Image Interpolation For Improved Video Rendering

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Introduction

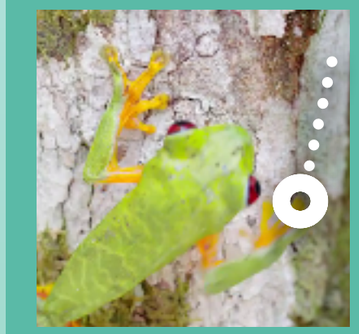
- Motion compensation or motion interpolation are forms of video processing in which intermediate animation frames are generated between existing ones by means of interpolation, in an attempt to make animation more fluid, to compensate for display motion blur, and for fake slow motion effects *(Wikipedia)*.
- It is used in a wide spectrum of domains, including:
  - Animation
  - Video/film editing
  - Virtual reality
  - Video compression
- It can be done algorithmically, or using artificial intelligence. Here, two algorithm approaches will be presented.

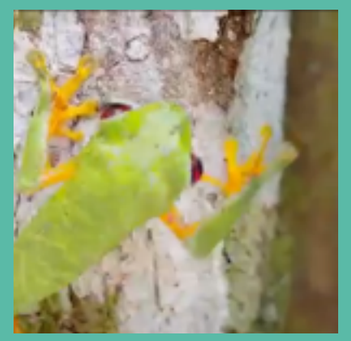
Intuitive approach

- The purpose of the intuitive method is to take images 2 by 2 and mix them in order to obtain an interpolated frame. To generate this image, one pixel out of two comes from the first image, while the second pixel comes from the second image.
- This algorithm allows us to fluidify the video by doubling its number of images.

Image 1 | Interpolated image | Image 2

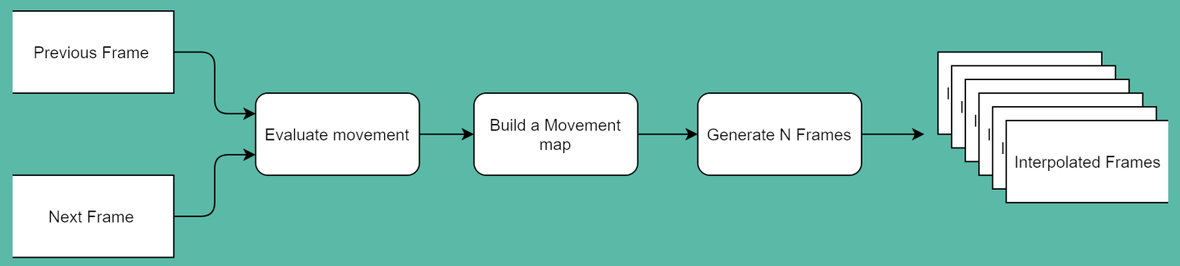
Motion Compensated Frame Interpolation





- MCFI is a form of interpolation that tracks movement between two frames and generates new images from this data. This kind of interpolation is mainly used to raise the FPSs of footage to match for example, the frame rate of a screen.
- Smarter algorithms generate intermediate frames not only by understanding quantities of movement, but also the shape of objects, depth and many more concepts.

A Generic MCFI Algorithm



Results of our experiments: https://drive.google.com/drive/folders/1agJQJGx7JM-aaJ1Y44cJq8AKyfnPb-NR

Depth-Aware Video Frame Interpolation (DAIN) (CVPR 2019)

Motion-Compensated Frame Interpolation Using Patch-Based Sparseland Model (2017)

Video: COSTA RICA IN 4K 60fps (ULTRA HD)