Datamoshing with Optical Flow

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Figure 1: We propose an algorithm to perform data moshing using optical flow. Our algorithm is general and has various applications. Using multiple video sequences, we can create perplexing video transitions where the visual information of one video is distorted or constructed using the motion of another (bottom row). Using a single video clip, we can create seamless looping GIFs with interesting glitch art effects. (top row)

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An important aspect of video editing is transitions between two consecutive scenes. Most video transitions are simplistic such as jump cuts or fade-ins. With the current rise of short-form video content on social platforms, more creative forms of transitions are an important aspect of creating more engaging content. In this work, we explore the use of optical flow to study a unique form of transition between two distinct scenes inspired by the decades-old technique of using MPEG compression data called *data moshing*.

Glitch art is the practice of corrupting digital media in order to create aesthetically pleasing effects. One specific form of glitch art called data moshing involves carefully altering the encoded data of MPEG videos such that motion information is applied to the incorrect visual data. This creates perplexing transitions between distinct shots, where the visual data of one scene appears to follow the motion of the next. This effect has existed for well over a decade and has gained interest for its use in popular media. Despite its popularity, data moshing has been predominantly carried out by altering compressed video data, which is inflexible and requires specialized software and expertise.

In this work, we propose a simple method for emulating the effect of data moshing, without relying on the corruption of encoded video, and explore its use in different application scenarios. Like traditional data moshing, we apply motion information to mismatched visual data. Our approach uses off-the-shelf optical flow estimation to generate motion vectors for each pixel. Our core algorithm can be implemented in a handful of lines but unlocks multiple video editing effects. The use of accurate optical flow rather than compression data also creates a more natural transition without block artifacts. We hope our method provides artists and content creators with more creative freedom over the process of data moshing.

1 APPROACH

We formulate our approach as an operation performed on two distinct video clips. For simplicity, we first describe a single step of our data moshing process. The input to our algorithm is an image c, and a video clip V consisting of multiple frames:

$$V = \{v_1, v_2, \ldots v_t\} \tag{1}$$

The output is a data-moshed version of c using the motion of V. We first compute optical flow for V in order to define the perceived motion between each frame. We denote this as an operation between two frames called $flow$. We use the optical flow from V to displace the pixel values in c using a remapping operator we denote as $remap$:

$$r_1 = remap(c, flow(v_1, v_2)) \tag{2}$$

The remapped image r_1 may have holes where new image content entered the frame between v_1 and v_2. To determine these regions

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