% probability.
- RGB Shift: Shifts the values of the Red, Green, Blue channels by up to ±10 with a 30% probability to introduce slight color variations and account for different lighting conditions or sensor noise.
- Normalization: Ensures consistency across the dataset.
- Converts the image to PyTorch tensor.

B) **Validation Transformations**:

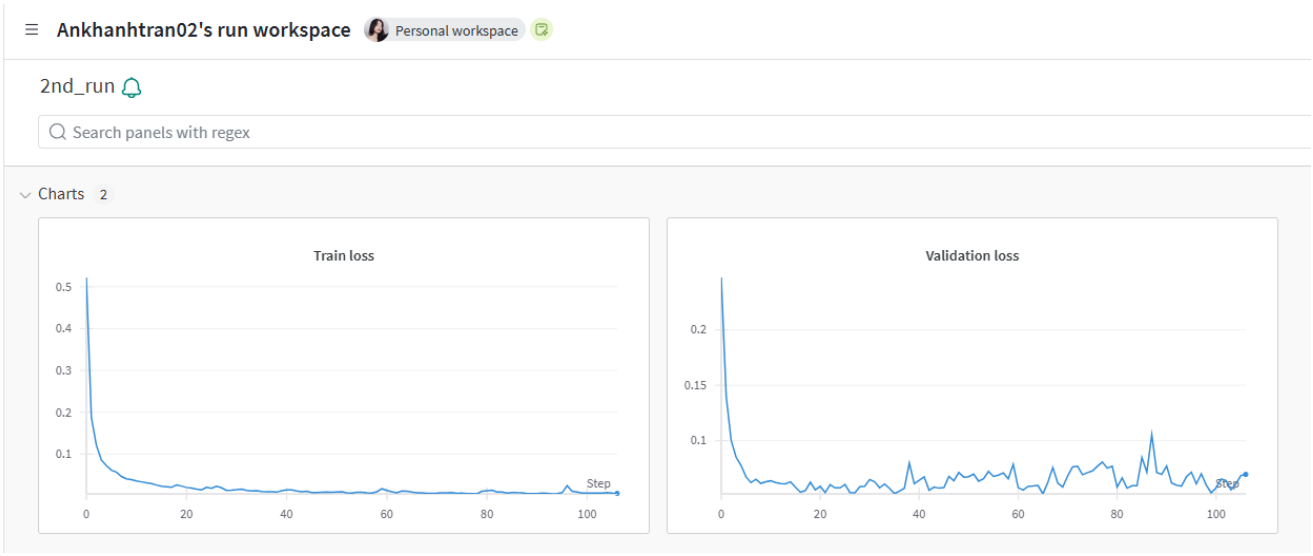
- Normalization
- Converts the image to PyTorch tensor.

2. **Model architecture**

UNet++: A variant of UNet that introduces dense skip connections and nested skip pathways for better feature fusion.

- **Encoder:** ResNet-34, including the following layers:
  - **Conv1:** A 7x7 convolution with stride 2, followed by batch normalization, ReLU, and max pooling.
  - **Residual Blocks**: including 4 layers:
    - Layer 1: 64 channels, stride 1.
    - Layer 2: 128 channels, stride 2 (downsampling occurs).
    - Layer 3: 256 channels, stride 2.
    - Layer 4: 512 channels, stride 2.
- **Decoder:**
  - **Dense Blocks**
  - **Conv2dReLU Layers**: Each block applies:
    - Convolution with kernel size 3x3 and stride 1.
    - Batch normalization.
    - ReLU activation.
  - **Attention mechanism**: Placeholders (Identity())

3. **Plots of losses during training**



4. **Link to GitHub repository:**
   https://github.com/ankhanhtran02/NeoPolyp-Segmentation