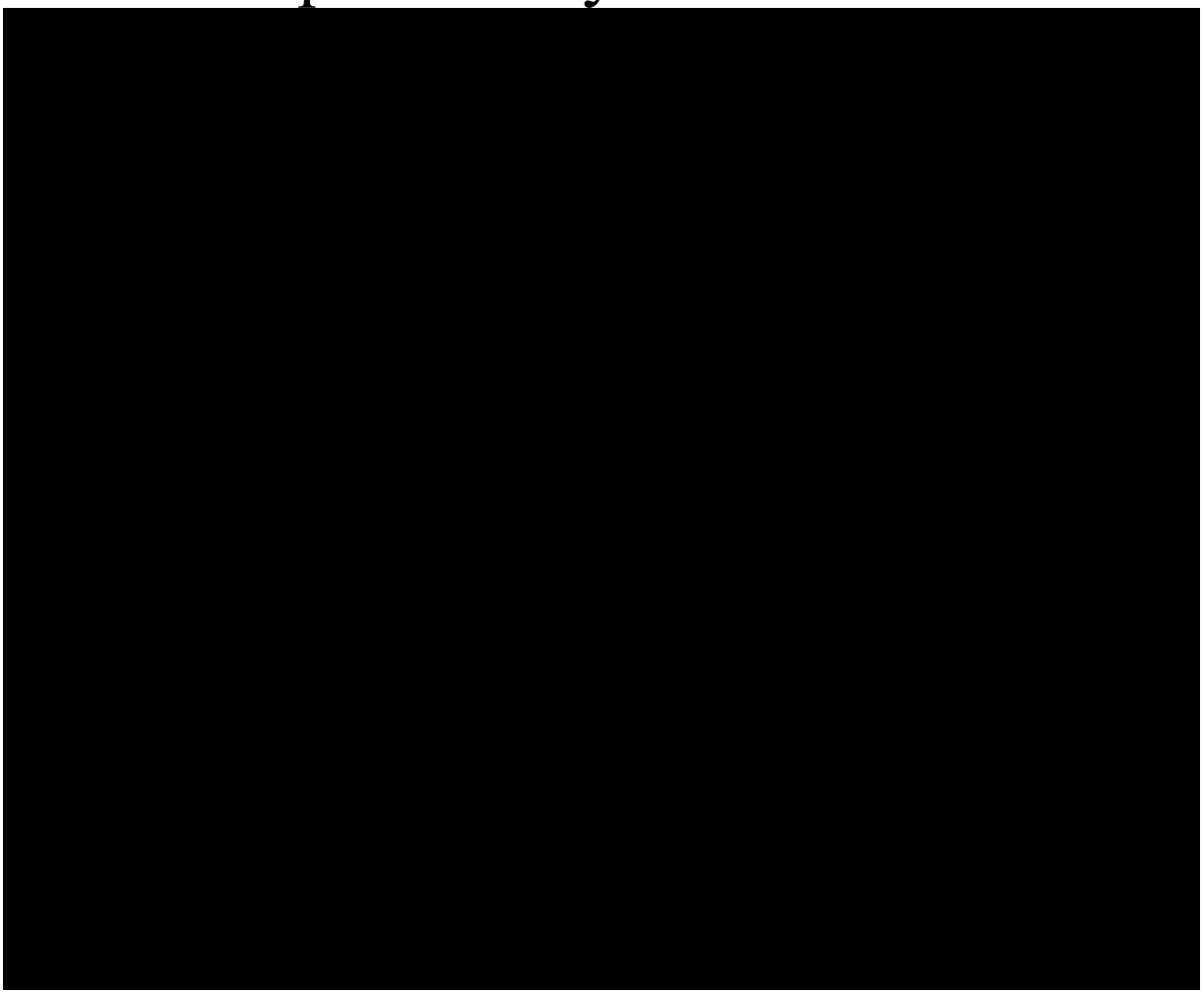
Rep Count System Artifact



Kushan Arampath 219142322

Contents

Overview

Background

This system aims to provide exercise information using the number of repetitions. Once equipped, the system will notify the rep counts to the user via a display and an LED. Designed to be used with multiple exercises, indoors and outdoors.

Problem Statement

Collecting data from exercises provide a lot of useful information that can increase the wellbeing and overall health in the population. Conclusions such as which age group performs exercises and how healthy they are or at what stage of the exercise people tend to injure themselves can be decided from analysing the data from rep counts. This system, designed to be light weight and small in size will serve the purpose of data collection from repetition exercises.

Requirements

- A Particle Argon
- An HC-SRO4 Ultrasonic sensor
- LED or Buzzer
- An LCD display compatible with particle argon
- Potentiometer
- Jumper Wires
- Resistors
- USB power source or battery
- Breadboard

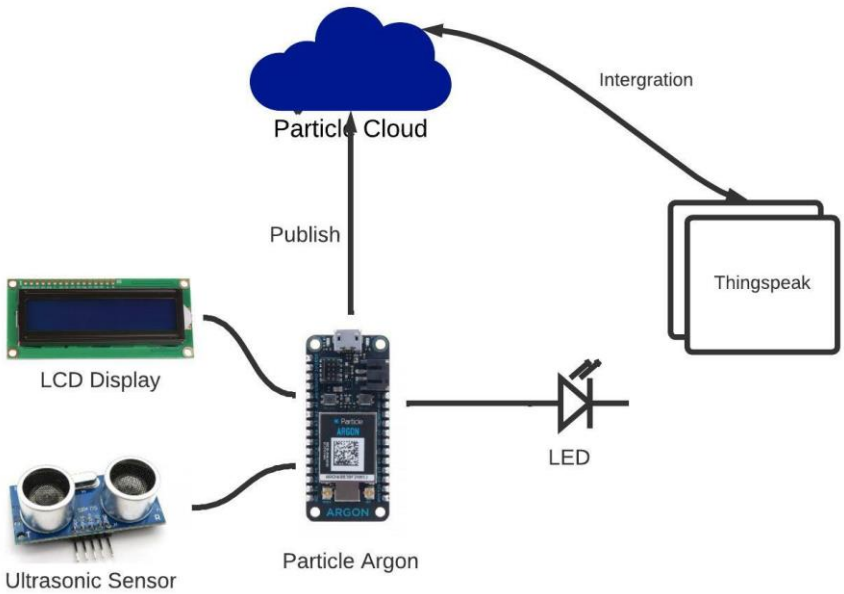
Design Principles

The system designed to be used in repetition exercises is equipped with an LCD display and an LED or a buzzer to notify the user of the rep count. Mobility and functionality was the main aspect observed when choosing the equipment. Choosing a Particle device instead of an Arduino device was done to reduce the size of the overall system.

LCD display, Ultrasonic sensor, and the LED is connected to the Particle Argon and via Wi-Fi it updates and data logs in particle data logs and it is also integrated with Thingspeak (Thingspeak, 2022), so data logs and data analysis can be done much easier. Final system would have a mobile application to provide a much user-friendly experience.

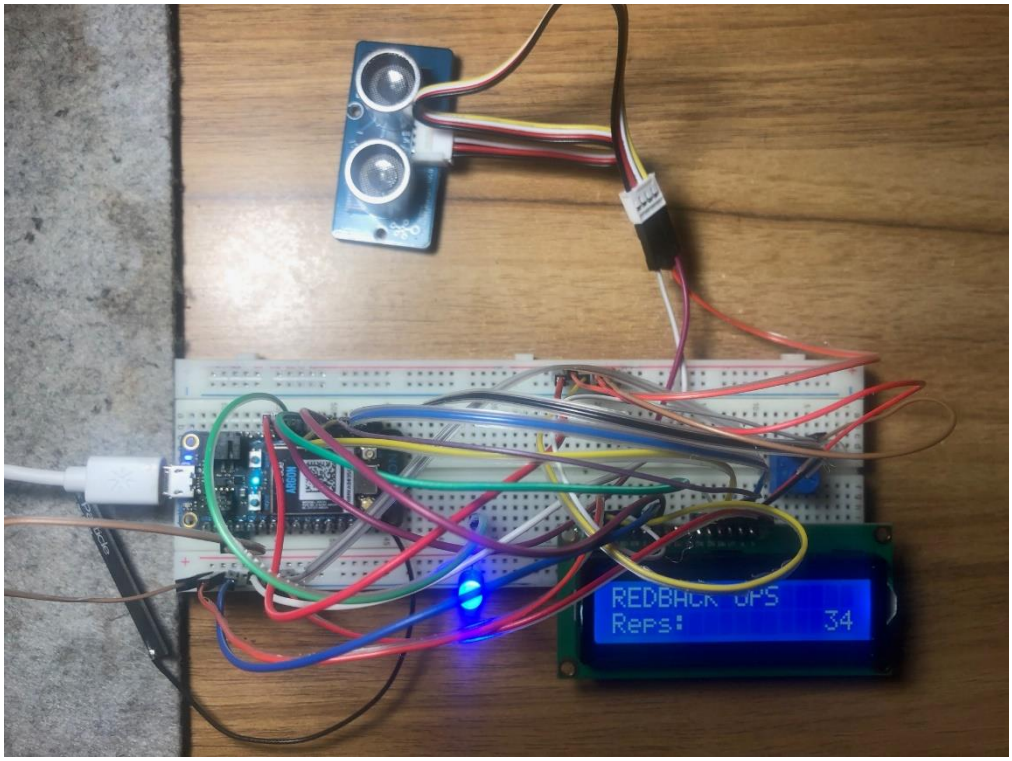
There are few wearable rep count systems in the market and it has been identified as a less dominated area by large tech companies such as Apple, Samsung and Garmin. Creating a functional device to tap into this market will provide valuable data that can be used in research or marketing.

Project Architecture



Graphic created in Lucidchart.
Student ID 219142322

This is the early prototype system in testing. Ultrasonic sensor , LCD display and the LED is connected to the Particle argon and is it connected to wifi and via USB as a power source.



Link to codes

(copy paste in browser to work)

https://github.com/ghubk/Redback-IOT.git

Testing Approach

Due to lack of resources such as Lithium Ion Polymer (LiPo) batteries, the prototype has only been tested on desk. An object (hand) is moving towards the ultrasonic sensor mimicking the motion of a push up or any repetition exercise. The led will light up once when the object has been moved closer and moved far. The LCD display updates the number of reps as part of user notifications.

Conclusion

Completion of the rep count system prototype was a success. There were changes made to the initial plans when choosing the equipment. Instead of using an Arduino Uno, a decision to use Particle Argon was made in order to keep the system small to make it a wearable device. By using a Particle Argon, data collection and analysis was also made easier due to Particle web services. Furthermore, the ability to integrate websites via webhook will provide the opportunity create websites or connect mobile applications. For data analysing purpose Thingspeak has been integrated to this system.

References

Lucidchart, 2022. *Lucidchart.* [Online]
Available at: www.lucidchart.com
[Accessed 22 May 2022].

Thingspeak, 2022. *Thingspeak.* [Online]
Available at: https://thingspeak.com/
[Accessed 22 May 2022].