

# A Point Feature Matching-based Approach To Real-Time Camera Video Stabilization

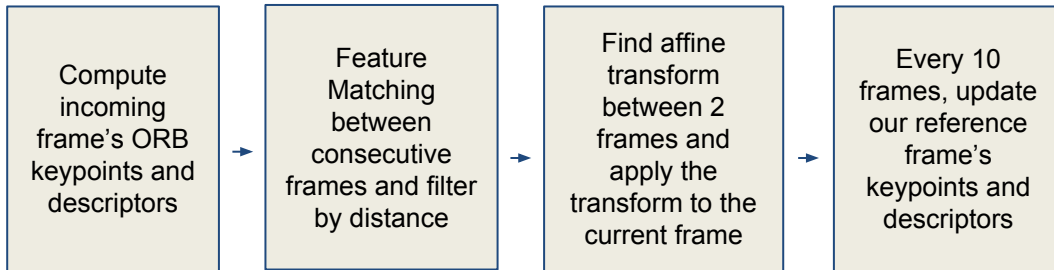
Juan Camacho, Alvin Kim

Department of Electrical Engineering, Stanford University

## Motivation

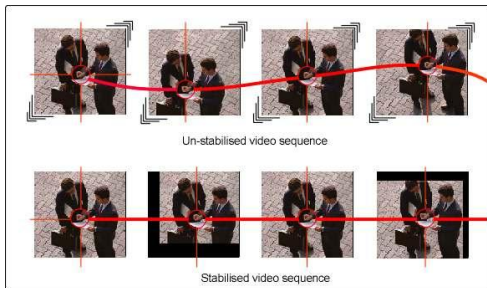
- Video recordings with hand-held devices can be negatively impacted by unstable movement and/or shakiness. The final result may appear jittery and general uneven as a result [1].
- In order to combat this issue, one can implement **video stabilization** techniques by repositioning and rotating each frame so that the final result appears stable.
- For power-constrained devices, efficiency is extremely important. The question is finding the balance of that efficiency while still receiving accurate results.

## Overview of Video Stabilization Method



## Related Work

- Our technique has been most inspired by Kulkarni et al. [2].
- We adapt this approach to a real-time setting so that we do not have to save and load video files for processing.



An example of video stabilization [4]

## Implementation Results



- Our initial prototype suffered from jittery and laggy output due to our technique being too computationally expensive.
- Therefore, we pivoted from a homograph transform to an affine transform, and delayed updating reference descriptors till every other 10th frame.

## References

- [1] Farid, Hany and Jeffrey B. Woodward. "Video Stabilization and Enhancement." Department of Computer Science, Dartmouth University.
- [2] Shamsundar Kulkarni et al. "Video Stabilization Using Feature Point Matching." 2017 J. Phys.: Conf. Ser. 787 012017
- [3] J. Dong and H. Liu, "Video Stabilization for Strict Real-Time Applications," in IEEE Transactions on Circuits and Systems for Video Technology, vol. 27, no. 4, pp. 716-724, April 2017.
- [4] "StableEyes real-time image stabilisation for high-zoom surveillance cameras"