There are a number of ways we could improve our video stabilization system. There are 3 main camera movements:

- Translational
- Rotational
- Scaling

We have successfully stabilized translational motion. With future work, we can stabilize rotational and scaling motion.

There are 4 situations:

- Still scenes
- Object movement in frame
- Zooming
- Panning

We have successfully stabilized still scenes. With future work, we can allow object movement in frame, zooming and panning.

**HARDWARE**

- Bullet Telpix Bu 1004DN camera
- Altera DE2-70 FPGA board
- VGA monitor for display

**DESIGN RATIONALE**

**Why Edge Detection?**

Changing the threshold changes the number of edges used in motion detection. Increasing the number of edges leads to more accurate motion detection, but also increases the noise. Therefore, there is a tradeoff between the number of edges and amount of noise.

**How Do We Compare Frames?**

Perform an XOR operation using the 1s and 0s of the edge detected images and count the number of 1s. The 1s represent mismatches, and the comparison with the least 1s tells us the motion.

**FUTURE WORK**

There are a number of ways we could improve our video stabilization system.

There are 3 main camera movements:

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**IMPLEMENTATION**

**Motion detection**

Edge Detection: Find abrupt changes in consecutive pixel color values

Assign edges in frame based on thresholding these changes

Frame comparison: Move current frame in search range and compare to previous frame

Movement with the most matches of edges decides the motion needed to correct

**Motion correction**

Frame Shift: Shift frame to the location chosen by frame comparison

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