



# Smartphone-based Health Sensing

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#### Agenda

We will be trying to reproduce the work from CVPR 2020 by Oxford University

"Seeing Red: PPG Biometrics Using Smartphone Cameras"

Slides are heavily inspired from Oxfords slides which is available <u>here</u>.

## Photoplethysmography

Photoplethysmography (PPG) is an optical technique used to detect volumetric changes in blood in peripheral circulation



## Photoplethysmography - Reflection

PPG can be collected with a camera by leveraging changes in skin reflective properties

Advantages:

- Resilient to observation
- No additional hardware

Challenges:

• Noisy signal



#### Can we use Smartphones to do PPG?

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# Lets try it yourself

Hands-On Experiment

1. Collect Data : 10s RGB video from smartphone

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Hands-On Experiment

- 1. Collect Data : 10s RGB video from smartphone
- 2. Visualizing the Heart Beats

# Lets try it yourself

Hands-On Experiment

- 1. Collect Data : 10s RGB video from smartphone
- 2. Visualizing the Heart Beats
- 3. Estimating Heart rate
  - a. Cleaning Signals using Filters
  - b. Estimating Heart rate using Peak Detection Algorithm
  - c. Estimating Heart rate using Fourier Analysis.

# Colab Link : http://tiny.cc/IITGN-Tut5