ISIM Lab No. 8 Report: Concerning the Oximeter

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In this lab, I used a photodiode to sense the slightly variable light opacity of my finger to mimic a medical oximeter.

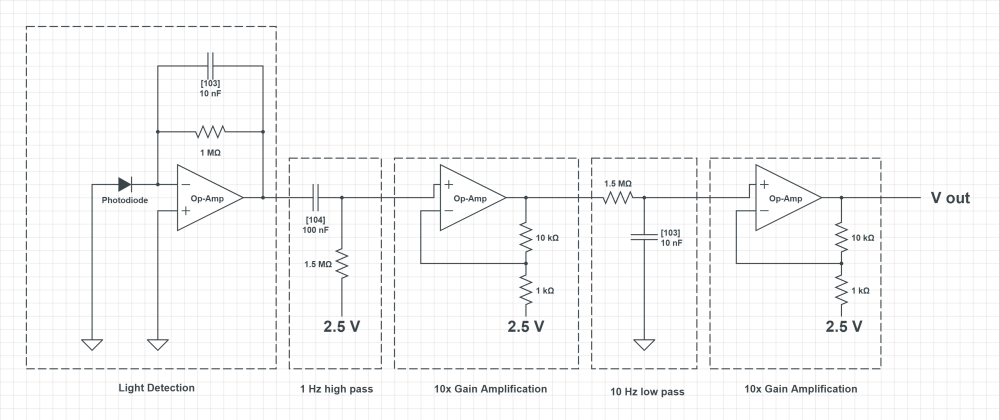

Figure 1: This is the circuit diagram I used filter and amplify the output from the photodiode. The signal goes through a 1Hz high-pass filter, a 10x amplification, a 10Hz low-pass filter, and another 10x amplification. The resistor and capacitor values in the diagram are the ones I used on my breadboard. I calculated the values by using the equation saying that the natural frequency in Hz, f, is equal to $\frac{1}{2\pi RC}$, and that CR filters and high-pass and RC filters and low-pass.

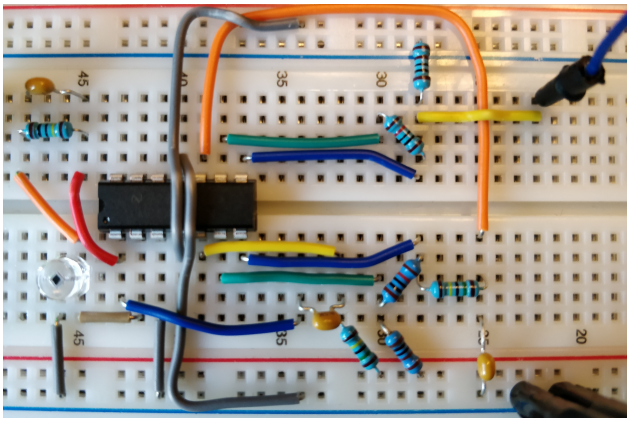

Figure 2: The breadboard circuit I built based on the diagram in Figure 1 can be seen here in Figure 2. V_{out} is the blue wire in the upper right corner.

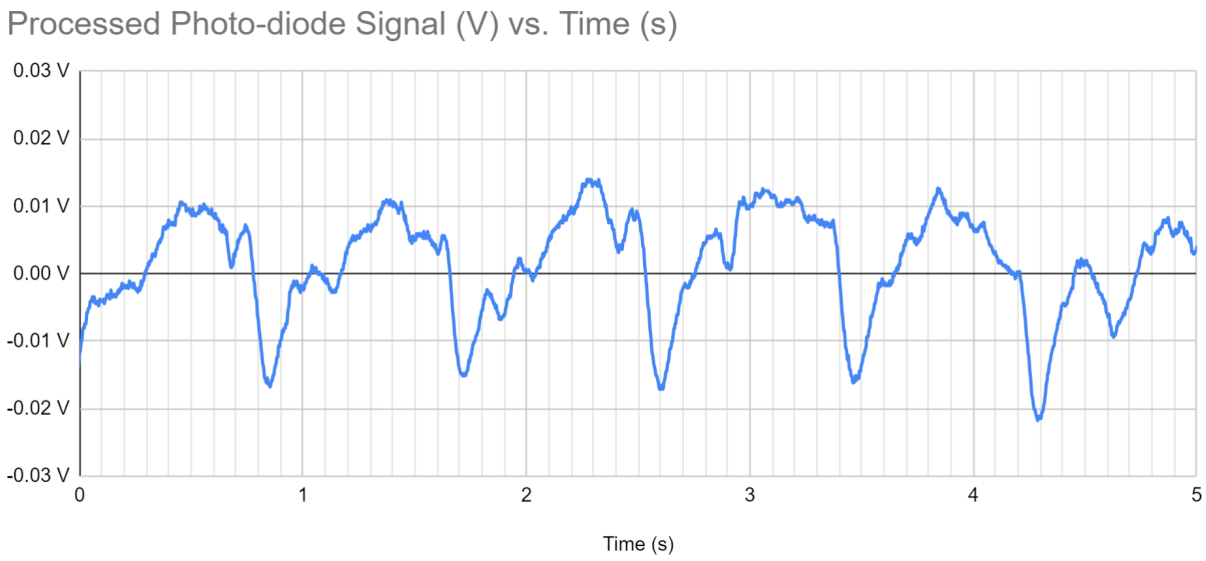

Figure 3: This is the processed signal at V_{out}. The deep dips that occur about every 0.9 seconds represent my heart beating. This reading is not as consistent as would be ideal - especially from a medical standpoint - but my heartbeat is visible so I was reasonably accurate.