

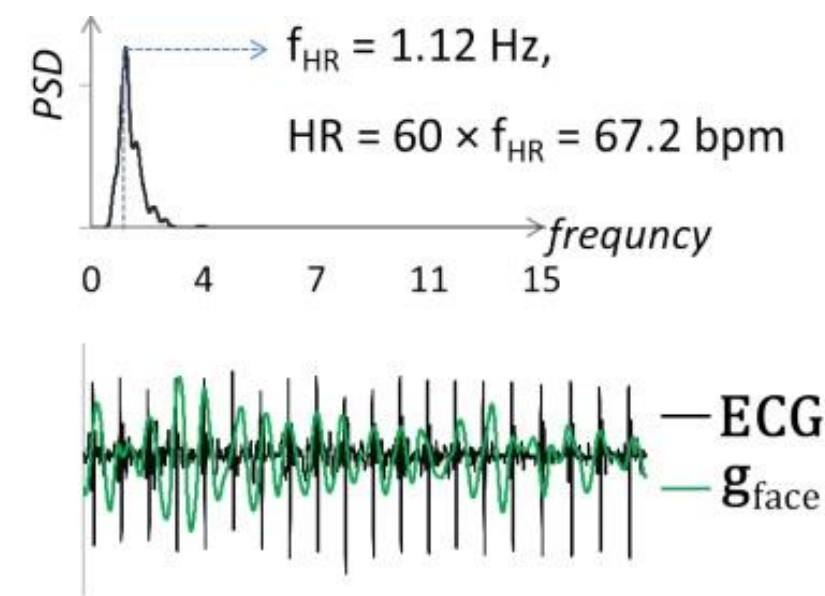
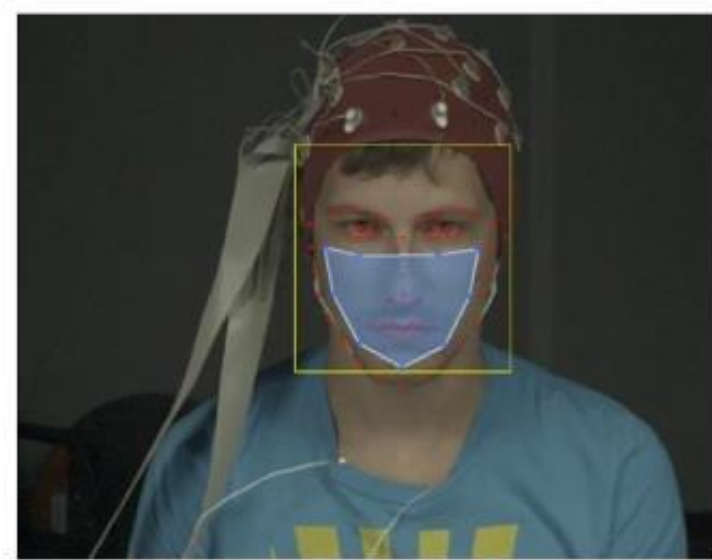
# Amplification of Heart Rate in Multi-Subject Videos

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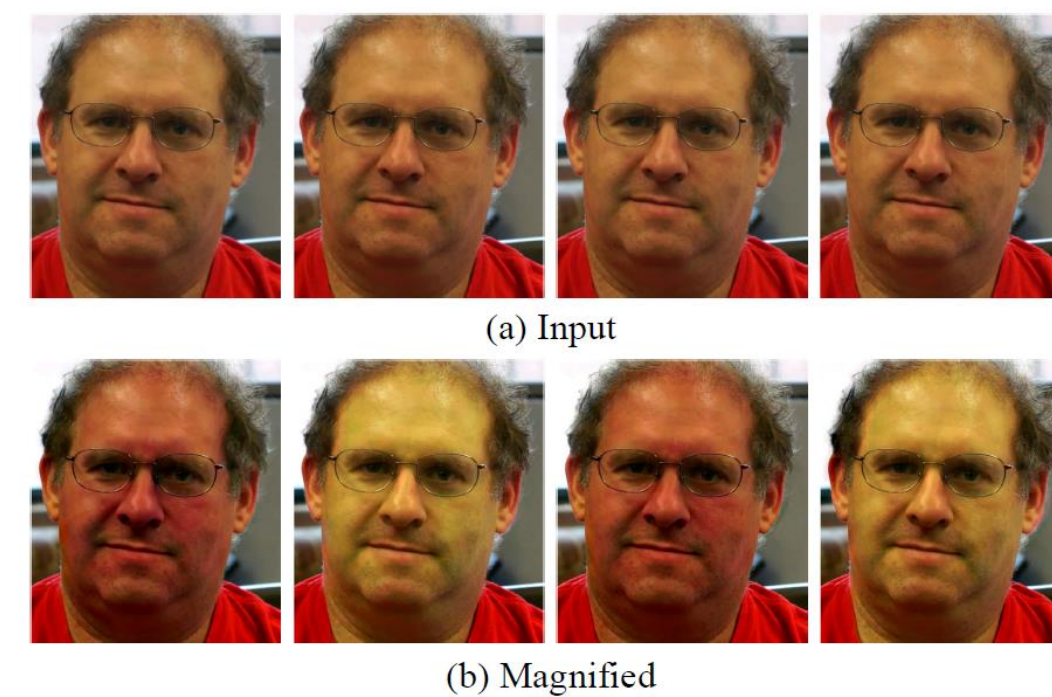
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## Previous Work and Motivation

Remote Heart Rate Measurement [1]



MIT Eulerian Video Magnification [2]



Use techniques explicitly aimed at pulse measurement and amplify specific frequencies for visualization. Potential applications include:

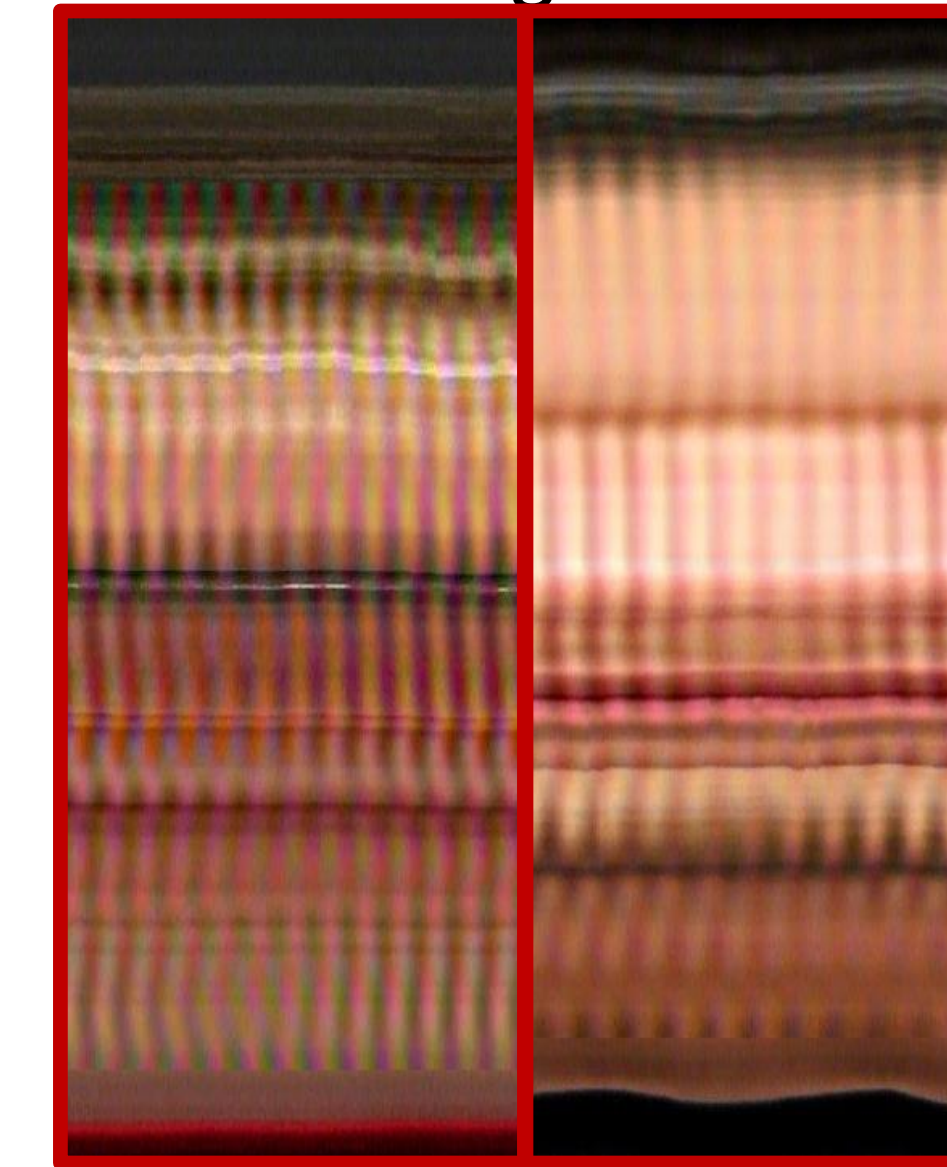
- Identifying patients for urgent care in ER waiting rooms [3]
- Calling a bluff in a poker match
- Enabling robots to sense fear

## Experimental Results

Before video magnification



After video magnification



## References

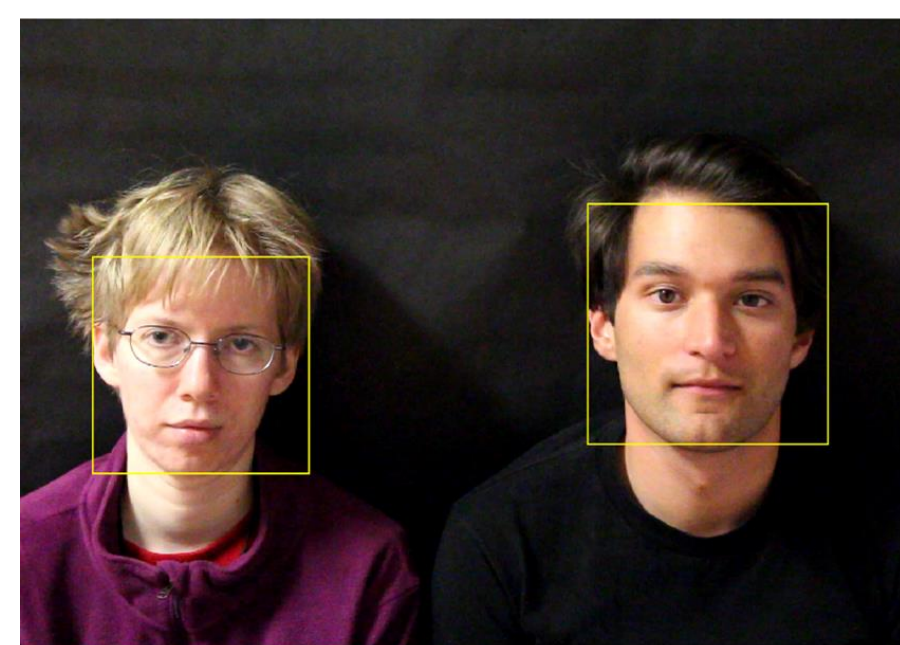
[1] Li, Xiaobai, et al. "Remote Heart Rate Measurement from Face Videos under Realistic Situations." *Computer Vision and Pattern Recognition (CVPR), 2014 IEEE Conference on.* IEEE, 2014.

[2] Wu, Hao-Yu, et al. "Eulerian video magnification for revealing subtle changes in the world." *ACM Trans. Graph.* 31.4 (2012): 65.

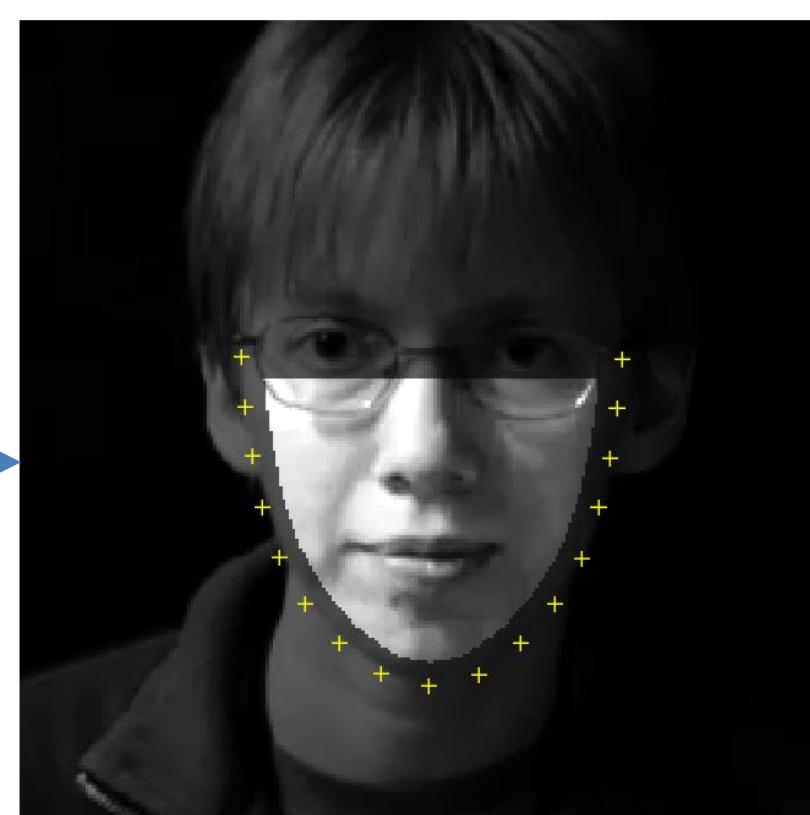
[3] Subbe, C. P., et al. "Validation of a modified Early Warning Score in medical admissions." *QJM: An International Journal of Medicine* 94.10 (2001): 521-526.

## New Combination of Videos

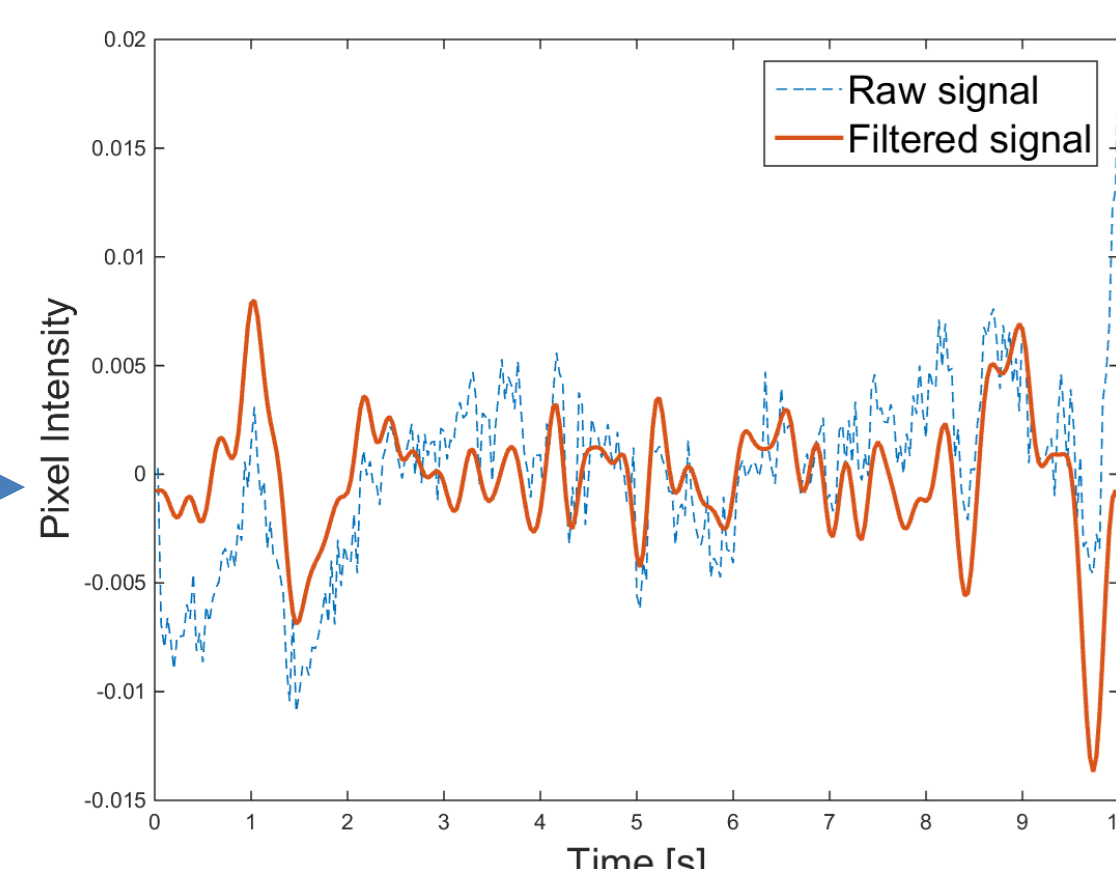
For each face



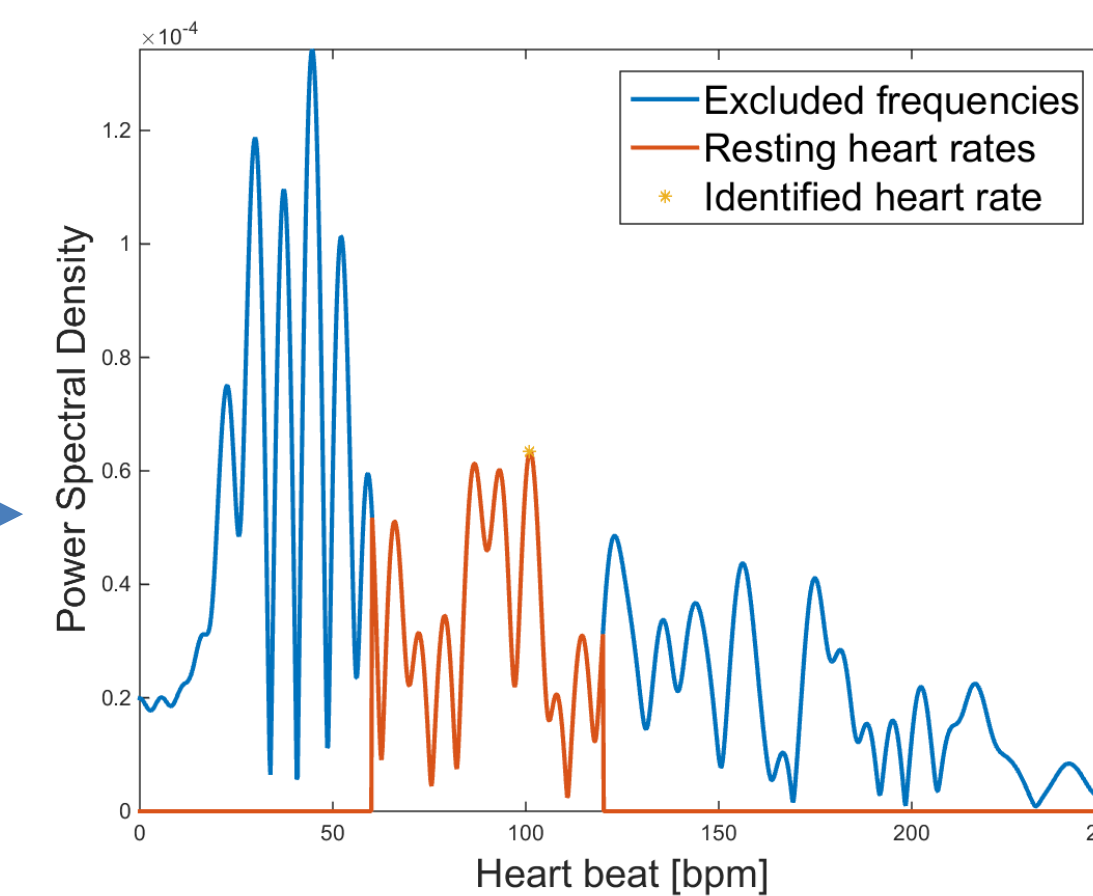
Get raw image and extract faces



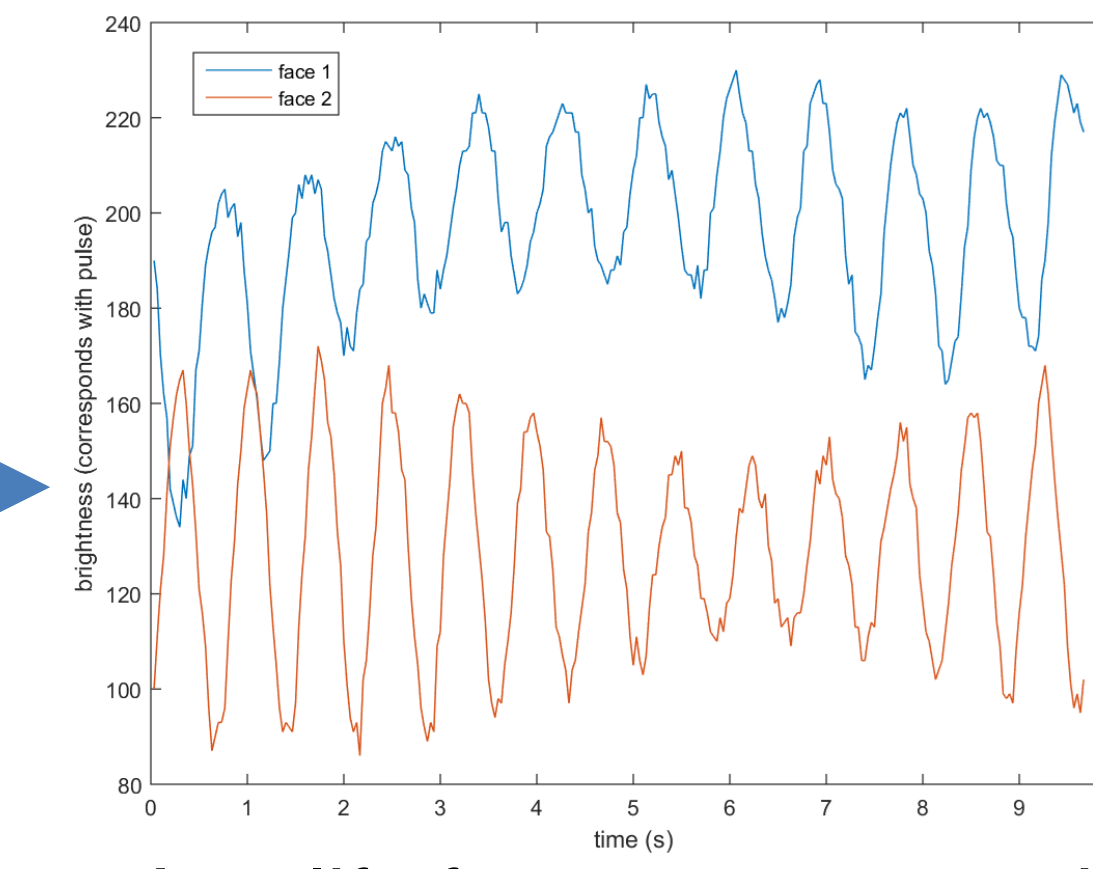
Extract keypoints. Get face and background average colors



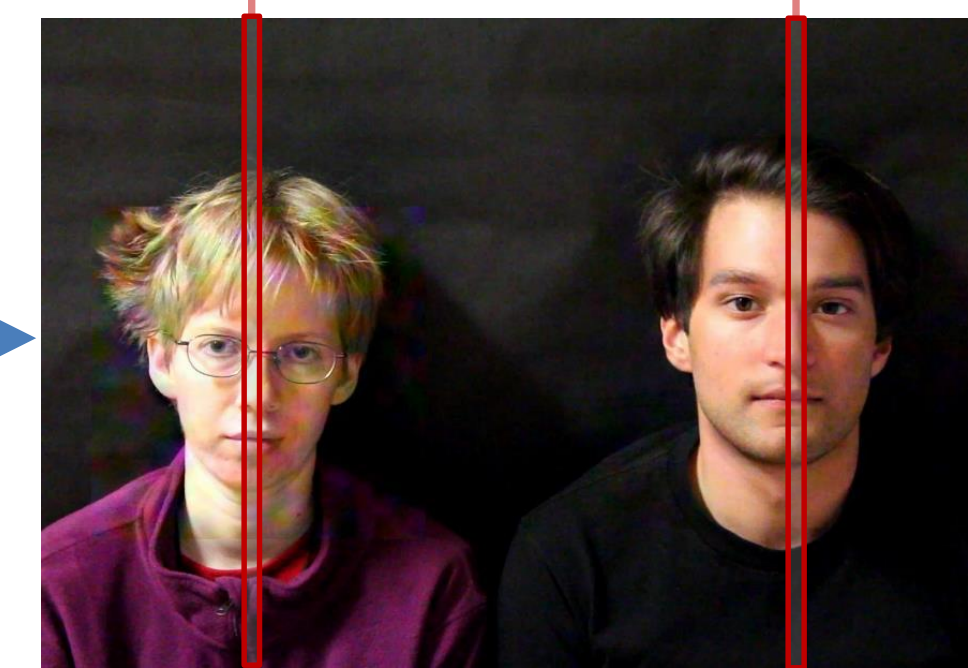
Get raw heart rate signal. Filter to remove noise



Extract correct heart rate from plausible levels.



Amplify frequency range in that video region.



Combine videos. (boxes shown above)