





OVERVIEW

- We propose a new method for generating animation (Video Frame Interpolation) between two conceptually far apart frames by modelling *continues* Warping with Neural Ordinary Differential Equations.
- Since the core of our method is warping, compared to existing approaches based on deep generative networks, our method does not suffer from hallucinations (i.e. falsely producing non-existent visual elements).
- Compared to discrete warping, the nature of our method allows to generate interpolated frames at arbitrary temporal resolutions (infinitely small time steps between frames). This makes a smooth interpolation between frames.
- Experimentally, we show that our method works when paired sequential frames are available (use of ℓ_2 loss) and when we do not have access to paired images of the animation (GAN loss).

MOTIVATION

- The task of Video Frame Interpolation is to synthesize the unavailable intermediate states in-between two or more consecutive video frames that together form a coherent sequence.
- ♦ A challenging setting in VFI is to create a short animation based on two frames that could principle be conceptually farther apart.



- \diamond This makes it harder to interpolate compare to a typical 'increase FPS' task with very similar nearby trames.
- ♦ Is there a way to interpolate frames at any infinitely small time steps? Yes!

Image2Gif: Generating Continuous Realistic Animations with Warping NODEs

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METHODS AND MAIN RESULTS

Input: first and last frames (model is aware only of these two)









Output animation: generated frames between input frames





EXPERIMENTAL RESULTS

♦ PoC: transformation from 3 to 4 using GAN loss, *i.e.* paired images are unavailable:



Paired images of non-smiling and smiling faces (fist and last frames) are available, *i.e.* ℓ_2 loss:



Unpaired sets of non-smiling and smiling faces (fist and last frames) are available, *i.e.* GAN loss:

