Training Set Reconstruction and Single-Video Generation

Abstract:

Over the past decade, deep learning has made significant strides in the fields of computer vision and machine learning. However, there is still a lack of understanding regarding how these machines store and utilize training samples to generalize to unseen data. In my thesis (guided by Prof. Irani), I investigated how neural networks encode training samples in their parameters and how such samples can sometimes be reconstructed. Additionally, I examined the capabilities of generative models in learning and generalizing from a single video. Specifically, I explored the effectiveness of patch-based methods and diffusion models in generating diverse output samples, and how such models can utilize the motion and dynamics of a single input video to learn and generalize.