



A PRELIMINARY STUDY ON NON-INVASIVE DIABETES CLASSIFICATION THROUGH PPG SIGNAL PROCESSING FROM SMARTPHONE FINGERTIP VIDEOS

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BACKGROUND OF THE STUDY

Diabetes mellitus is a chronic disease characterized by elevated blood glucose levels. Approximately **463 million** adults worldwide have diabetes, and nearly **half of them** remain **undiagnosed**.

Photoplethysmography (PPG) involves detecting variations in light absorption to analyze **blood volume changes** with each heartbeat.

PROBLEM STATEMENT

Development of Towards Non-Invasive Diabetes Classification Using PPG Signal Analysis from Finger Video Recordings

01

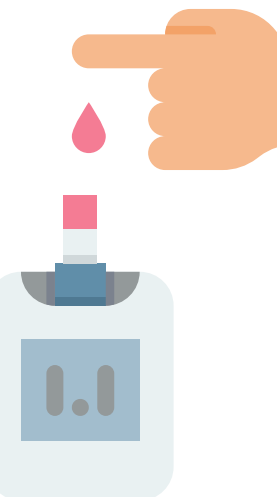
Diabetes mellitus is a **chronic disease** characterized by elevated blood glucose levels. Approximately **463 million people** worldwide have diabetes [1]

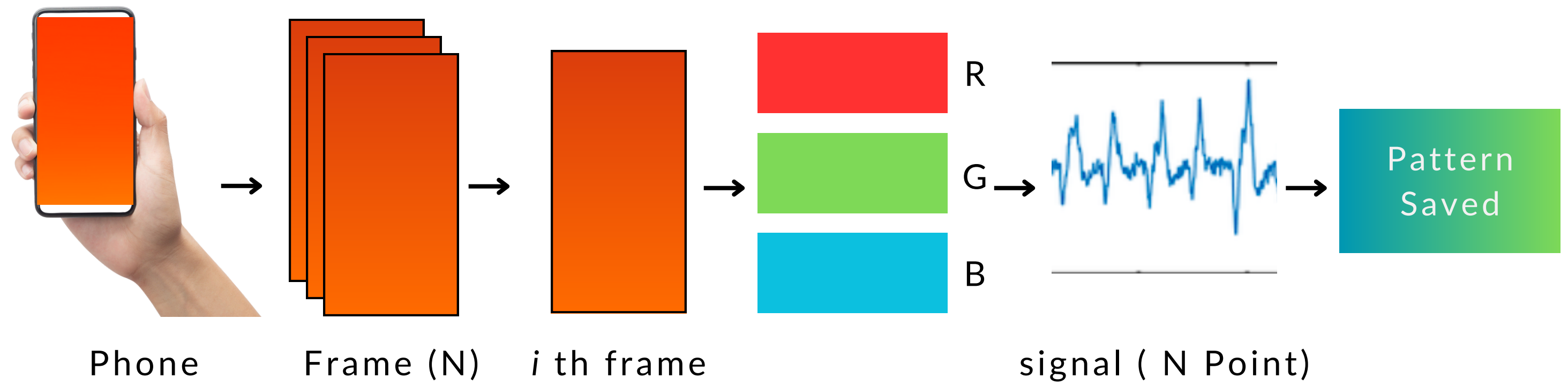
02

The mortality rate attributed to diabetes in Indonesia increased by **58% in 2021** compared to 2011 [1]

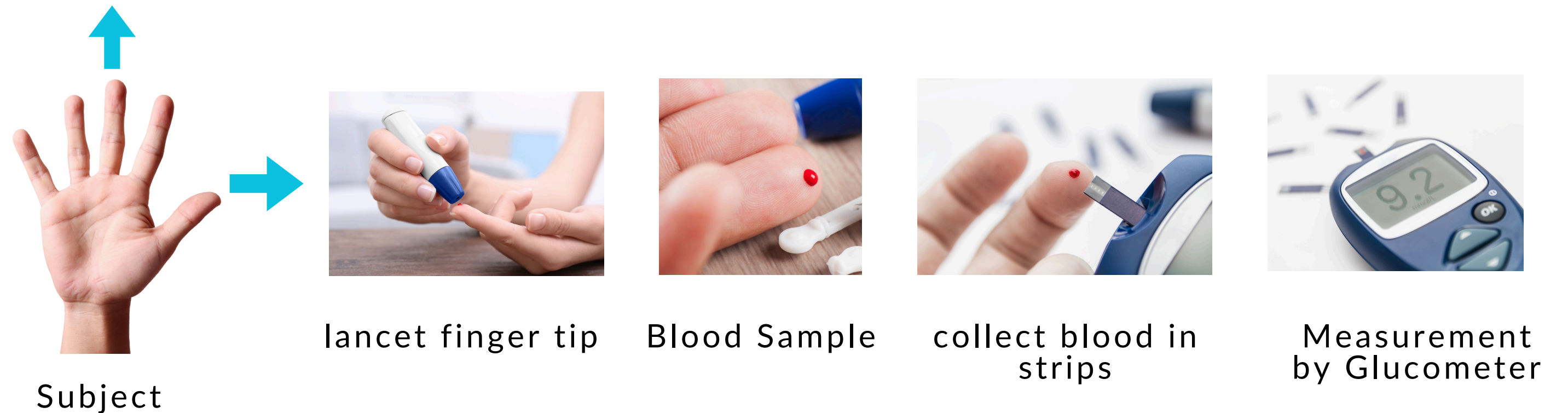
03

To control blood glucose levels, measurements are typically taken by **pricking** the patient's arm or finger to obtain a blood sample

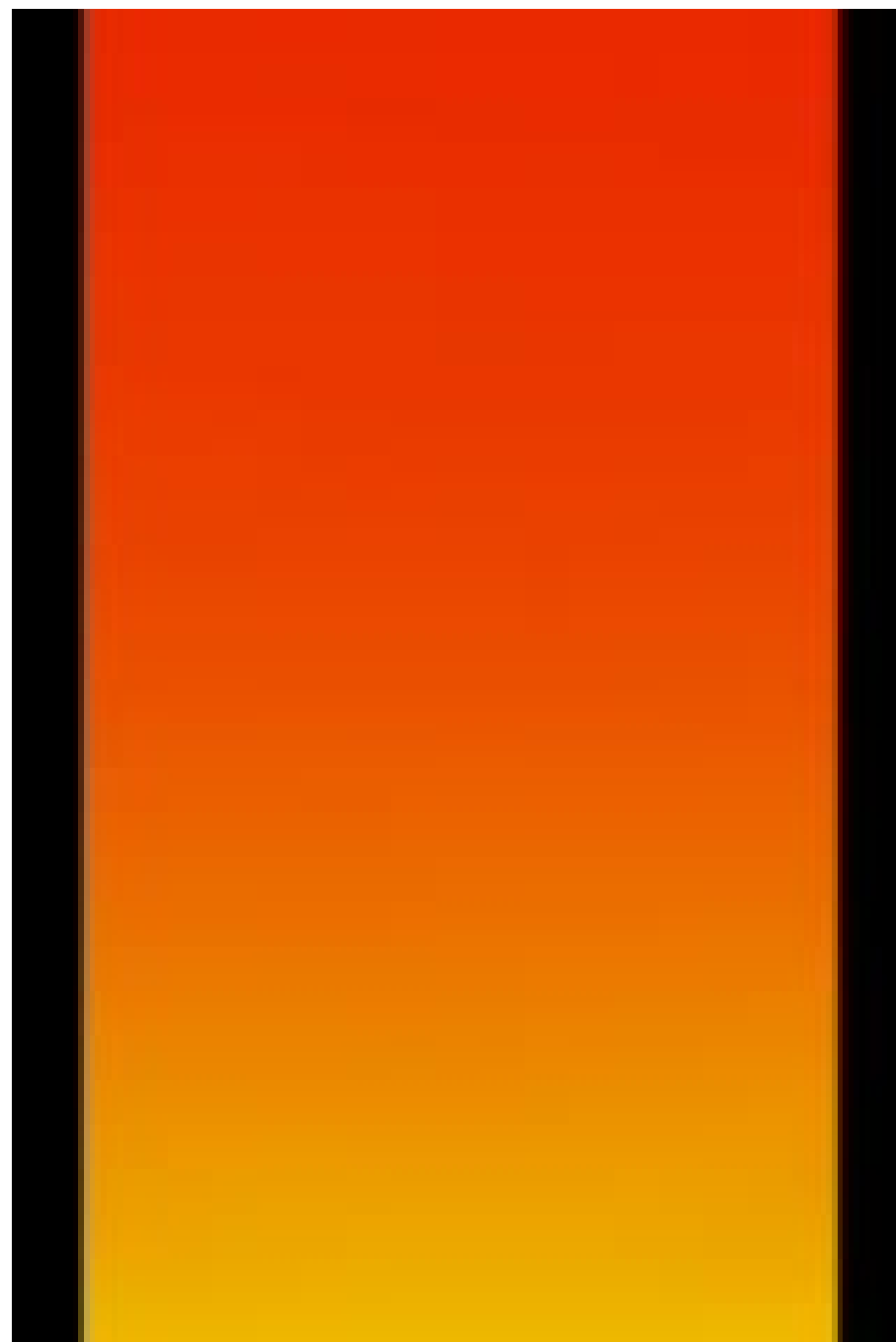
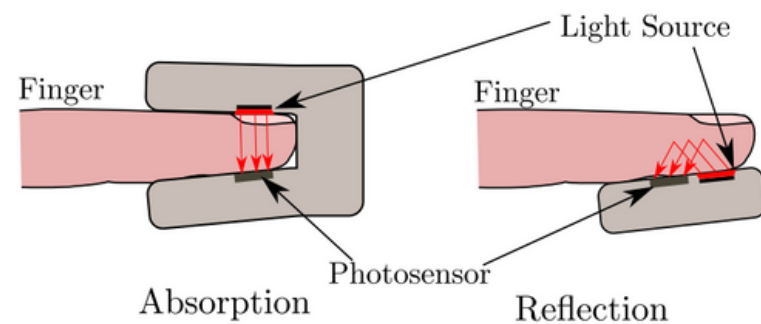




Proposed Method (Non Invasive)



Conventional Method (invasive)



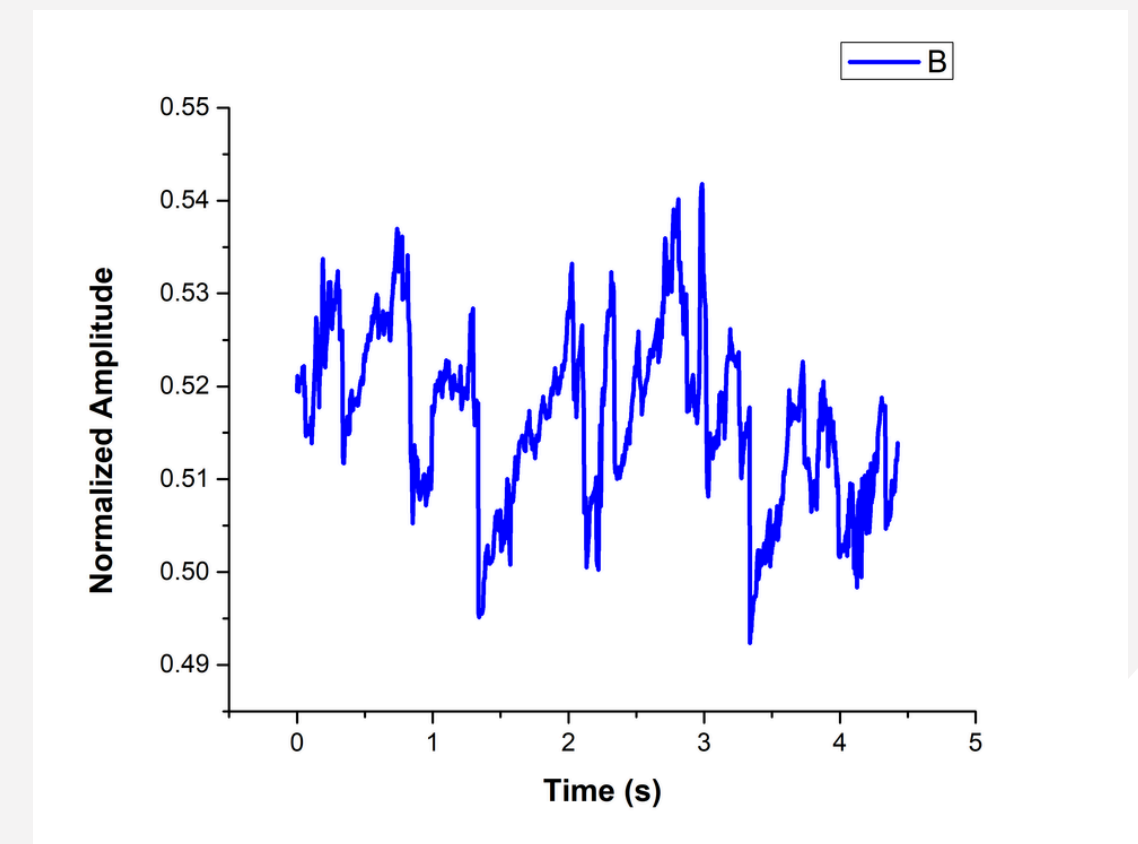
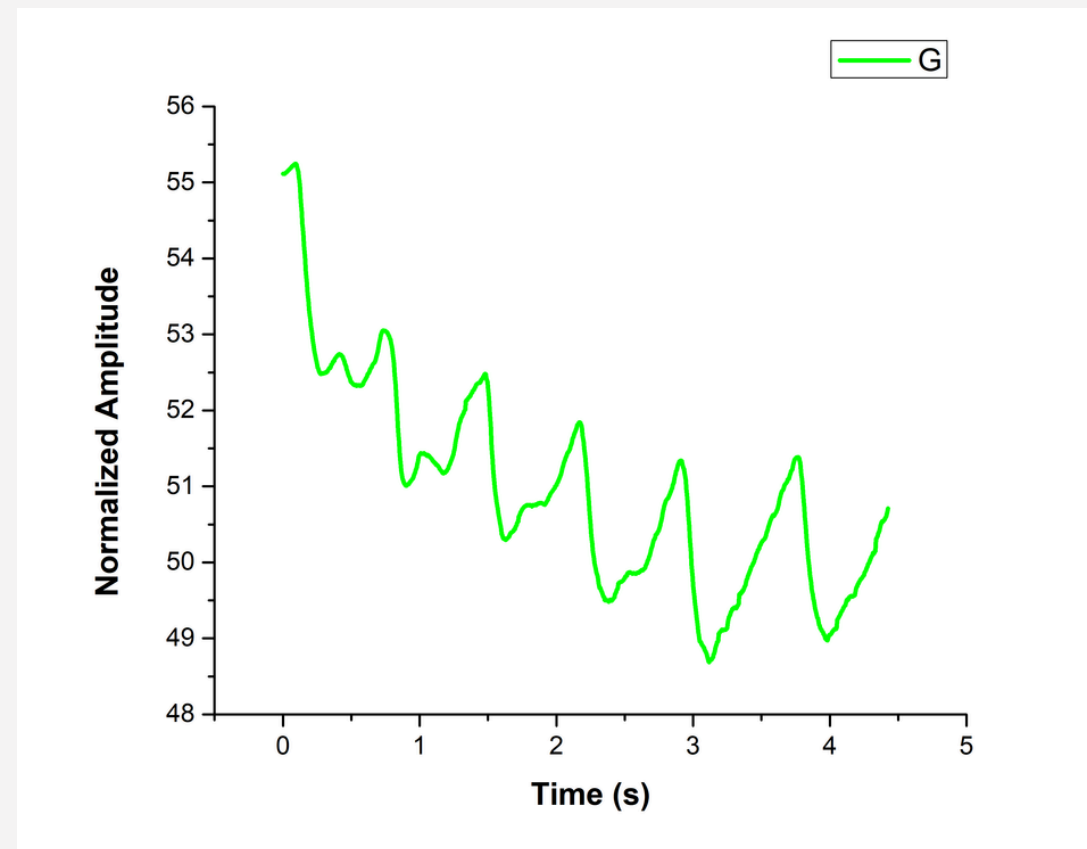
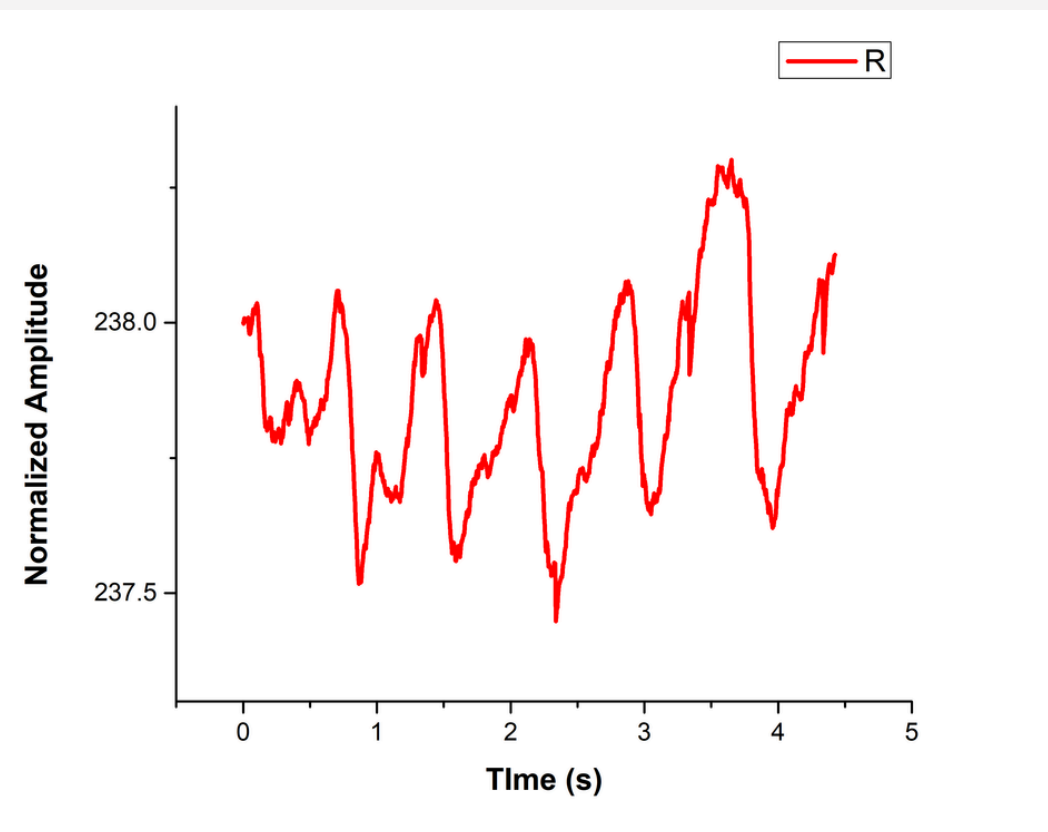
DATASET

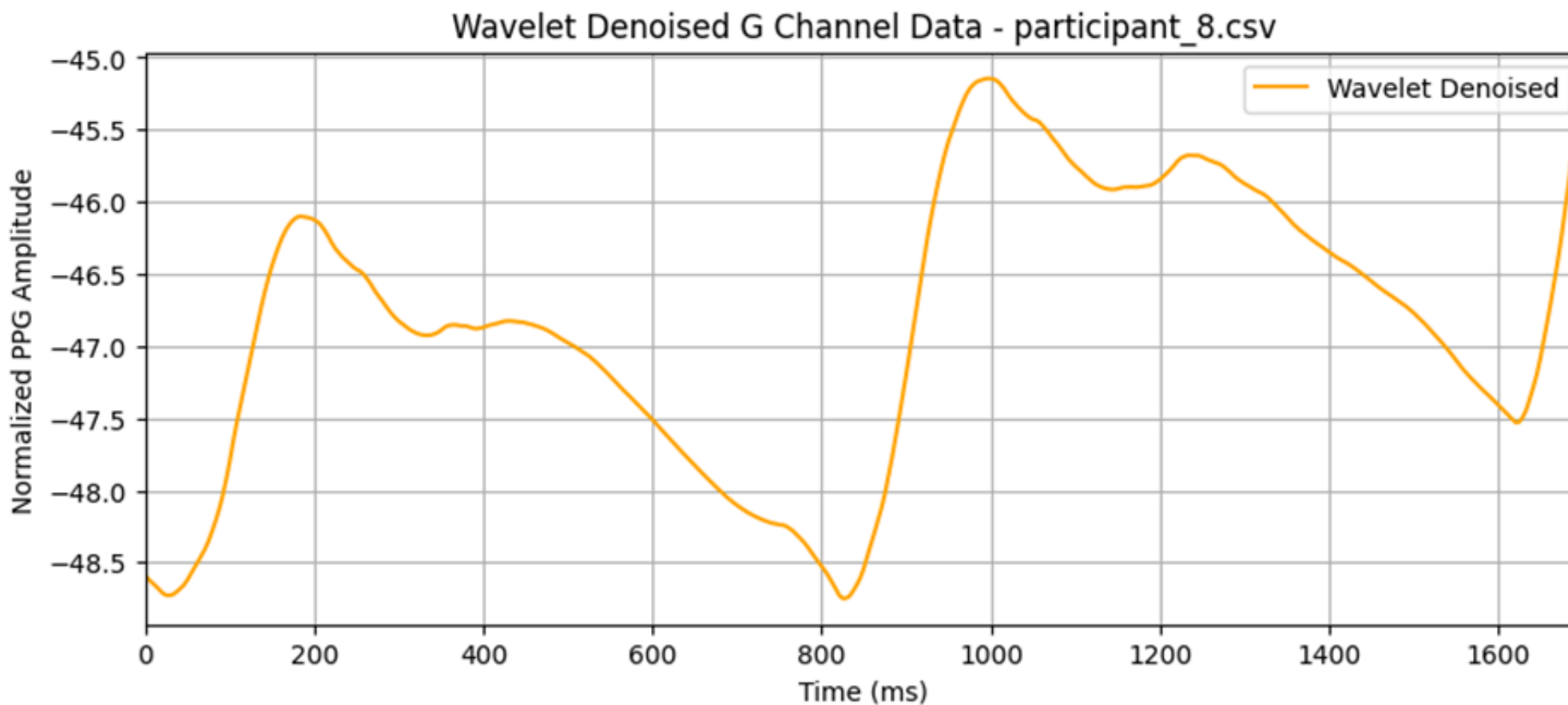
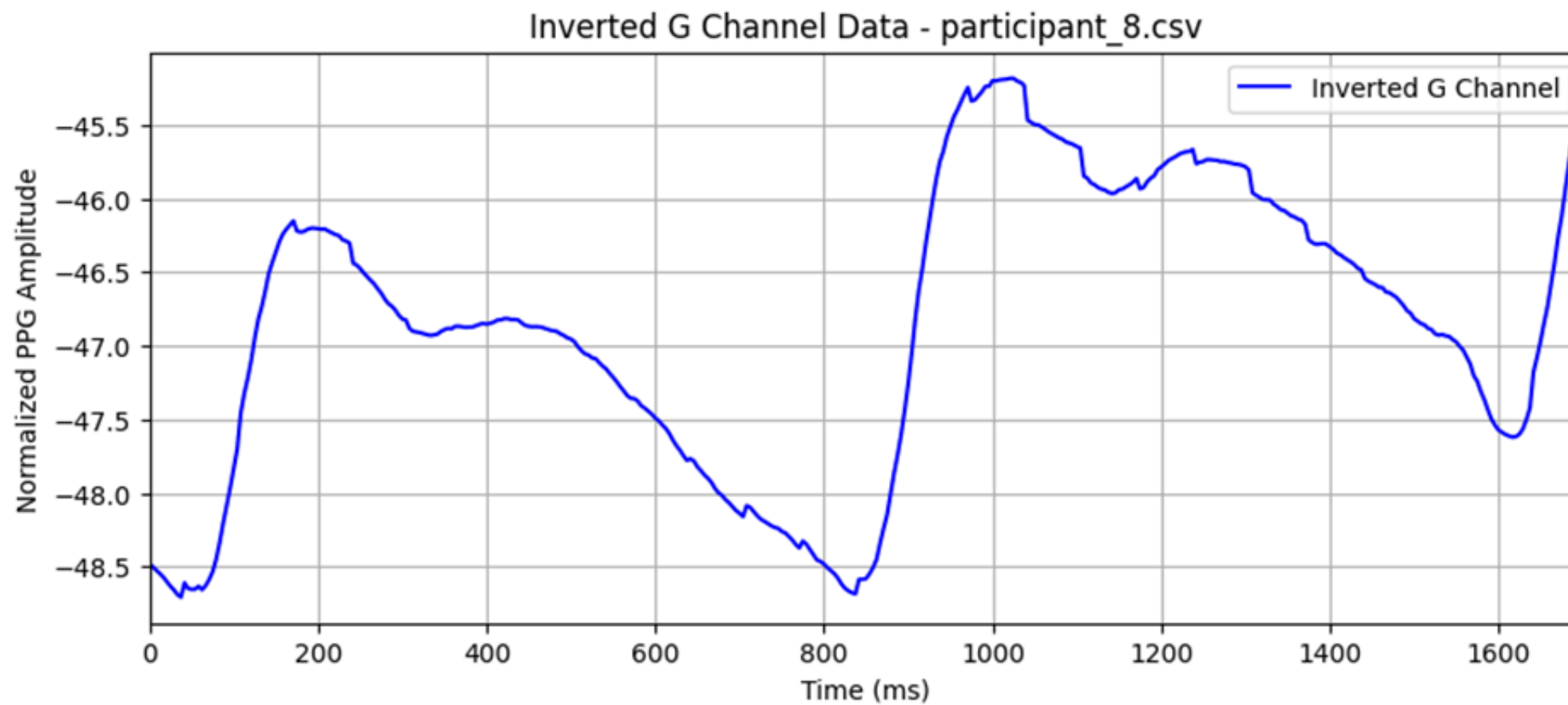
A single capture session consists of a video recorded in 1280 x 720 resolution at 240 frames per second, for a duration of 30 seconds. The video is resized to 360 x 240.

<https://github.com/ssloxford/seeing-red/> [2]

SIGNAL EXTRACTION

The extracted signal from each image was plotted and trimmed to display several waveforms, highlighting the characteristics of the PPG signal





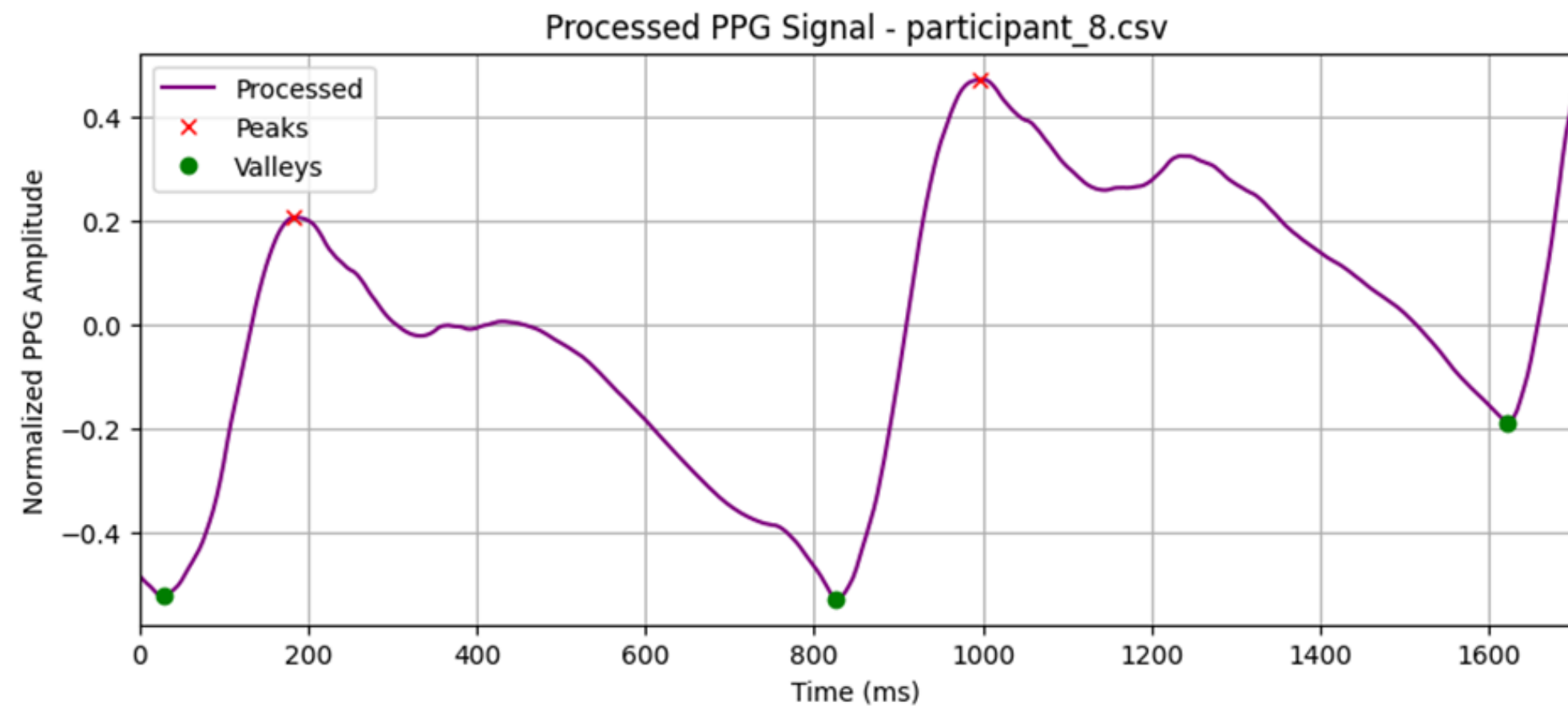
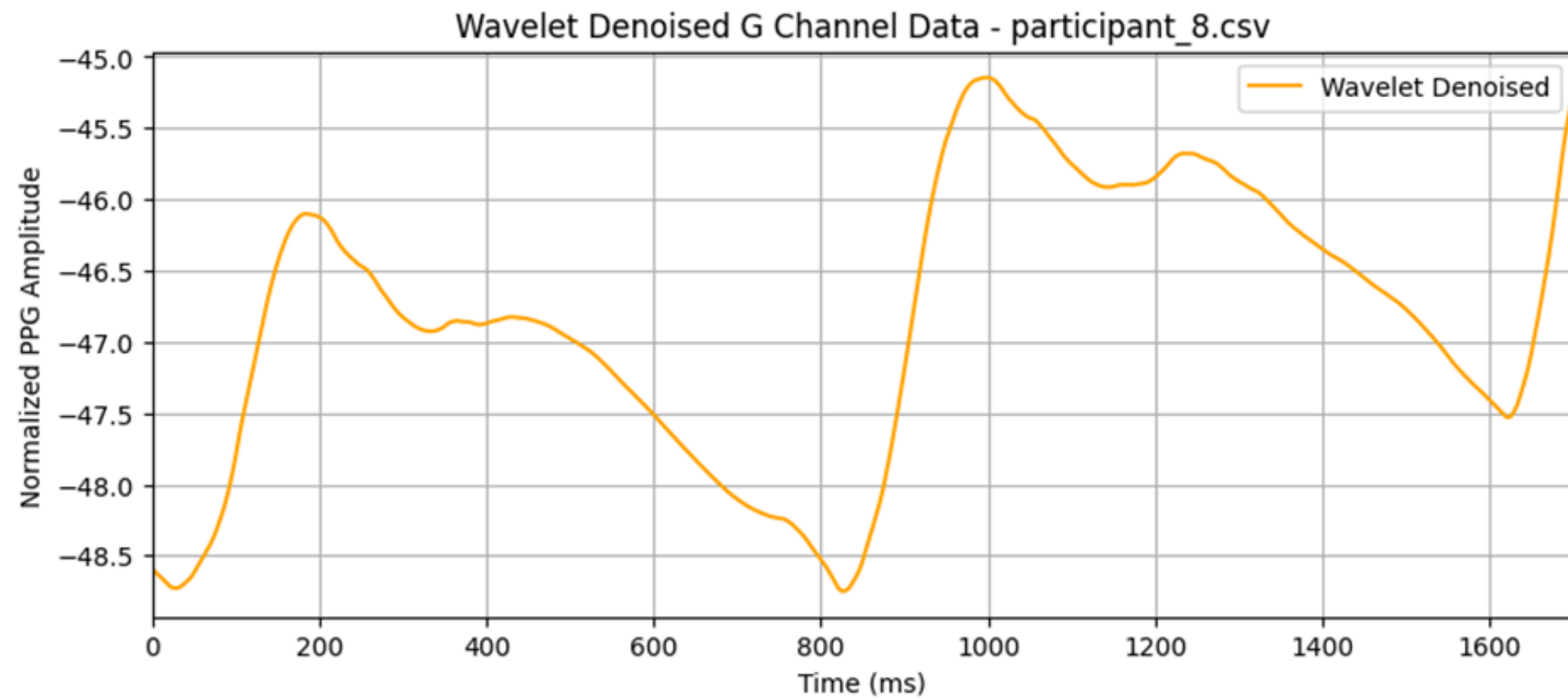
SIGNAL PROCESSING

Butterworth

$$H(s) = \frac{1}{\sqrt{1 + \left(\frac{s}{\omega_c}\right)^{2N}}}$$

Discrete Wavelet Transform (DWT)

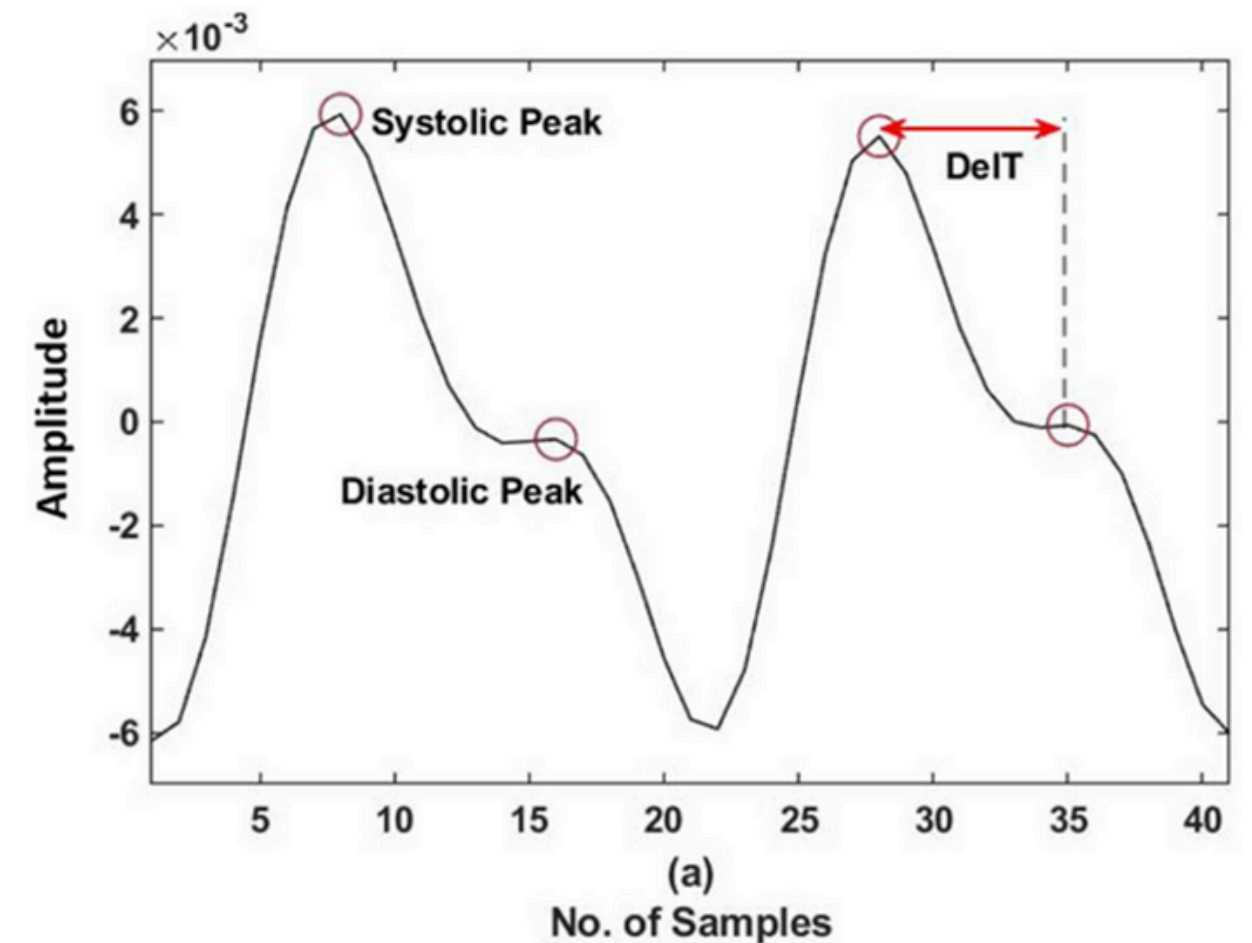
$$x(t) = \sum_{k=1}^N c_k \psi_k(t) + \sum_{j=1}^M d_j \phi_j(t)$$



SIGNAL PROCESSING

Peak and Valley Detection

fase systole dan diastole pada siklus jantung





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THANK YOU