Data-driven Hallucination (Project 9)

Team Image Processors
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Github Link - https://github.com/Digital-Image-Processing-IIITH/project-image-processors

Problem statement

Given a single image as input, we want to automatically create a plausible-looking photo that appears as though it was taken at a different time of the day. This should be done using a fixed database of time lapse videos, of which the input image may not be a part of. Also we want to make the image look realistic, while preserving the colour schema.

Goals

1. Given a single image as input, our main goal is to time hallucinate the photo, as if it was taken at some other time of the day.

2. Output image should look realistic, without dramatically altering the color appearance of the picture.

3. Deal with the large variability of appearance changes.

4. Preserve features in the input images in output images, (such as edges).

Database [LINK]

Our database contains around 450 time-lapse videos, which covers a wide range of videos with different backgrounds and foregrounds, such as different landscapes and cityscapes, including city skyline, lake, and mountain view. This database is given a priori and independent of the user input, in particular, it does not need to contain a video of the same location as the input image.

Milestones

I. **18/10/20 - 22/10/20 : Reading and understanding the paper**

We will read and understand the whole paper,this will include understanding of the overall algorithm,analysing it and thinking of the implementation.We will have team discussions to make sure everyone understands the problem statement.

II. **23/10/20 - 27/10/20 : Global Matching**

This is the first step of our algorithm in which we have to identify all the videos consisting of scenes similar to the given input image.

III. **28/10/20 - 31/10/20 : Frame Selection**

For each selected video, we seek to retrieve a matched frame (M) that matches the time of day of the input image.

IV. **1/11/20 - 5/11/20 : Local Matching**

We seek to pair each pixel in the input image I with a pixel in the match frame M.

V. **6/11/20 - 11/11/20 : Locally Affine color transfer**
- We want it to explain the color variations observed in the timelapse video.
- We want a result that has the same structure as the input and that exhibits the same color change as seen in the time-lapse video.

VI. **12/11/20 - 18/11/20 : Denoising image**

The affine mapping has a side effect that it may magnify the noise existing at the input image, such as sensor noise or quantization. We need to remove those.

Results

Given an input image and time of the day, output images with hallucinations will be generated.
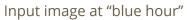

Input image at "blue hour"

Hallucinations at night

Input image at "blue hour"

Hallucinations at golden hour