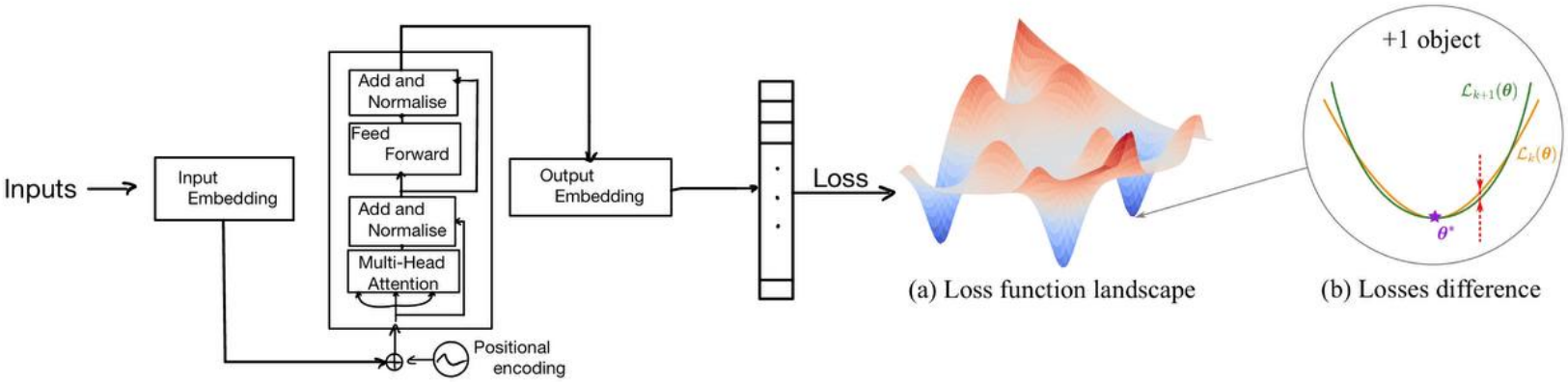
Loss function Landscape Convergence for a Transformer Block



1. In the neighborhood of a local minimum, the loss function can be approximated by a quadratic form
2. When incrementally adding samples to the training set, we observe convergence in the optimization landscape

$$\mathcal{L}_k(\boldsymbol{w}) \approx \mathcal{L}_k(\boldsymbol{w}^*) + \frac{1}{2}(\boldsymbol{w} - \boldsymbol{w}^*)^\top \mathbf{H}^{(k)}(\boldsymbol{w}^*)(\boldsymbol{w} - \boldsymbol{w}^*)$$

The described convergence will provide estimates on the minimum data size for efficient training.