

## **ABSTRACT**

Photoplethysmography (PPG) is a method used to observe any changes of blood's volume of an organ in a certain time interval. Each peak of PPG output signal represents a heart beat thus PPG can be used to observe performance of the heart. Furthermore, we are also able to extract another signal from PPG signal which can be used to measure someone's respiratory rate which is represented by change of amplitude of PPG signal. However, using PPG in measuring respiratory rate has not been developed to the stage where respiratory rate can be measured automatically.

In this final project, a system which is able to transform PPG signal to respiratory signal was made. Respiratory rate is measured automatically and displayed on an application based on Android. The PPG signal undergoes filtration, amplification, and extraction in analog also the calculation is done by microcontroller ATmega 8 before its final result sent to mobile phone via Bluetooth connection.

In testing stage, with 22 data samples from different 11 people, it was known that there was difference in between measurement result done by designed system and manual calculation. Compared to manual calculation, accuracy of the designed system is 60,50% in measuring respiratory rate and 53,89% in measuring heart rate.

**Keywords:** Photoplethysmography (PPG), Heart Rate, Respiratory Rate, ATmega8, Bluetooth, Android