In-Clinic Pediatric Fitness System

John Sutton • Alissa Nishida • Lauren Hishinuma • Eric Swanson
Advisors: Dr. Reinkensmeyer and Dr. Chen

SAMUELI SCHOOL OF ENGINEERING
UNIVERSITY of CALIFORNIA • IRVINE

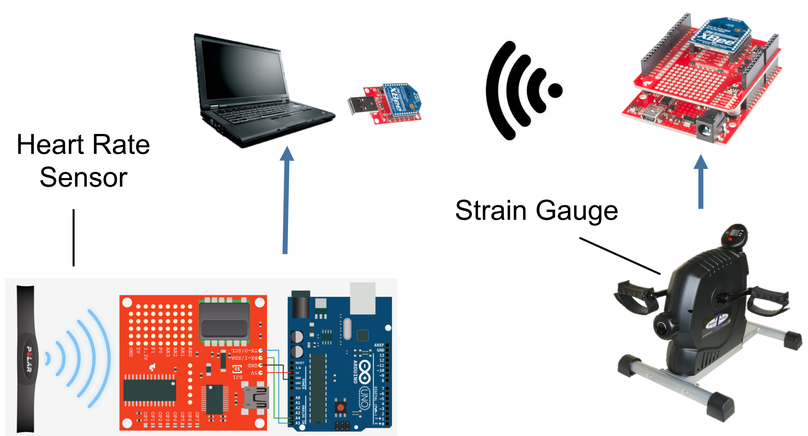
Background

Currently there isn't an easily accessible device to measure fitness in children, as most exercise tests are too expensive for children to take. Simple BMI tests are inaccurate as they are merely ratios of weight and height, and do not accurately describe a person's health and VO2 max tests are expensive and require more space than is available in most pediatrician's offices, and the machine is about $8000. Many kids are also unmotivated to take these tests and do not try very hard, making their results unreliable. This problem is of even greater concern with around 20% of elementary school kids qualifying as obese.

Goal

The goal of our project is to design a device that accurately measures fitness in children and that is small enough and inexpensive enough to use in a pediatricians office. The device also needs to maintain accuracy while recording data in real time.

Basic Design Concept



Requirements

- Cost less than $800 dollars
- Record heart rate and work rate
- Only the lower body exercises
- Compatible with children ages 8-14
- Able to vary work rate to maintain 70-80% heart rate
- Fits inside a 2 ft x 2 ft x 2 ft space

Current Status

- Currently the mini exercise bike is capable of reading and recording power in real time
- The angular velocity is being read with a reed switch
- Heart rate is being read wirelessly and recorded using polar heart rate monitor
- An exercise study is being scheduled to test our device

Innovation

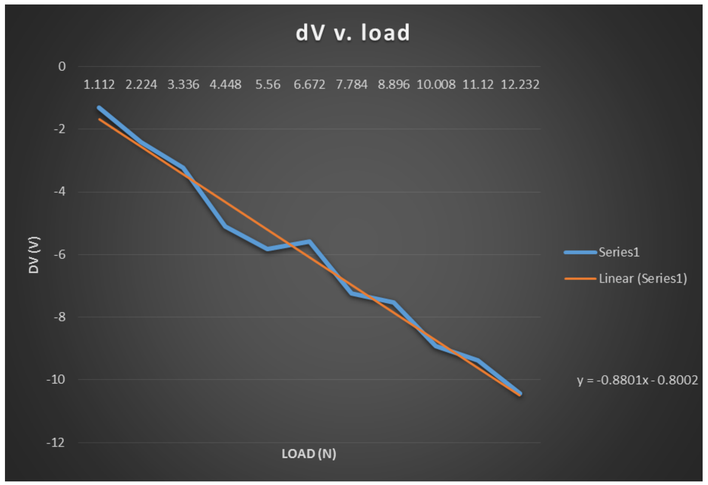
Our fitness system is estimated to cost around $500, which is a price reduction of 93.75%. By utilizing a strain gauge and the Xbee system, we are able to accurately determine power output in real time, along with the patients heart rate. Together these values can be related to determine a child's fitness.

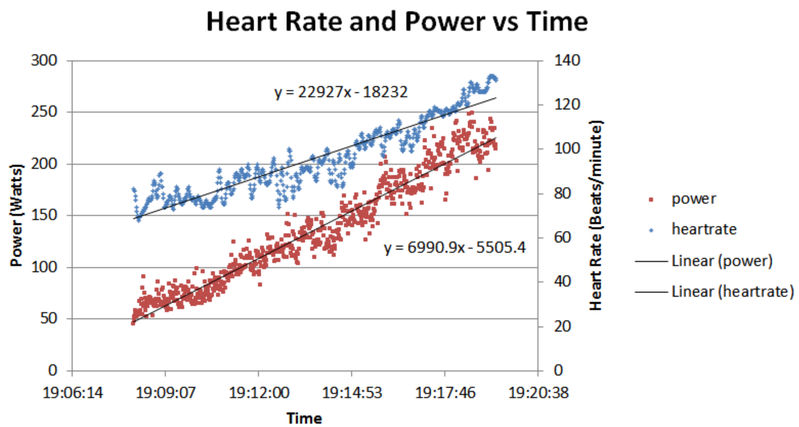
Improving Children's Fitness

Due to the small size and reduced cost, pediatricians would finally have a device to easily measure children's fitness. The device has potential to revolutionize the way to measure fitness in children, and as a result help to increase the health of the nation's youth.

Next Step

Our next step is to continue conducting exercise studies. We will test our device against the current machine with a group of 10 children who have signed up for the study. If our device is determined accurate, work on a game to pair with the device will begin.





For more information contact us at suttonj@uci.edu