Encoder Based Frame Prediction
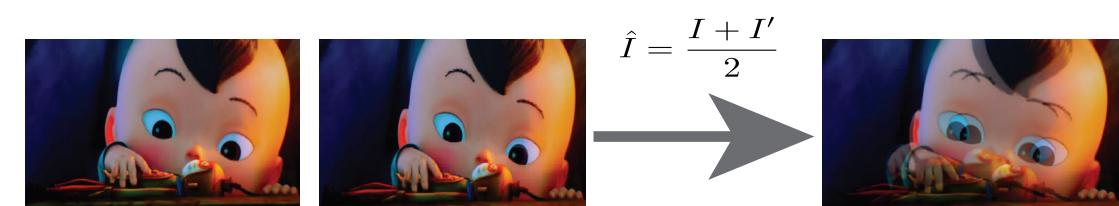
Yue Li   Sijun He   Li Deng

Motivation

- Task: Predict intermediate frames from two given frames

- Application: Video Compression, Video Generation

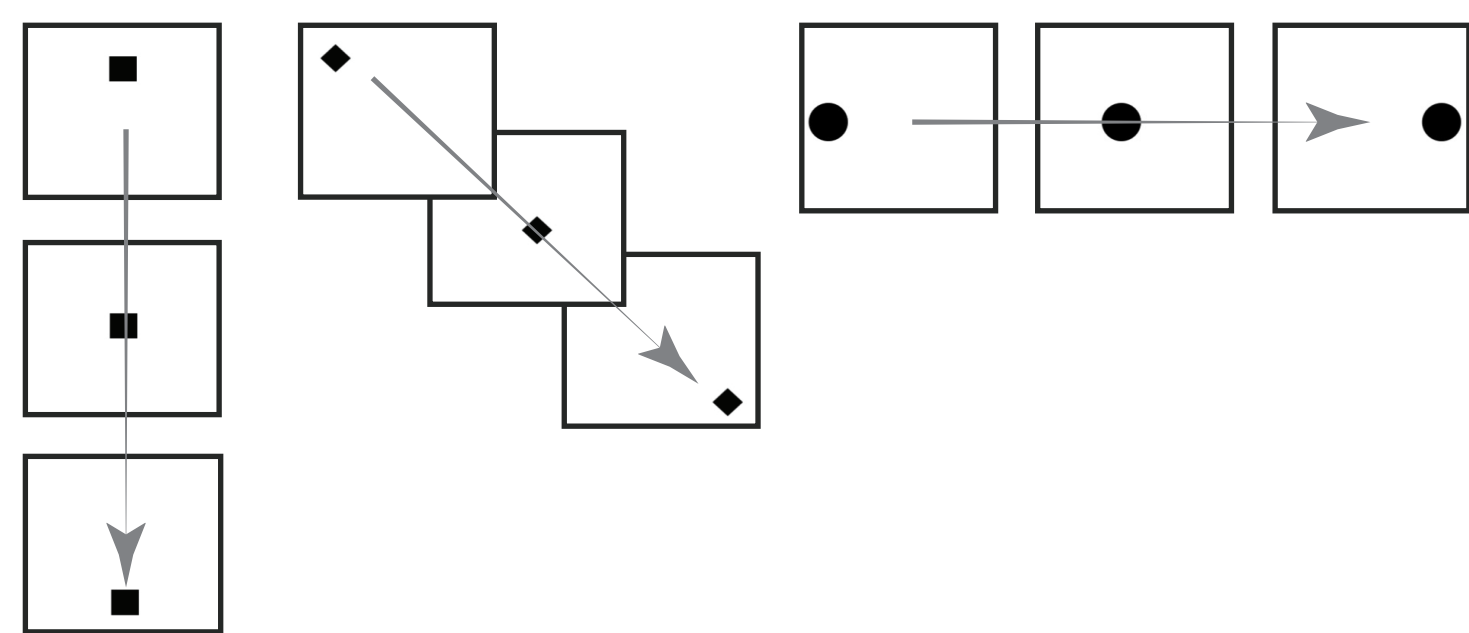- Challenge: "Understand" Motion in images

Baseline

Linear Interpolation: blurry overlay

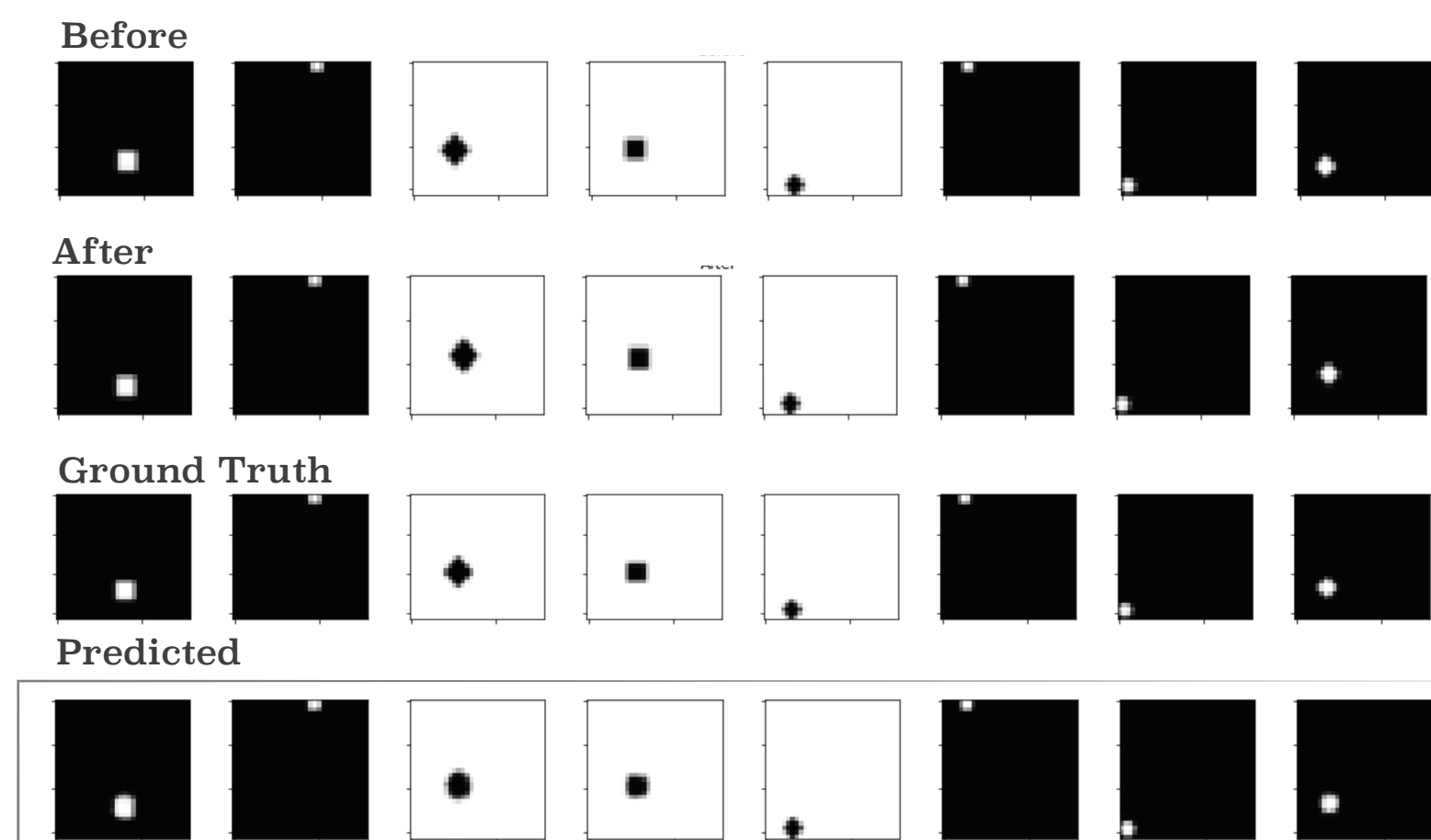

$$\hat{I} = \frac{I + I'}{2}$$

Exploration: Moving Box

- Hand-crafted 3000+ frames of assorted shapes on different paths
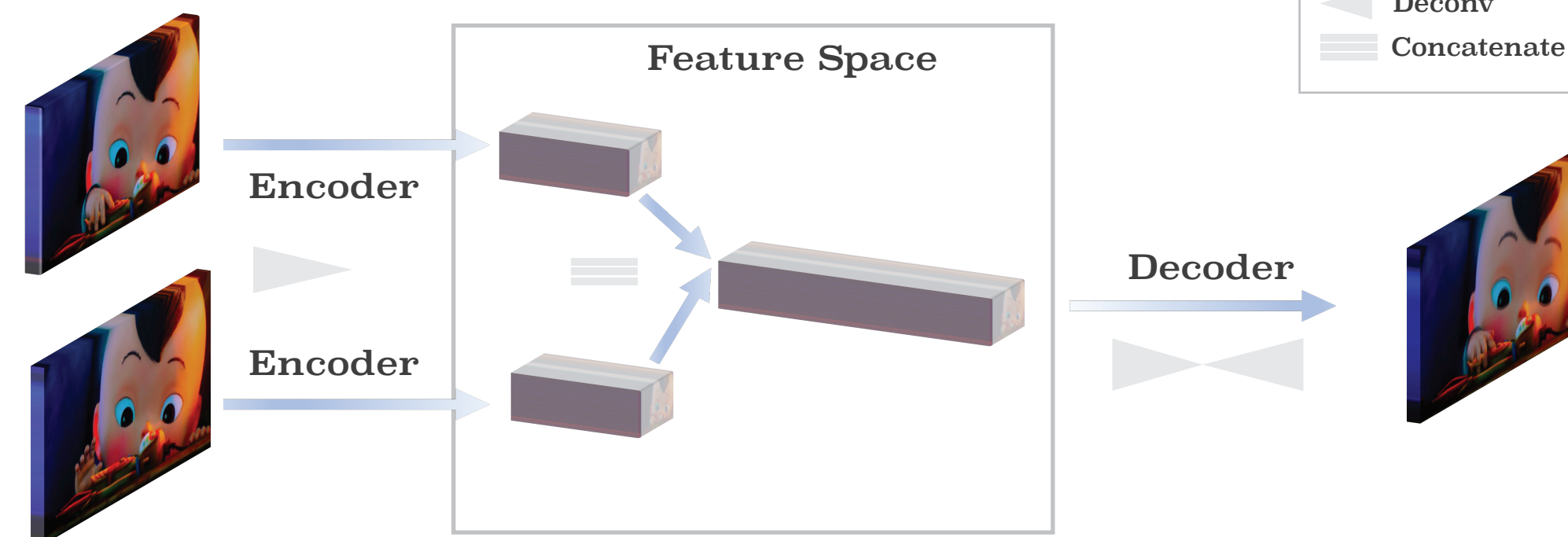- Augmentation: reverse color, reverse motion, add background...
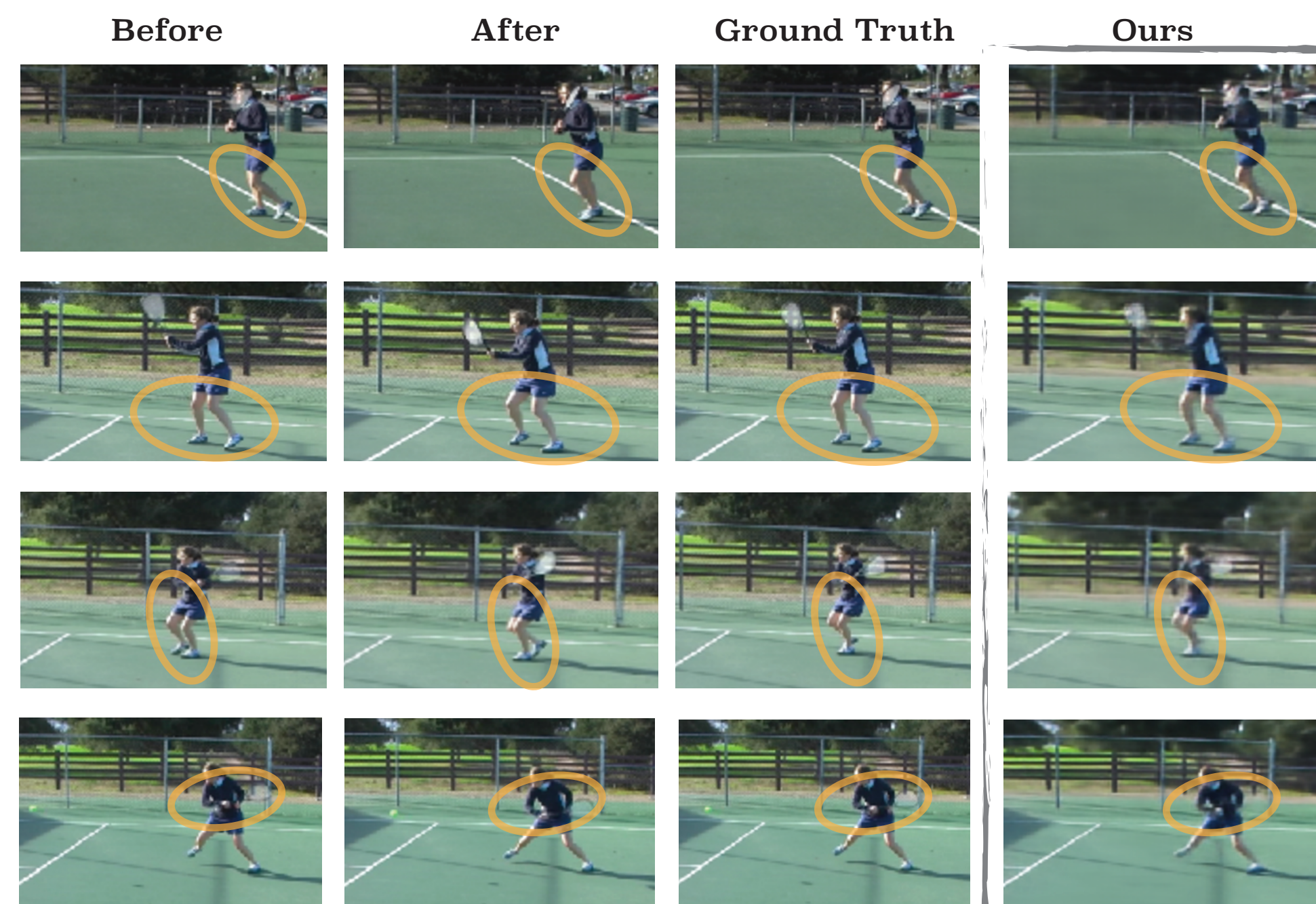

Performance on Test Data

Before

After

Ground Truth

Predicted

Encoder-Decoder for Feature Transormation

Average frames in feature space, and decode back to frame

Conv
Deconv
Concatenate

Feature Space

Encoder

Encoder

Decoder

Performance on Test Data

Before   After   Ground Truth   Ours

Failure Cases

Sequence to Sequence

Encode global information of sequnece

Nonlinear Motion

Input Sequence

Output Sequence (Ground Truth)

Encoder

Decoder

Sequence Information

Combined Seq. Loss
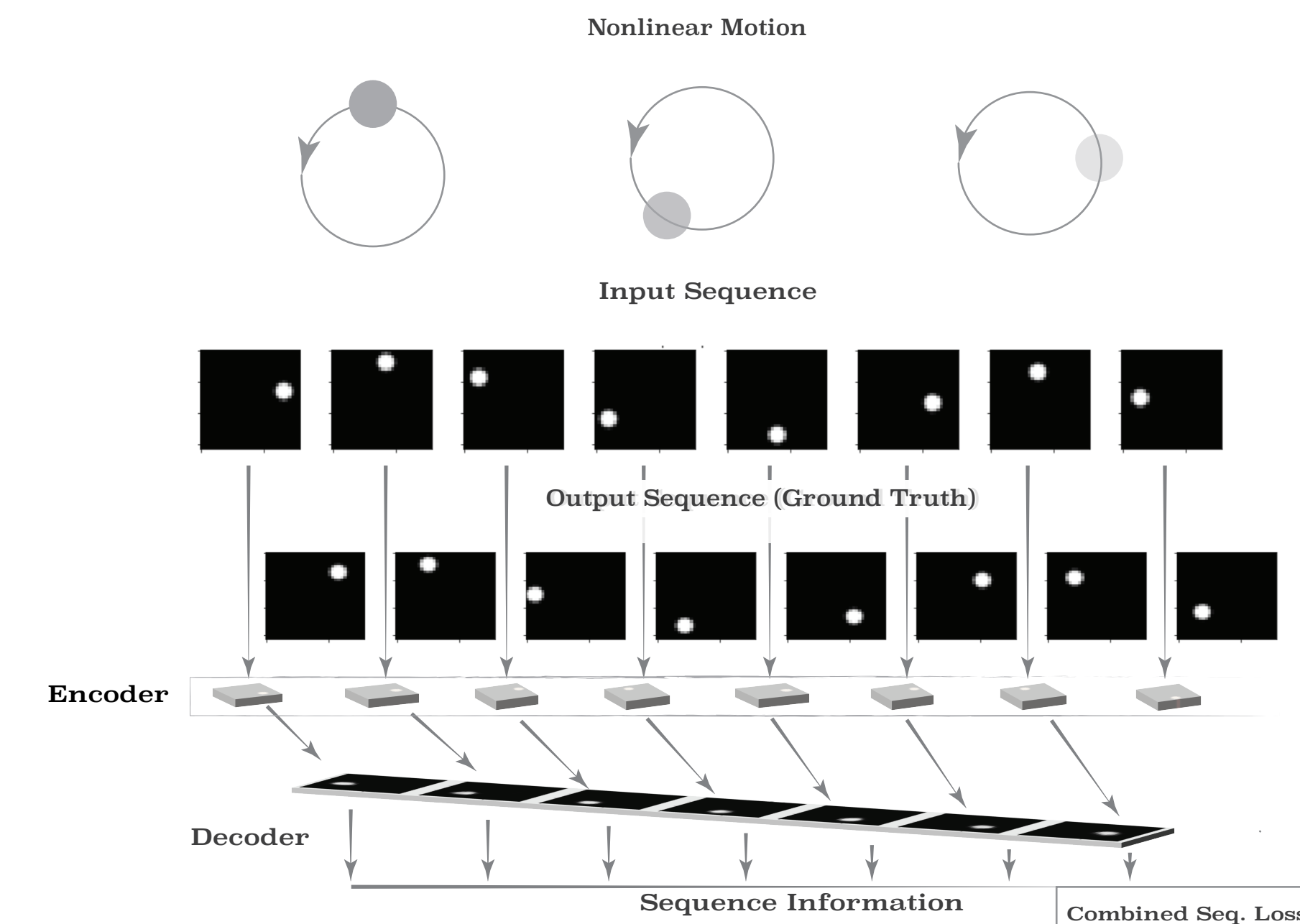
Prediction without Guidance of Next Frame (smaller gap):

Input Sequence

Seq. Before

Next Frames - Ground Truth

Seq. Ground Truth

Next Frames - Generated

Seq. Predicted
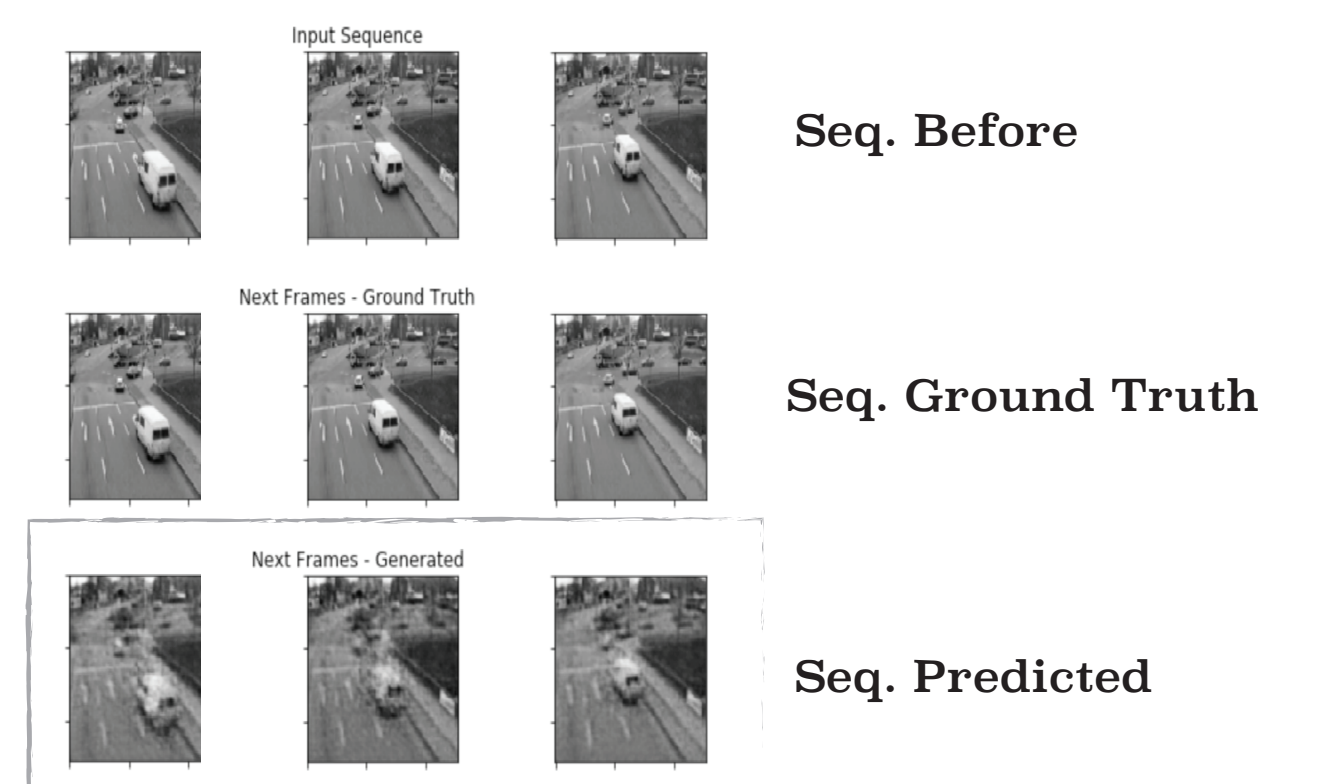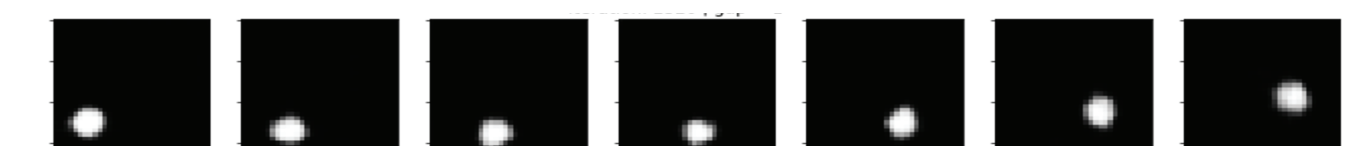
Web Demo

Github Code Repo

https://github.com/dengl11/CS231N-Project