Video Stabilization

Group15

Description

1. Cut video frames into smaller blocks. By dividing the frames into smaller units, the video stabilization algorithm can analyze and track the movements of individual blocks more accurately.
2. We use the brute force search method to determine the block movements. Specifically, we compare the movements of blocks between consecutive frames, searching for the best alignment to minimize MAE.
3. Smoothing the video frame movements is another critical feature we explore.
4. We track the motion vectors for several frames and adopt a smoothen filter for them to get smoothened motion vectors for each block.
5. We then infer where each block should be based on smoothened motion vectors and recombine them, using the original frames to fill in the gaps if necessary.
6. Output the smoothened video, with motion vectors if needed.

Functionalities

The following functionalities/features will be added to the video stabilization lab:

- A button to upload raw video.
- A selection box to choose the number of small blocks video frames will be cut into.
- A selection box to choose the smoothen filter (window size for moving average) for frame movements.
- A button to turn the motion vectors display on or off.
- A selection box to decide whether the pixels from the previous frame are copied to empty pixels in the current frame.
- A button to generate stabilized video.