**Task 2: Landmark Regression Model Report**

**1. Hypothesis: Transfer Learning for Speed**

My hypothesis was that the visual "brain" (the encoder) trained for segmentation already understood the basic structure of the ultrasound. Therefore, I could use **Transfer Learning** to create a landmark model very quickly.

**2. Implementation: The "Head Swap"**

I did not build a new model from scratch. Instead, I:

1. Took a standard smp.Unet with its pre-trained resnet34 encoder.
2. **Chopped off** the entire "artist" decoder (the part that builds the mask).
3. **Bolted on** a new, simple "analyst" head. This was a 2-layer Linear network that takes the high-level features from the "brain" and distills them into just 4 numbers.
4. The model was trained to predict the 4 horizontal (x-axis) coordinates for the 'cardiac' and 'thorax' extents, using MSELoss.

**3. Result**

The hypothesis was a huge success. The model trained very quickly because the "brain" was already smart. This provided a working landmark model (best\_model\_hypothesis\_1.pth) that was ready for the pipeline