

Wrist Based Pulse Oximeter and Calorimeter

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Background

Our advances as a society have led to many great achievements in many fields. However, despite this achievements being positive in most aspects not all have increased our health and safety. One of the main concerns is child obesity. While many view the technology as a plus in everyday life that's not necessarily the case, in fact many children spend quite a few hours a day in front of the TV or computer screen when they used to spend it outside playing and exercising. This phenomenon coupled with the tendency to overfeed, whether it's the parent over feeding the child or the child who is uninhibited from eating whatever they want, obesity has skyrocketed in the children of America. The two major goals of institutions focused on reducing childhood obesity, such as the Children Obesity foundation, is to educate children and the community on healthy eating choices and physical exercise. This project will focus on the latter of the two. A wrist based pulse oximeter and calorimeter will be built such that a child will be able to operate the device as well as be able to set achievable goals to achieve a new level of physical health.

Purpose

The goal of this project is to use the Flora microcontroller platform as the foundation for a health/fitness tracker. The tracker will be able to gather and display the wearer's pulse, blood oxygen level and calories burned during the workout. The device uses an accelerometer as well as various diodes to gather this information to display the data on a small display screen. The device should be simple enough so that middle school students, the target demographic, could build and program their fitness tracker, giving them a larger investment in using the tracker and becoming healthier.

Design/Method

The design for the pulse oximeter portion of the device requires two diodes: a red and infrared one. For each of these there will be four photodiodes to measure the reflectance of the two diodes. The signals will be stored and analyzed using a program such as LabView. The calories will be measured using an accelerometer. A formula will be created and programmed into an Arduino to find the calories consumed.

Results

To test the device three test subjects will be used. The subjects will perform physical activity such as walking or running for a certain set time and the results gathered by the device will be compared to results gathered by an over the counter monitor.