Arduino Based Concussion Sensor

By: Aaliyah Yu & Maddox Yu

Maker Faire 2018

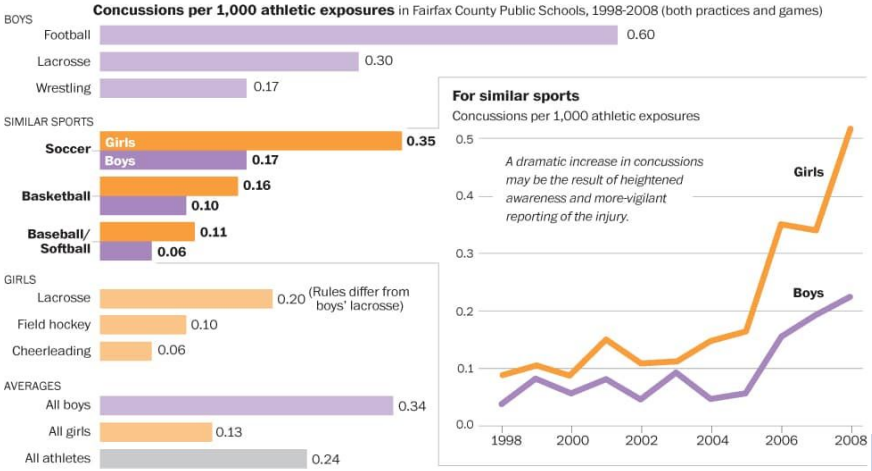
Aegis of Soteria

Tiny Guardians Make a Big Difference

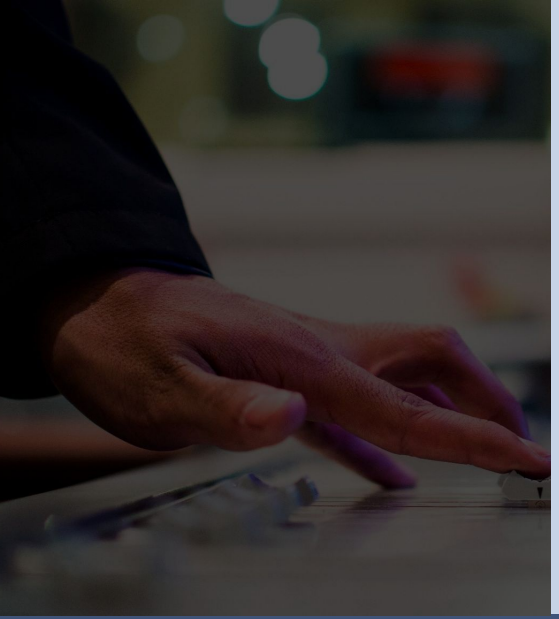
In the U.S alone, about 1.6 to 3.8 million people have sports-related concussions every year. With our device, parents or coaches can see when a concussion has happened so they can help the person before their concussion becomes even more serious.

How We Got Started

Maddox loves to play football. However, his mom was worried about him getting a concussion.

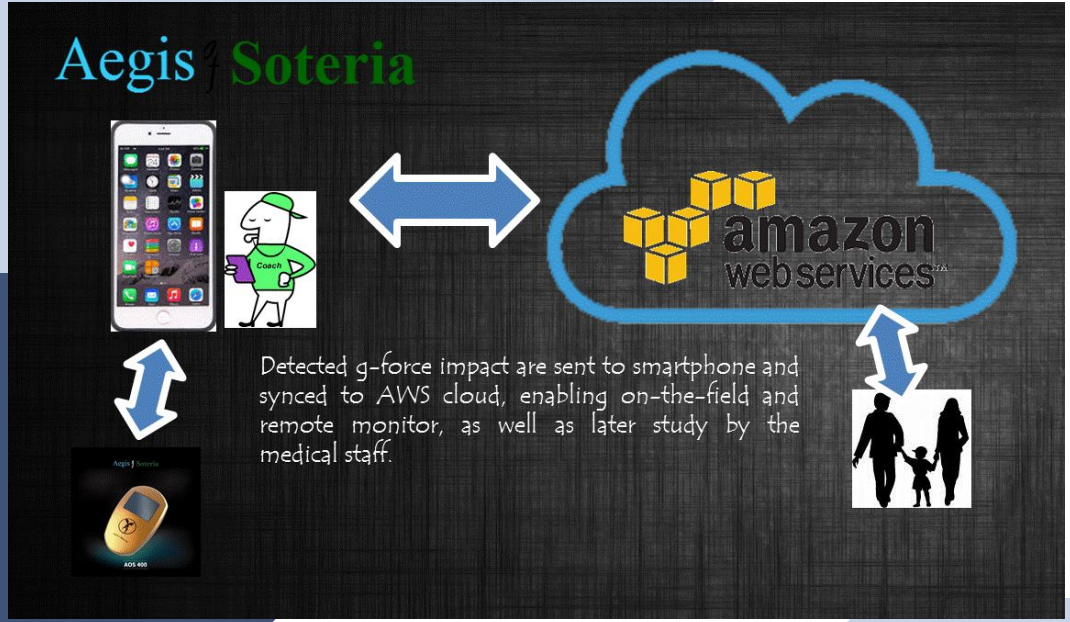


Washington Post, 2013



A concussion sensor built on an Arduino platform with the data hosted on AWS. Additionally, the algorithm is optimized when available.

The Solution



“When facing a problem, do not walk away from the problem. Find a way to solve it.”

The Team

Aaliyah Yu

Business, product development

Maddox Yu

Hardware and software

Additional Help From:

The TechShop

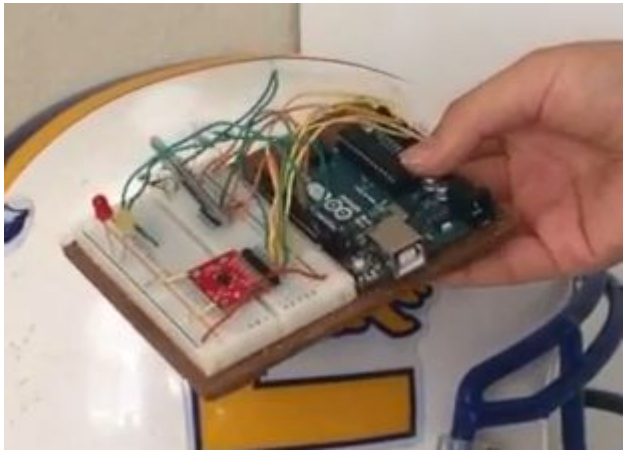
TinyCircuits

HWTrek

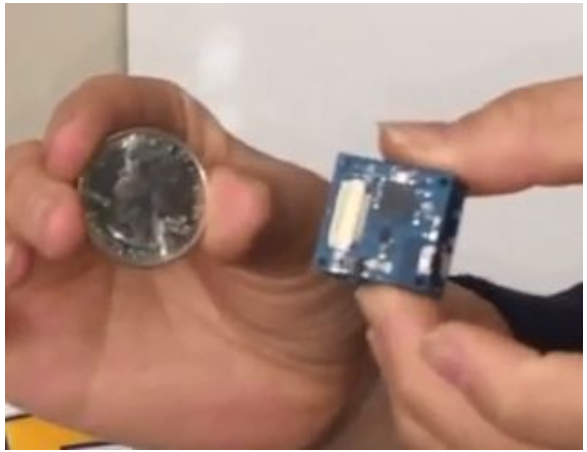
And many others

Hardware Designs

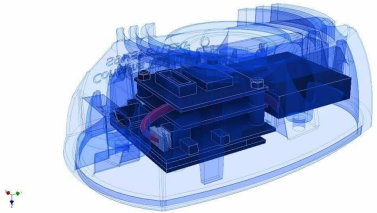
Prototype #1



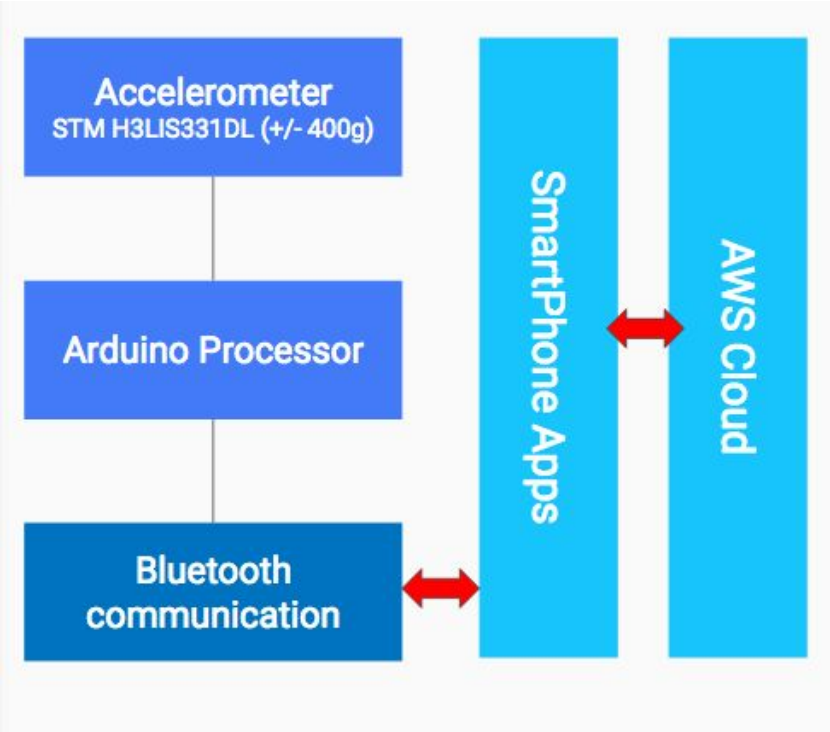
Prototype #2



Final Result



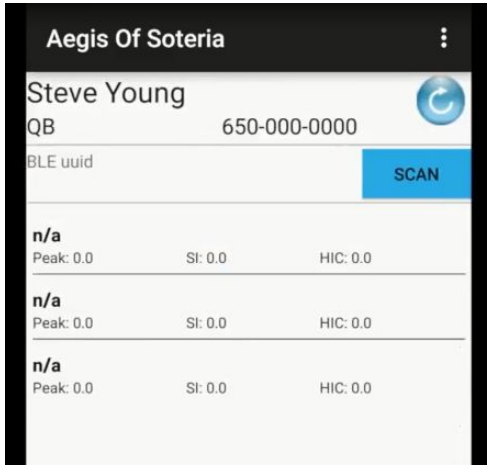
Key Components

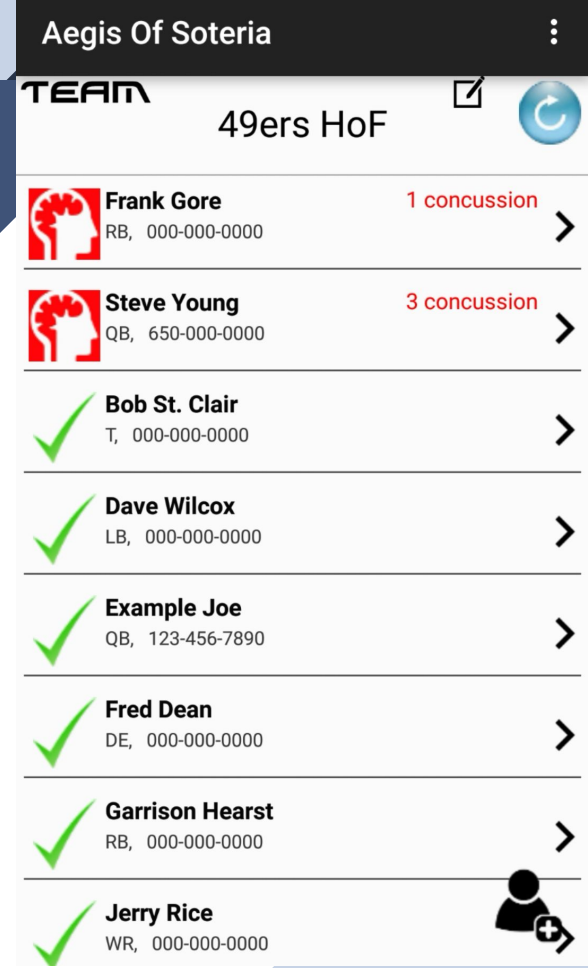


- Hardware is Arduino based
- App used to send data
- AWS cloud

The App

- Organizes player info
- Collects data about concussion from sensor
- Shares info with parents and coaches





Milestones

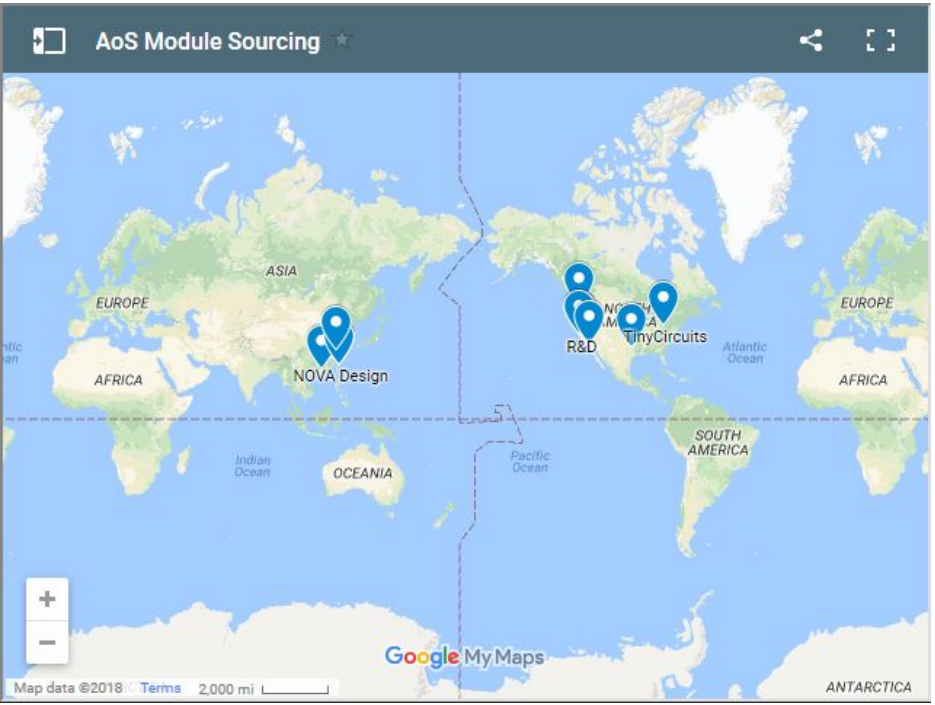
Aegis of Soteria

- Mar 2015 — Project Started
- Oct 2016 — 3rd Gen (Production Concept) Prototype
- Nov 2016 — Android Apps developed
- Jan 2017 — Launched on Kickstarter
- Mar 2017 — Finalize manufacturing version
- Jun 2017 — Manufacturing test run; Finalize Algorithm, Apps, and Cloud service
- Oct 2017 — Pilot Product shipment; Ship Android & iOS Apps

For more details:

http://www.aegisofsoteria.com/timeline.html#details

All The Support We Got



Components

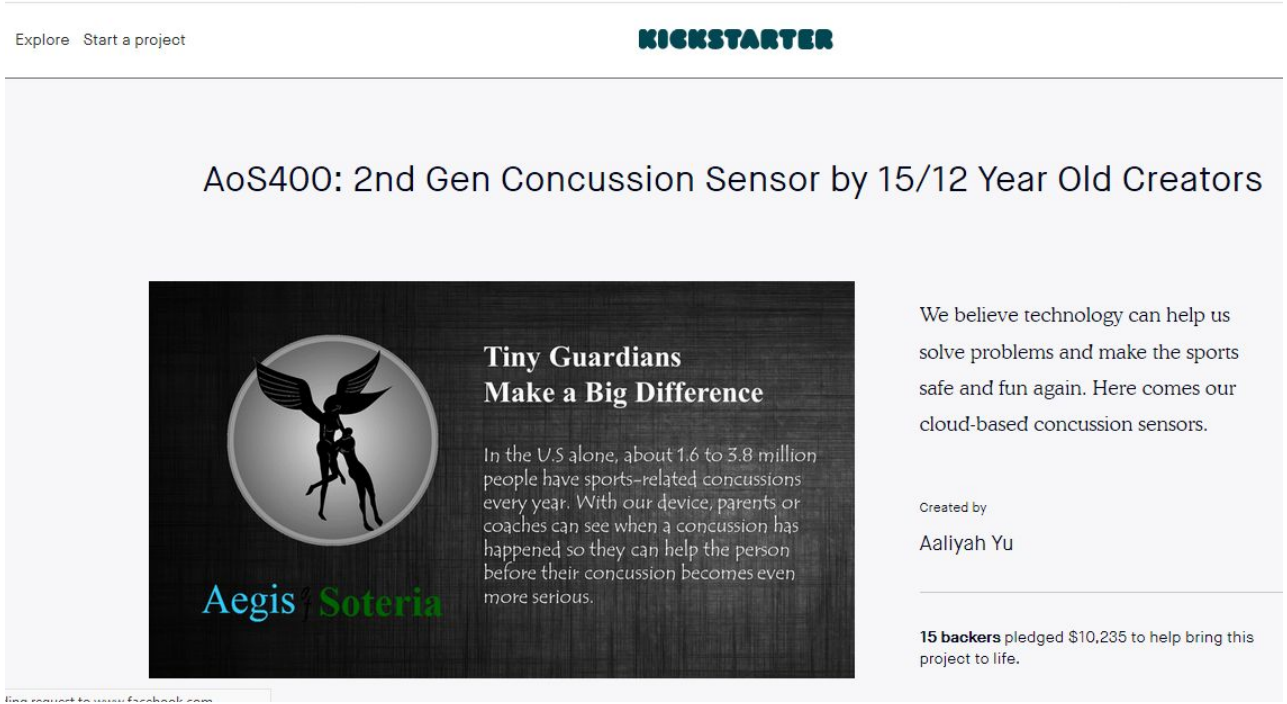
- Seeed Studio, Shenzhen, China
- HWTrek, Shenzhen, China
- VierMTech, New Taipei City, Taiwan
- TinyCircuits, Akron, OH
- KAI FUNG INTERNATIONAL CO., Taichung, Taiwan
- Minitaps, Seattle, WA
- Mouser Electronics, Mansfield, TX
- 哈利路亞精密螺絲, Suzhou, China

Industry Design

- Focus PDM, Menlo Park, CA
- NOVA Design, New Taipei City, Taiwan
- 上上產品設計, Taipei, Taiwan
- KAI FUNG INTERNATIONAL CO., Taichung, Taiwan

Special Thanks to San Jose's TechShop

Kickstarter



Thanks for the support:

- Failed 1st kickstarter campaign in 2017
- 2nd try was successful

Patent

(12) **United States Patent**
Yu et al.

(10) **Patent No.: US 9,936,756 B1**
(45) **Date of Patent: Apr. 10, 2018**

(54) **CONCUSSION SENSING SYSTEM WITH CLOUD-BASED PREDICTION MODEL UPDATE**

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(73) Assignee: **Aegis of Soteria LLC**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/713,579**

(22) Filed: **Sep. 22, 2017**

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(Continued)

Primary Examiner — Tejash Patel

(57) **ABSTRACT**

A system to monitor hit impact force and to predict the likelihood of a concussion which includes a wearable device with an impact sensor and an application processor for prediction, a smartphone mobile application, a cloud-based data storage system, and an algorithm improvement system

We have just been issued a US patent:

Concussion Sensing System With Cloud-Based Prediction Model Update

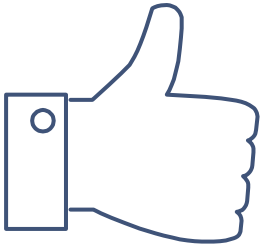
What We Have Learned

Arduino platforms are useful for product development.

Open platforms such as HWTrek and Upwork allow us to dip into the global knowledge pool for any help we need.

Never be afraid of tackling something you do not know.

Learn, Research, Ask for help.



THANK YOU!

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