BeNeRF: Neural Radiance Fields from a Single Blurry Image and Event Stream

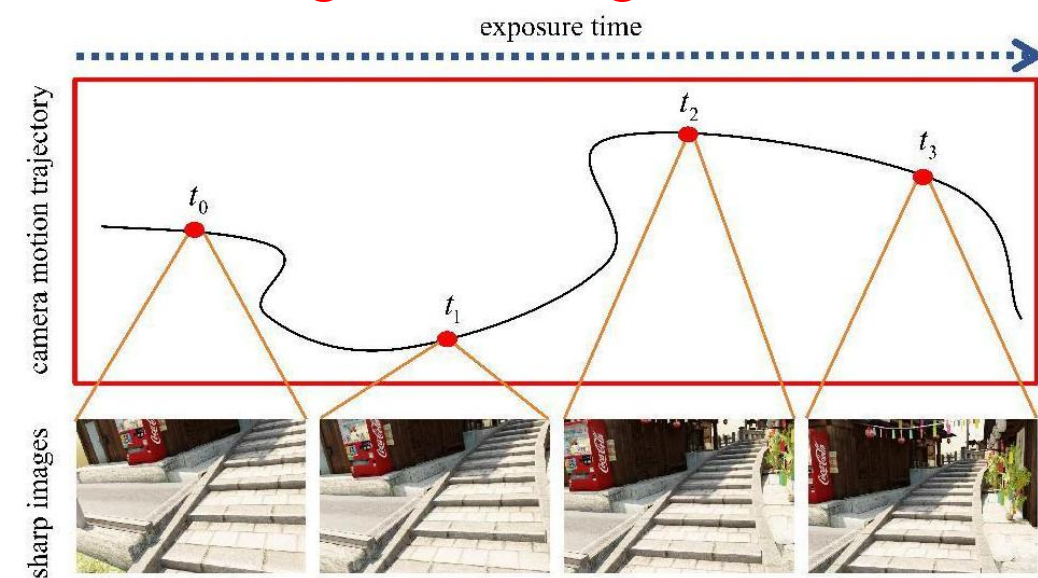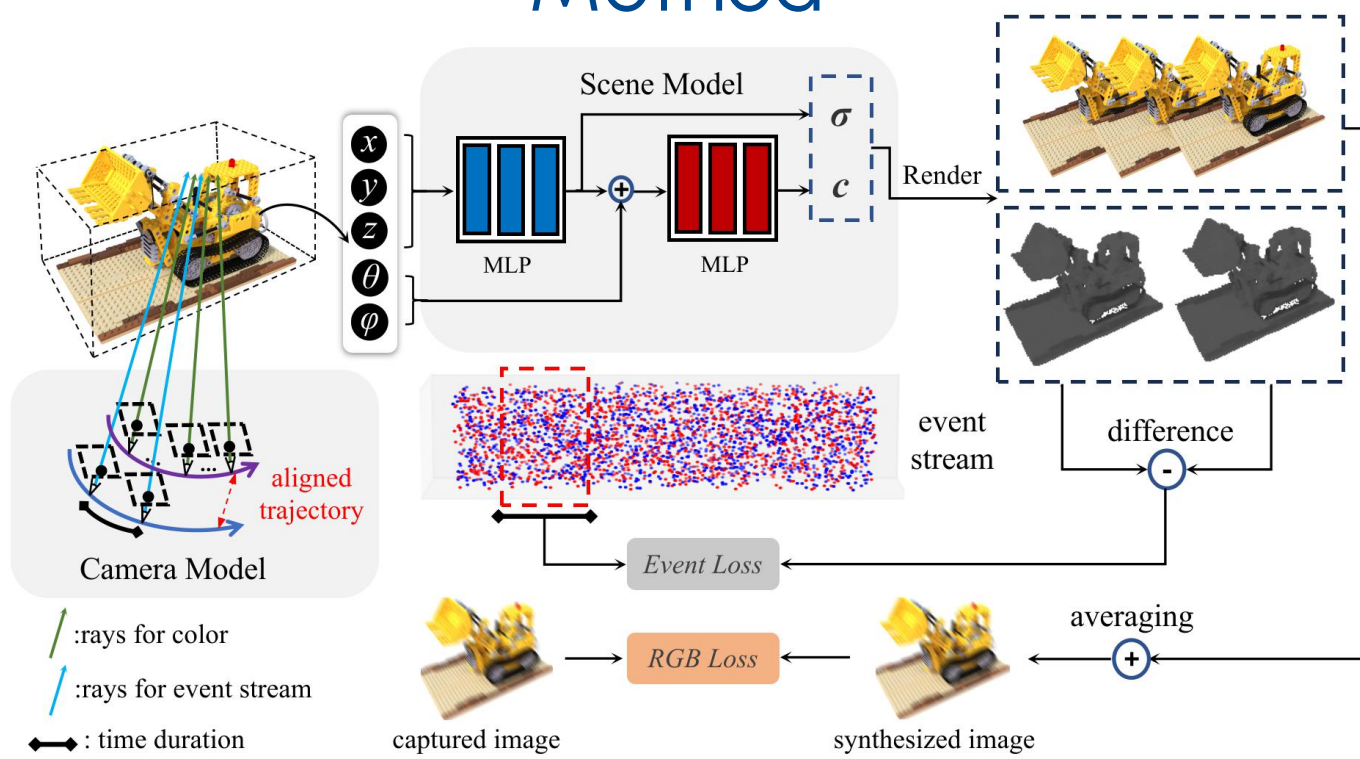Wenpu Li*, Pian Wan*, Peng Wang*, Jinghang Li, Yi Zhou, Peidong Liu†

Motivation

- Neural radiance fields from a single image without pre-trained models as priors.
- Motion blur is prevalent and degrade image quality.
- Motion-blurred images encode geometric information

Method

- Introduce event stream to regularize NeRF withstand motion blur.
- Model the camera motion with a cubic B-Spline in SE(3) space.
- Blurry image and brightness change within exposure time can be synthesized given the 6-DoF poses interpolated from the Spline.
- Jointly learn NeRF and camera motion by minimizing the loss.

Comparison

We explore the possibility of recovering the **neural radiance fields** and **camera motion trajectory** from a **single** blurry image!!

Make blurry image alive!!!
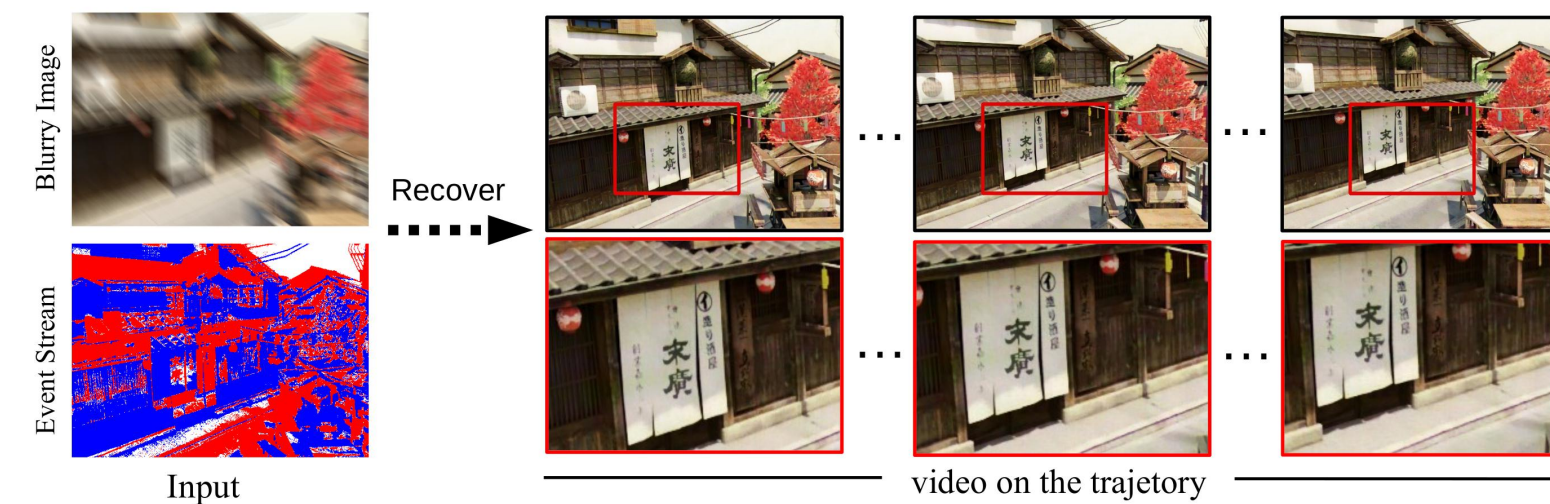
Contribution

- Jointly recover NeRF and camera motion from **a single blurry image** and event stream without any priors.
- Render sharp images from learned NeRF without generalization issue.
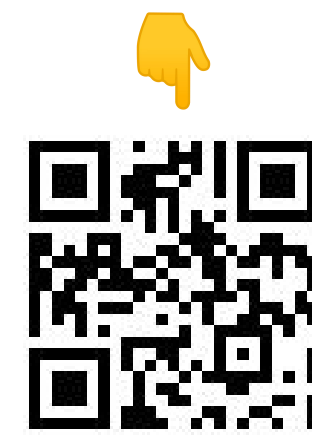- Surpass previous methods utilize multi-view inputs or pre-trained model.

Code   Let's make blurry images alive!   Paper