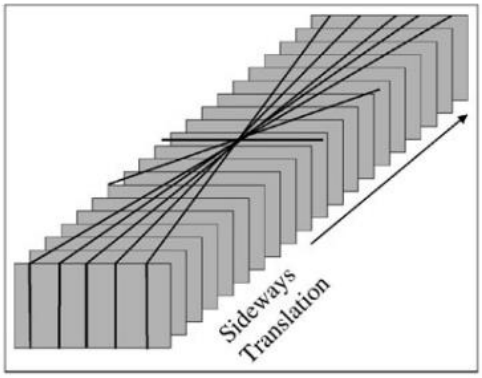
1. **Introduction**: This PDF is a continuation of the main exercise where we produced *sideways* stereo views, this bonus generates a **forward** motion illusion (dolly zoom effect) from the same input video. To refresh our memory, we adaptively sliced frames from input video to stitch a viewpoint panorama, we used Barcode blending of even/odd panoramas to mitigate blinking of fine and fast flowing objects. To create an illusion of zooming in, we implemented the XSlit method.
2. **XSlit Method**: We implemented the X-slits projection model proposed by Peleg et al. (2003). Unlike standard perspective projection, which assumes a single optical center, the X-slits model defines projection rays passing through two non-intersecting lines: a horizontal slit corresponding to the camera's motion path and a virtual vertical slit. Such a configuration cannot be captured by a conventional camera but can be synthesized computationally. To generate X-slit views from our sideways-panning video, we use non-stationary mosaicing. Instead of stitching fixed vertical strips, we sample image columns whose temporal position shifts linearly across the frame, effectively slicing the space–time volume diagonally. The sampling function $t(x) = \alpha x + \beta$ controls the induced parallax, allowing us to synthesize the appearance of forward or backward motion from a camera that physically moved only sideways.



Schematic description of slices in space-time

3. **Implementation**:

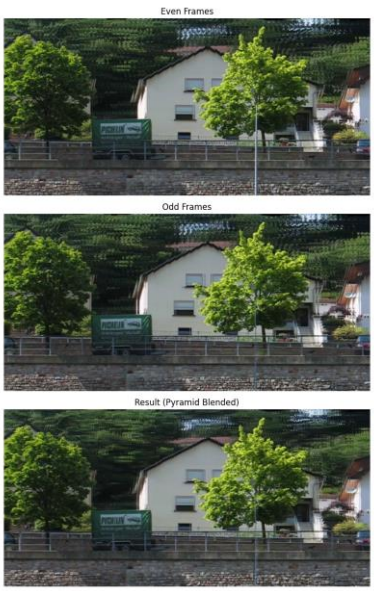
   Slicing and stitching became a familiar task in the main exercise, however there were two main obstacles we had to overcome to achieve good results:

3.1. **Aspect ratio**: In "Mosaicing Impossible Stereo Views" (Peleg et al), authors note: "The most apparent aspect of the distortion … is the variation of aspect-ratio". While they propose scaling vertically by 1 + (focal length)/(depth of main object), we do not have the real-world depth data, nor did we implement relative depth estimation, thus for each individual video we handpicked the vertical stretch on which we interpolate, additionally enhancing it with overall scaling to add to the effect.

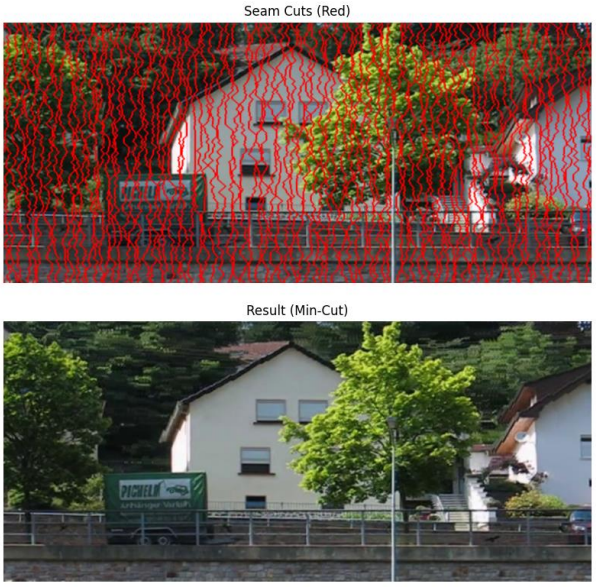
3.2. **Blinking**: While in the main exercise Barcode Blending helped mitigate this artifact, in XSlit the effect is exacerbated by the slopes and stretching we do. We resorted to using min-cut stitching on overlaps of classical strips twice the regular length to keep fine objects intact, while computationally more expensive we will present the results of both methods and let the reader be the judge of cost-effectiveness.

4. **Visualizations**:

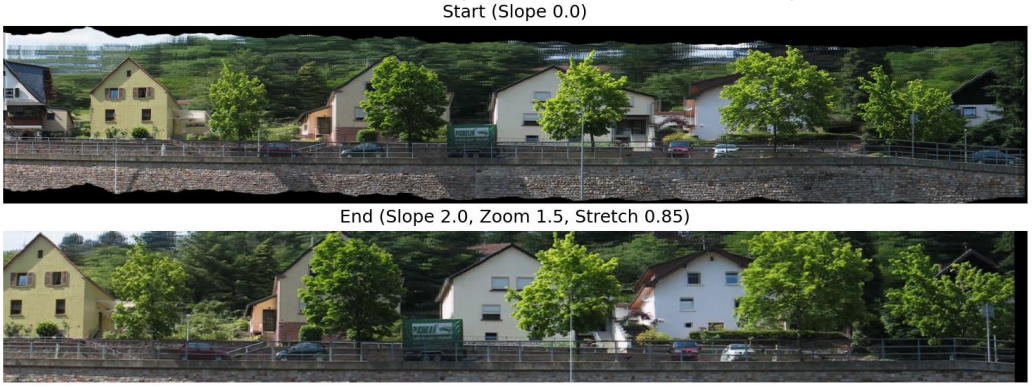
1. Result of Barcode Blending (Blinking)



2. Min-Cut seams and stitching result



3. First and last view of video generated with Barcode Blending



4. First and last view of video generated with Min-Cut

Note: In motion the tradeoff between the methods is clearer, Barcode is characterized by constant blinking of poles while min-cut has sharper, yet "blockier", as well as 5x difference in computational time.

5. **Future work**: A couple areas of experimentation I sadly couldn't showcase by the deadline include relative depth estimation to fight background parallax, min-cut methods beyond 2D that may provide wider views of background between the houses and combining depth estimation with current method for Z-layer segmentation.