PORTFOLIO OF SAL AMARASINGHE

2017

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ABOUT ME

Hello World. It's great to meet you; at least virtually for now, I'm Sal. I'm a Seattle based product designer with a mechatronics engineering background.

I have always been a tinkerer and designer but when I broke my dad's computer as a child trying to fit it in a metal box I figured I should acquire some technical skills before trying to make it look cool.

As an engineer, I have worked at companies such as General Motors, Apple and Microsoft; developing the next great hardware product while outwitting schedules and spending months manufacturing in China. As a designer, in my spare time, I have partnered with colleagues and classmates to fulfill my dream of creating products to uplift society at a global scale.

In addition to my professional experiences, I have also studied and volunteered in various places, including; Vietnam, Thailand, Russia, South Africa and Sri Lanka. Through these adventures I have gained a passionate understanding of how technology, design and humans work when brought together.

When I'm not working I like to climb mountains, ride my motorcycle into the sunset, break things and fix them, board a plane to somewhere, create cool new product concepts and eat.

BIOSPARK
A PORTABLE & RUGGED QPCR THERMOCYCLER

My teammate and I indentified a gap in the healthcare orgranization where quick and accurate diagnoses could save lives. Instead of waiting for a doctor to perform a symptomatic diagnosis, we could create a machine that would in as little as 20 minutes tell a patient if they have an infection or parasite using a small blood sample. This machine is called BioSpark.

Biospark is a portable qPCR (Real-time Polymerase Chain Reaction) machine that is capable of amplifying and detecting trace amounts of DNA. The primary goal of Biospark is to provide labs, medical centers and practitioners in developing countries an affordable platform that will progress the state of healthcare.

Skills: Electronics, product design, manufacturing, biology & chemistry

Tools: Altium Designer for PCB and schematic capture, Photoshop, SolidWorks, pencil and paper for sketching

Team: Filipp Demenschonok

Status: Concept completed Nov 2015, now in hardware prototyping phase

biospark

The Problem

The following are some identified problems with current qPCR devices:

1. qPCR is not easily portable and accessible in rural regions of the world.
2. qPCR is not cheap for under-priviledged nations.
3. qPCR requires the prescence of medically trained professionals in labs

The Design Criteria

1. Create a handheld, portable and rugged form factor device.
2. Find a balance between cost and measurement accuracy.
3. Make the product easy to use by anyone at anytime (similar to an automated external defibrillator - AED).
4. Add value by creating beneficial byproducts to the user at no extra cost.

The Motivation

Growing up in a developing country, I witnessed first hand the effects of disease and improper healthcare on individuals and families. I was fortunate enough to not live in poverty but was not fortunate enough to help those in need at that time. Diseases like Malaria and food or waterborne parasites ran rampant and without readily available medical care and testing, most people fell victim. BioSpark was created because I wanted to put my engineering talents to help society and make healthcare as accessible as possible.

1. There is a 34.1% mortality rate in low-income nations from infectious/ parastic diseases (source).
2. PCR machines in labs usually start at a cost of about USD$5500 and are not real-time.
3. Current PCR machines require a lab technician or medical professional to use them.

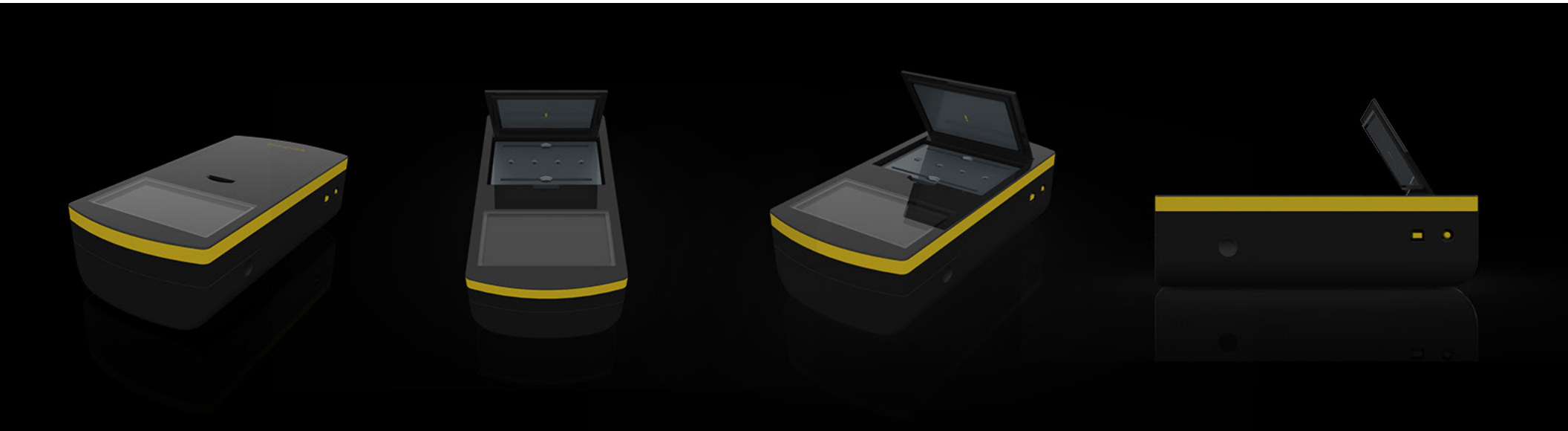
The Solution

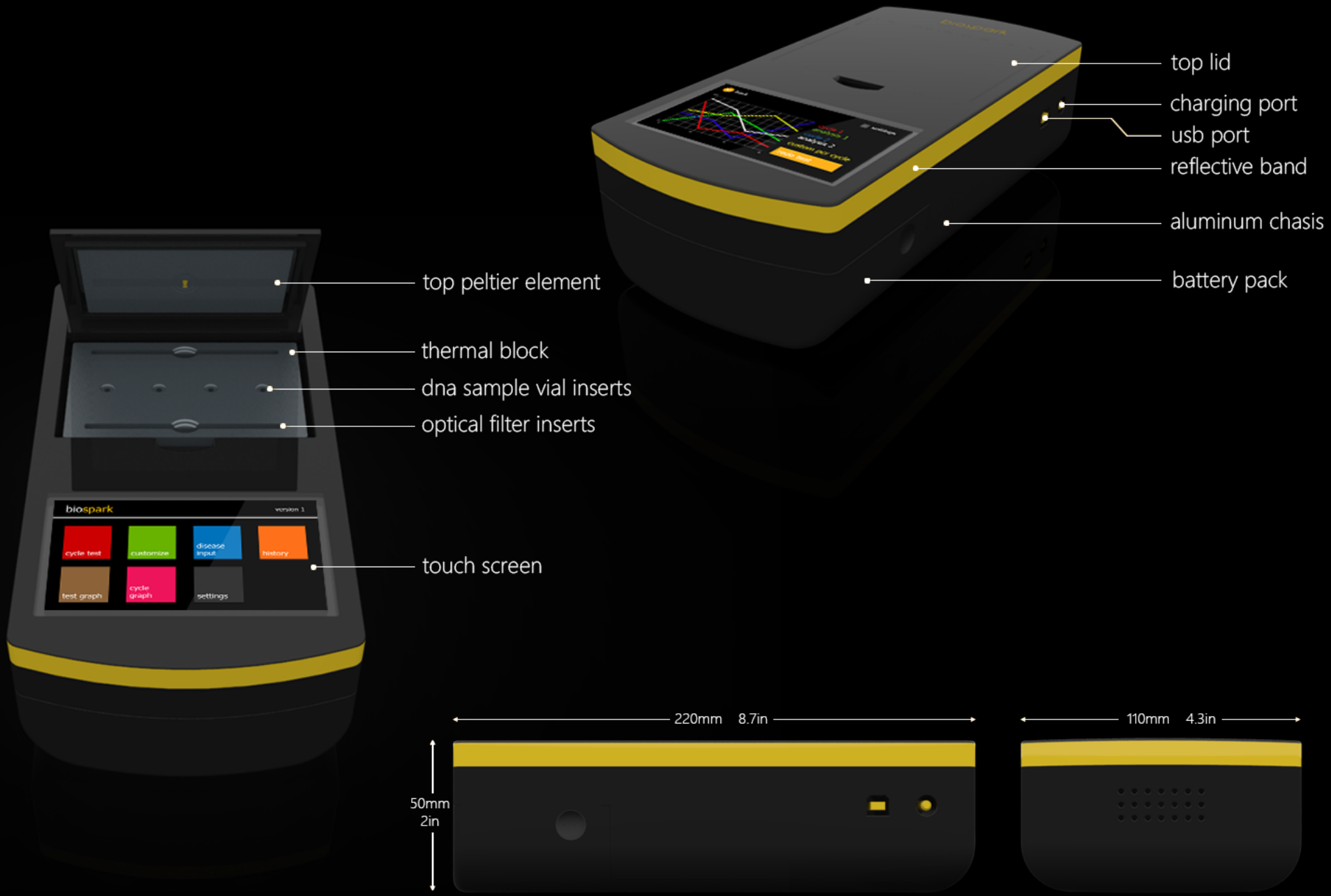
BioSpark was designed to fit comfortably in a hand or be placed on a table. The dimensions are controlled by the internal components but still have an aesthetic and rugged feel to it. The external surfaces are high-friction, scratch and water proof with a yellow reflective strip for visibility at night.

BioSpark has three main uses:

1. Inpatient testing & pharmacogenetics - Effective bed side diagnostics for custom treatment based on DNA profiles
2. Field patient pathogen testing - Diagnose and immediately treat diseases in the field without a lab.
3. Food & water testing - Eliminate pathogens at the source before human exposure.

Note: The BioSpark design has a provisional patent with the USPTO.




top lid
charging port
usb port
reflective band
aluminum chasis
battery pack
top peltier element
thermal block
dna sample vial inserts
optical filter inserts
touch screen
biospark
version 1
cycle test
customize
disease input
history
test graph
cycle graph
settings
220mm 8.7in
110mm 4.3in
50mm
2in

The Responsibilities

Due to the start-up nature of BioSpark there is a lot of work dealing with the integration of engineering, design and business. I am responsible for integrating the mechanical design of the internal features with the industrial design, including color, materials and finish. In addition I created the user interaction scenarios, user interfaces and visual design of all the software. I also help with the electronics and the business plan along with delivering pitches to investors for funding or technical support.

The Business Plan

For BioSpark to be a viable product we need to think of long term sustainability. Here is a quick summary of our business proposal once a viable product has been created:

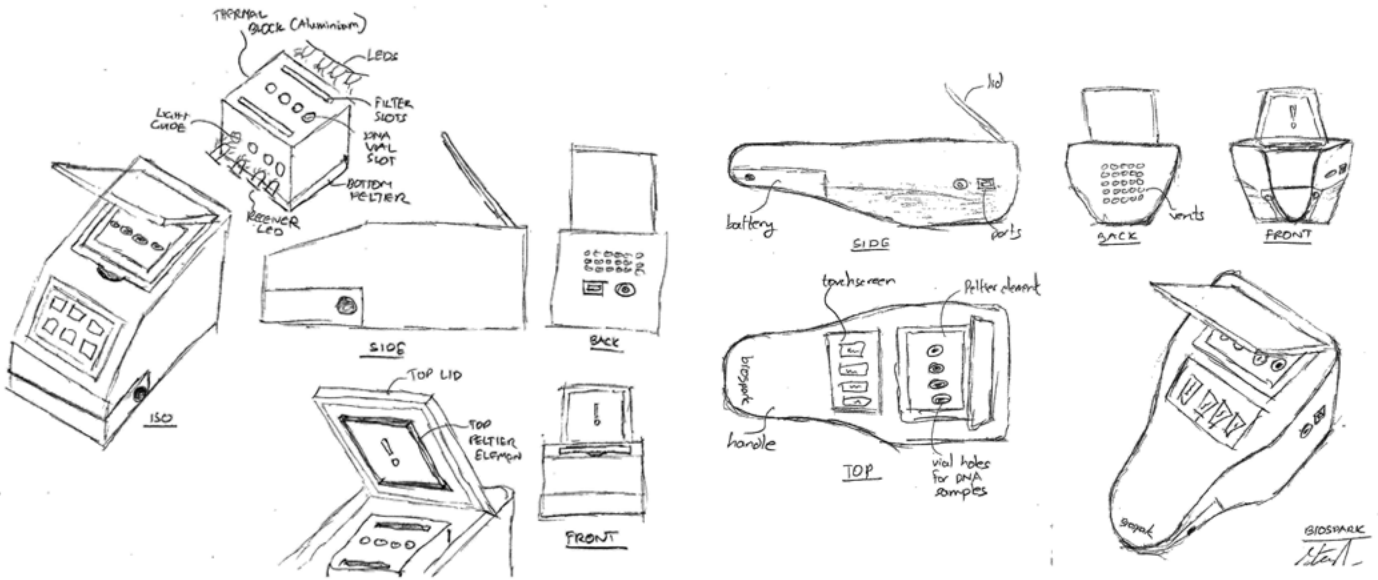
1. Sell the BioSpark Thermocyclers at a competitive pricing to established hospitals or labs.
2. Provide the BioSpark Thermocyclers free to various health organizations in poor nations.
3. The vials to be used with BioSpark containing the reagents will be sold to everyone.
4. The distribution of the vials will be our long-term source of income to support the company.

The Challenges

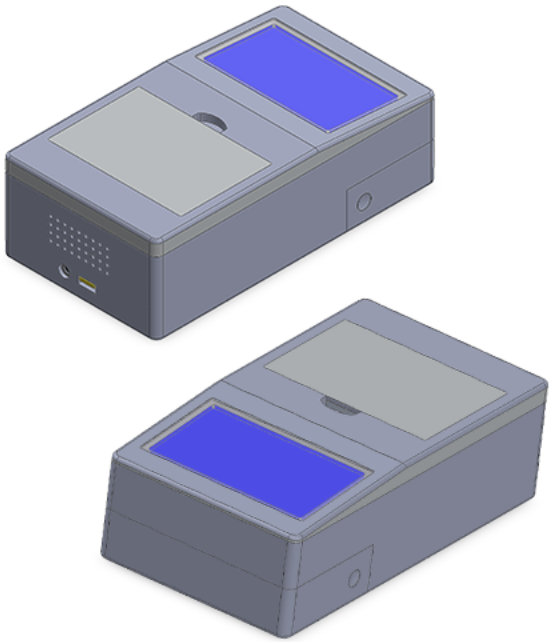
BioSpark is becoming one of the most challenging projects I have worked on but it is also one that I am most proud of. Given that I am a competent engineer, I can make BioSpark feasible and with my self-taught design skills I can make it desirable. But BioSpark is much more than an engineering and design problem. It is a problem that requires me to learn about business principles, sustainability, chemistry, biology, thermodynamics and hardest of all the ability to convince investors and researchers that they need this device.

BioSpark is about 35% complete and there is a long road ahead with FDA approvals, mass manufacturing, design optimization, income statements and hospital integration. However, I am confident this is one project that I will follow through to the end by using the lessons and experiences I have gained by taking other products to completion.

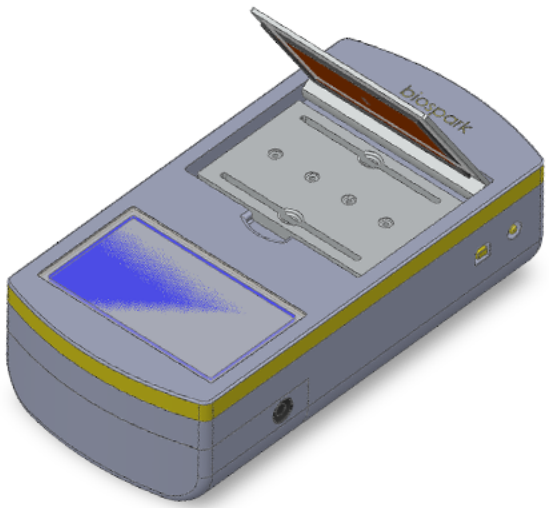
In my head I have a vision that BioSpark is being used by a field doctor, treating a child, but cannot figure out her illness based off her symptoms. The doctor uses BioSpark and in about 20 minutes, learns that the girl has meningitis and immediately treats her with antibiotics. This vision is what drives me to make BioSpark a reality.



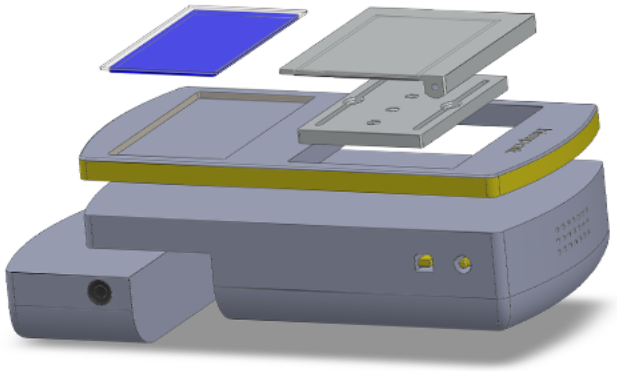
Conceptual sketches of BioSpark to get an understanding of shape, size, weight and form factor before transferring to CAD



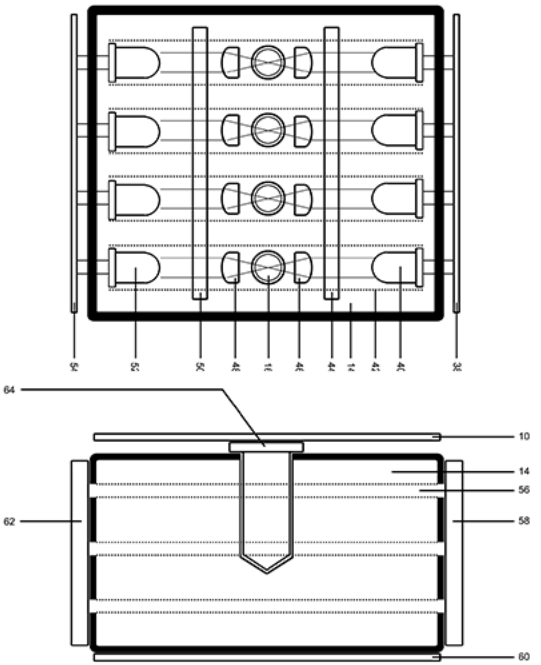
The first CAD model of BioSpark



The final CAD model of BioSpark



An exploded view of BioSpark's final design



The structure of the thermal chamber and vials

QUICKBYTE
A TASTE FOR LIFE

QuickByte is a mobile based food ordering system used by customers while dining at a restaurant. I envisioned a dining experience that eliminated the ambiguities with the ordering process at restaurants. I created QuickByte to deal with issues like language barriers, communication mishaps, payment error, food customization and ingredient selection. It also allows a user to immediately review the restaurant while the dining experience is fresh on their mind.

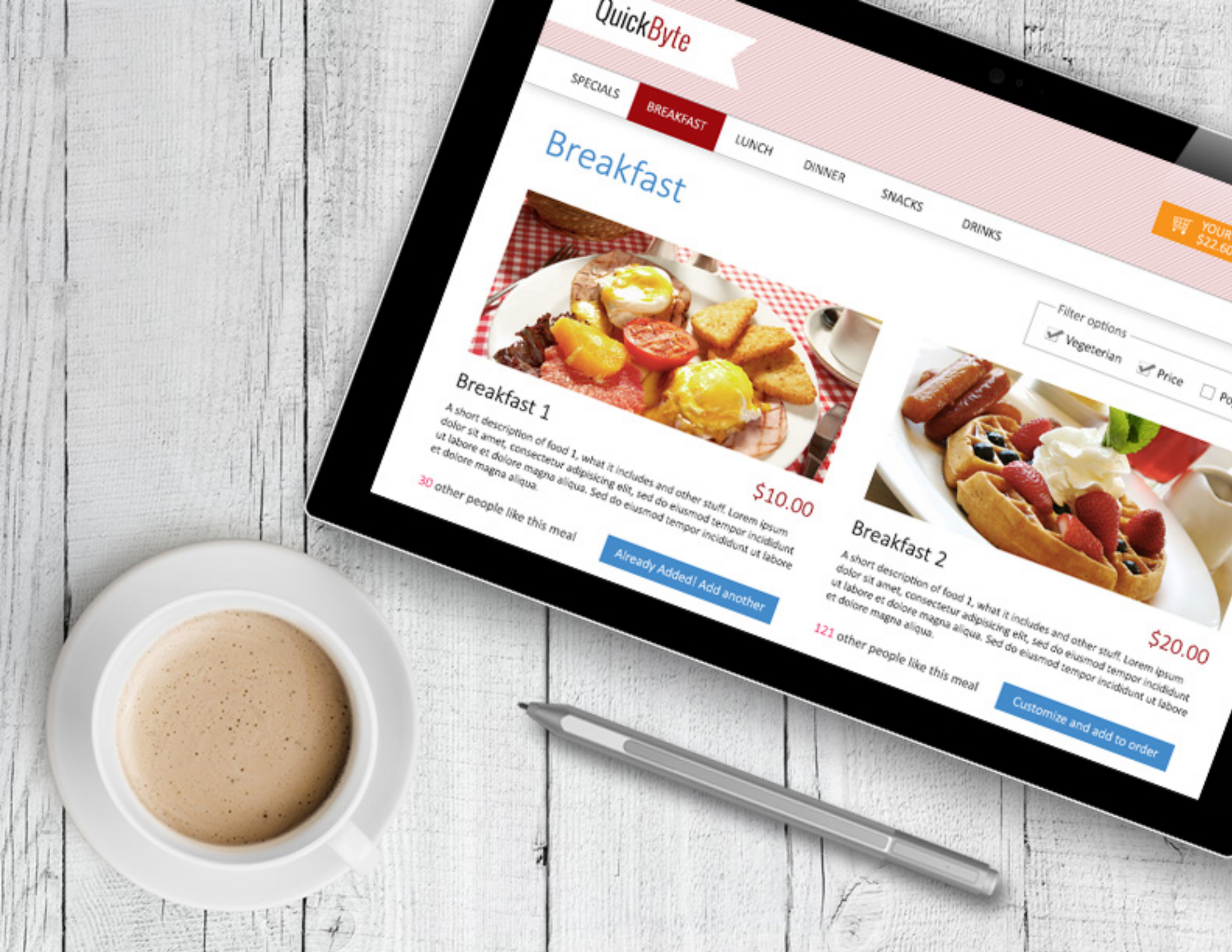
Click here to play with the prototype.

Or click here to watch a video of QuickByte

Skills: UX/UI design, interaction design, HTML/CSS/PHP, video editing

Tools: Adobe Suite, Paper Prototypes, Contextual Inquiries, Sketching

Status: Project completed and implemented May 2014.


QuickByte
SPECIALS
BREAKFAST
LUNCH
DINNER
SNACKS
DRINKS
Breakfast
Filter options
Vegeterian
Price
Breakfast 1
A short description of food 1, what it includes and other stuff. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
$10.00
30 other people like this meal
Already Added! Add another
Breakfast 2
A short description of food 1, what it includes and other stuff. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
$20.00
121 other people like this meal
Customize and add to order

The Problem

The popularity of technology replacing humans in the workplace has grown significantly over the years and one industry that has a significant potential to integrate machines in their daily operations is the food service industry.

1. The food ordering process can cause confusion and ambiguity.
2. Language barriers and unclear menus pose health hazards and unexpected results.
3. The payment process can be frustrating.

The Design Criteria

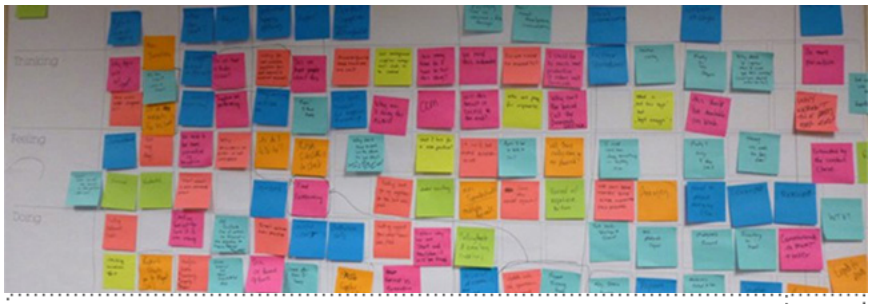
1. Create an electronic system that can essentially replace a server at a restaurant.
2. Be user friendly and convenient regardless of technical ability .
3. Operate on any portable platform (tablet, smartphone, kiosk) .

The Motivation

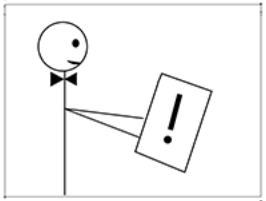
I was motivated to create this product because of my own personal experiences while dining in foreign countries. I was annoyed by vague menus, ineffecient service and awkward payment methods.

The Solution

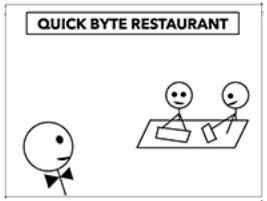
I created QuickByte by using various interaction and interface design principles such as storyboarding, wireframing, user surveys and high/low fidelity prototypes. The final solution was a responsive software application that can run on various portable mediums. I designed the front-end and back-end myself by learning the tools and programming languages on my own time. The following pages show my prototypes and final design.



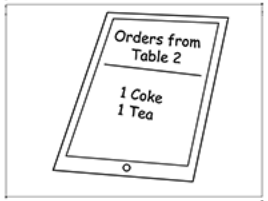
Restaurant Staff



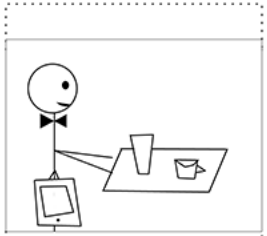
Our waiter Mike has just received notification on his iPad that new customers have logged in and seated themselves at table 2.



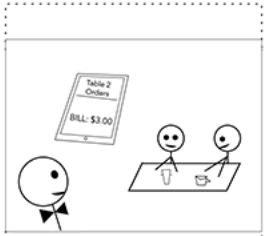
The customers don't seem to have any problem using the system so Mike should expect to receive orders on his iPad soon.



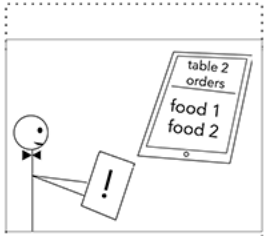
Looks like Table 2 has just put in a new order! Mike is going to prepare these orders and deliver them as soon as possible.



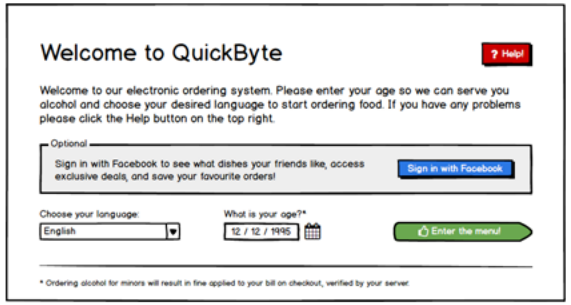
Orders are ready and Mike is going to deliver them to table 2.



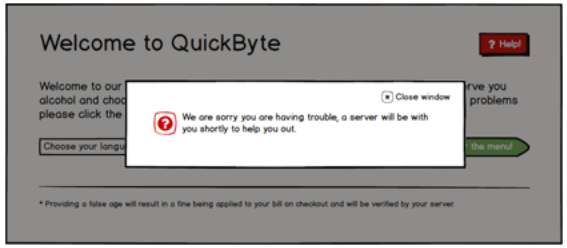
After Mike has delivered the first batch or orders to table 1 he clears the order by adding it to



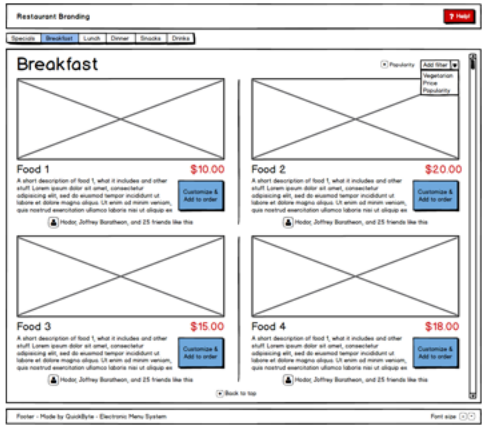
Mike now receives a new notification from table 2 with new orders placed



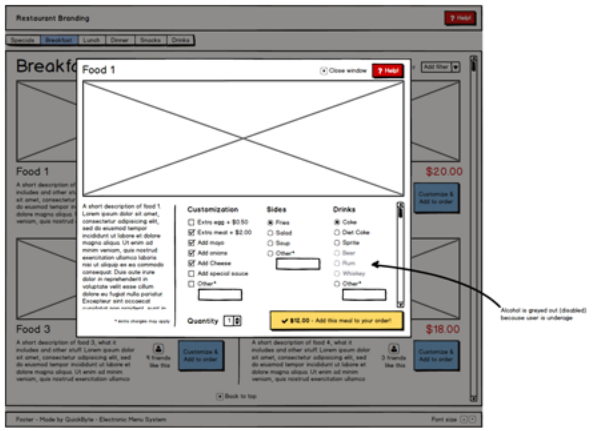
The welcome and age verification (for alcohol)



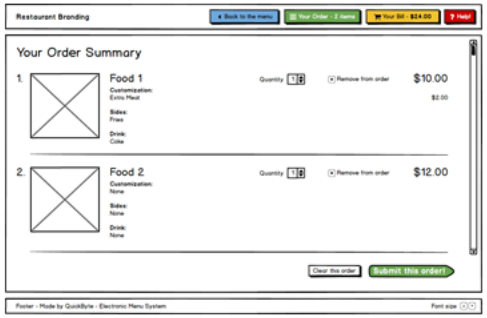
The help pop-up that is available at any screen



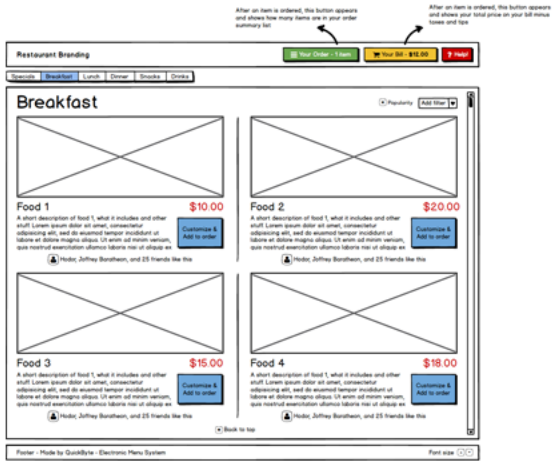
A selection of food that can be filtered and sorted



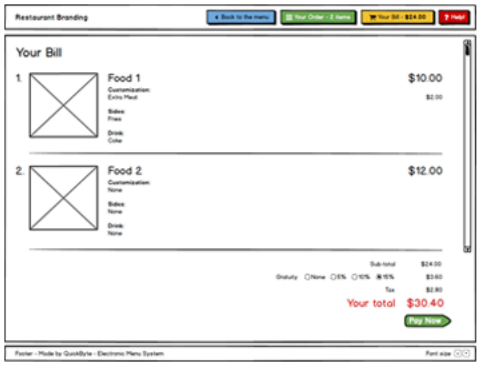
The detail view and customization for food



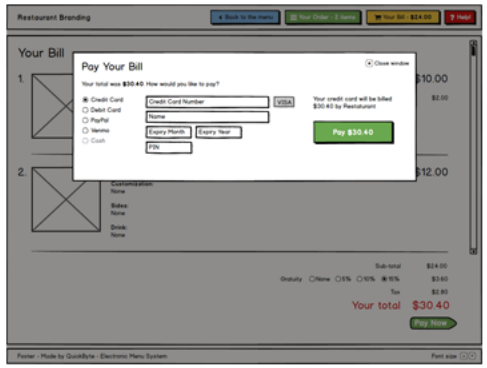
The order summary screen after submitting an order



The change in UI after an order has been submitted

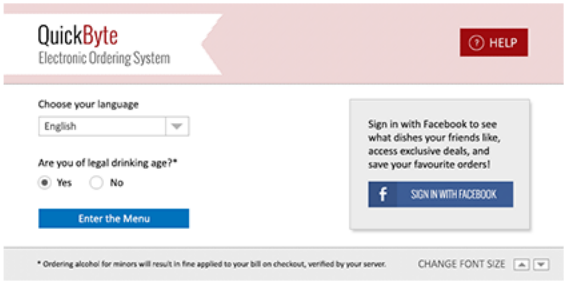


The billing page

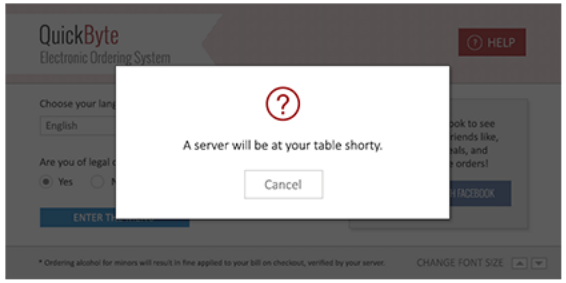


The secure electronic payment page

After payment, the review screen to review the restaurant



The welcome and age verification (for alcohol)



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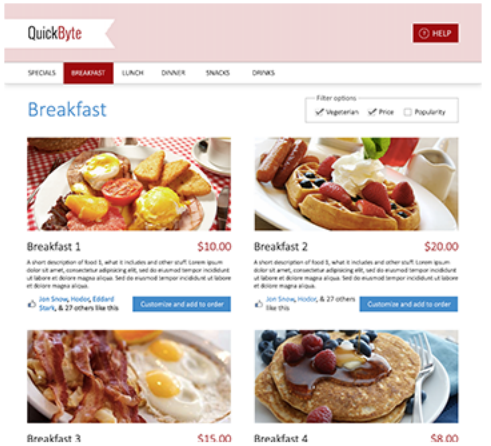

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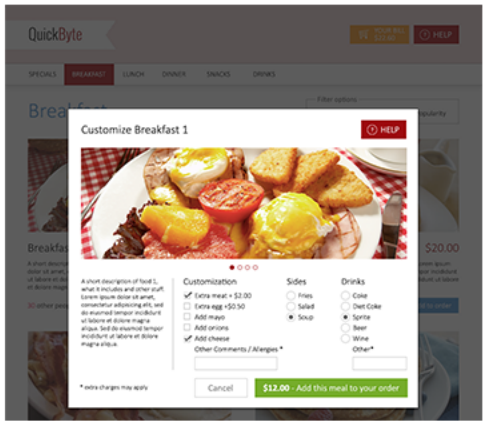

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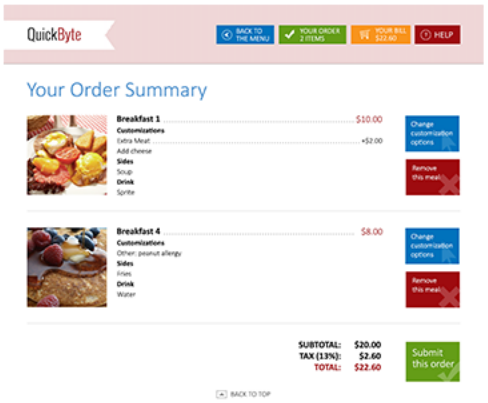
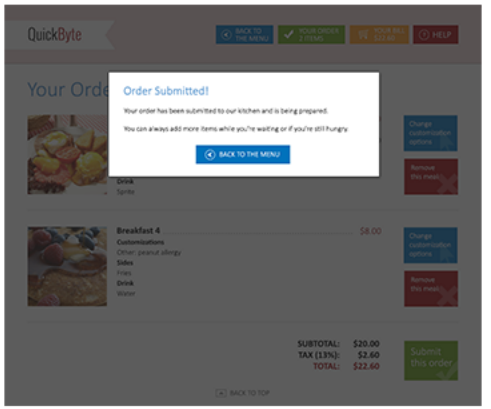
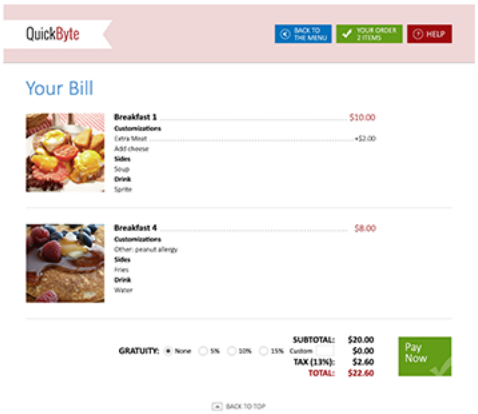


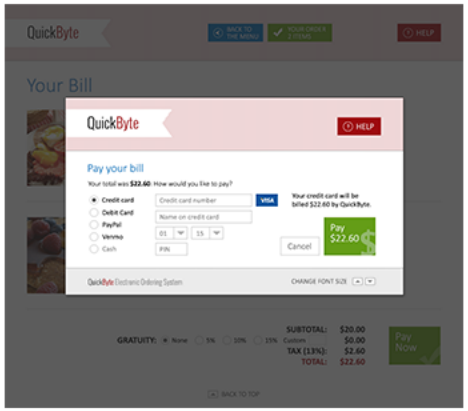
The order summary screen after submitting an order



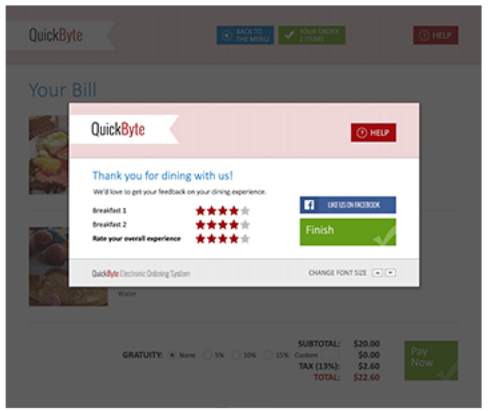
The change in UI after an order has been submitted



The billing page



The secure electronic payment page



After payment, the review screen to review the restaurant

PULSE PUNCHING BAG
THE FUTURE OF FIGHT TRAINING

With the popularity of Mixed Martial Arts (MMA), my goal is to provide the new fighter with an interactive punching bag and eco-system to improve their fighting technique safely and without the need for a trainer.

Our team created the Pulse Punching Bag which is an smart punching bag that can provide a fighter with visual cues to punch, kick or elbow. The bag will then measure data and provide feedback to the fighter. The bag also comes with a software eco-system to motivate and enhance the user experience.

I was responsible for creating the user experience, software application and the design of the products visible features. I also integrated the electronics with the mechanical design. I was also responsible for developing the patents, business plan and delivering pitches to various investors for funding. The project was completed and donated to the University of Waterloo's kinesiology faculty.

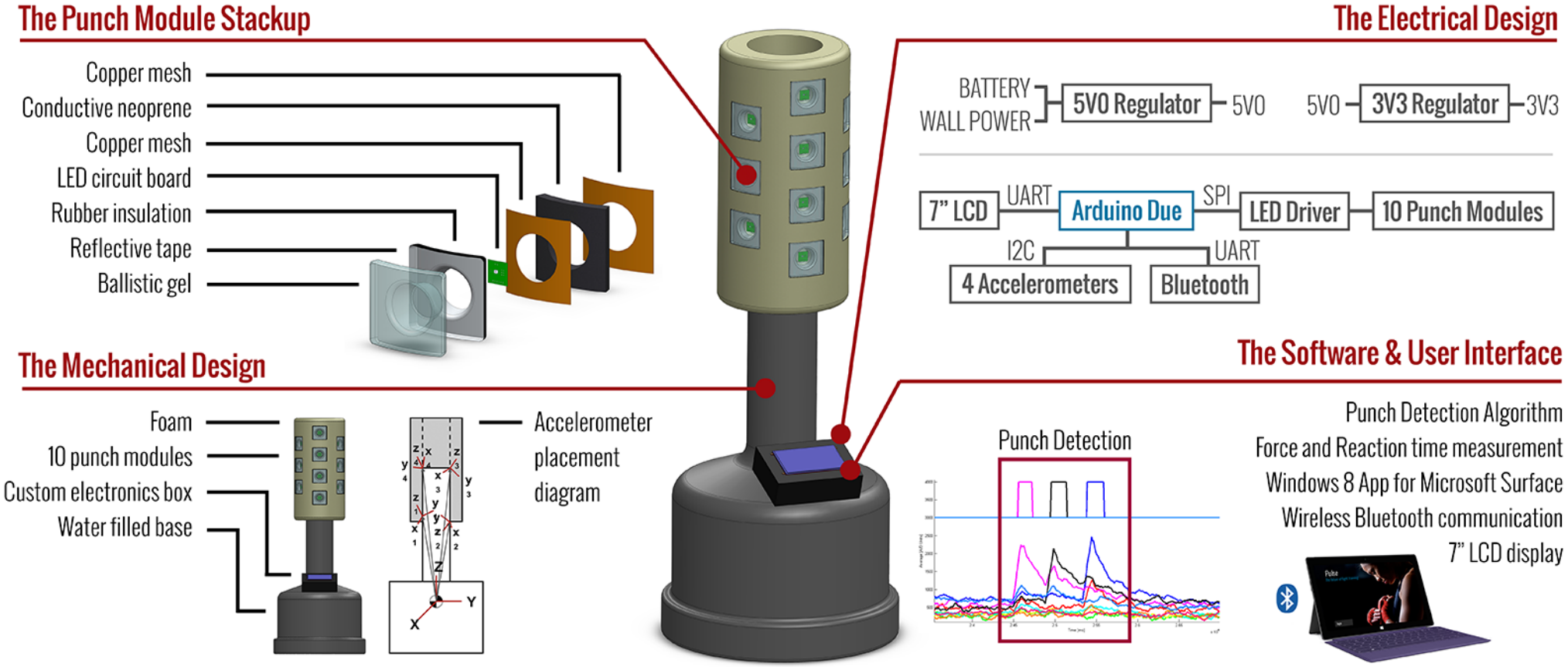
Watch a video of the Pulse Punching Bag in action.

Skills: Electronics, interaction design, product design, UX/UI design

Tools: Photoshop, Illustrator, Notepad++, pencil and paper for sketching

Team: Filipp Demenschonok, Fiona Chui, Adam Craig

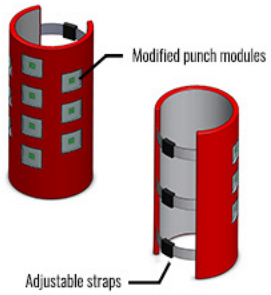
Status: Product completed and handed over (Dec 2014)



The Pulse Punching Bag product with all its features and technology

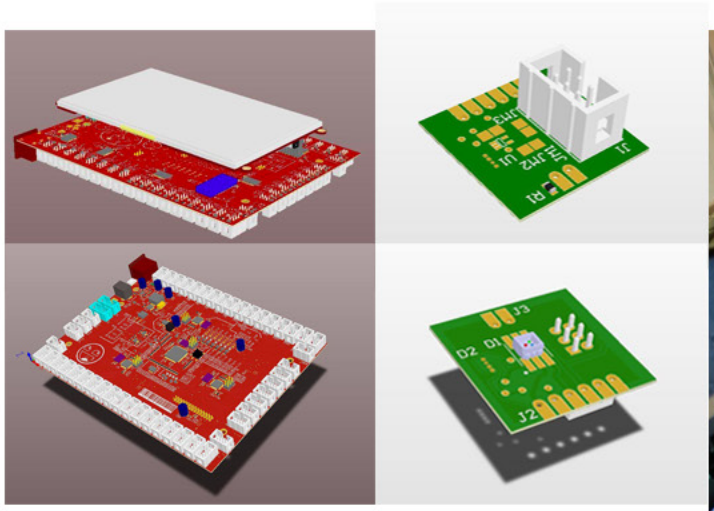
The Pulse Punching Bag being demoed

The eco-system is responsive to scale to various screens

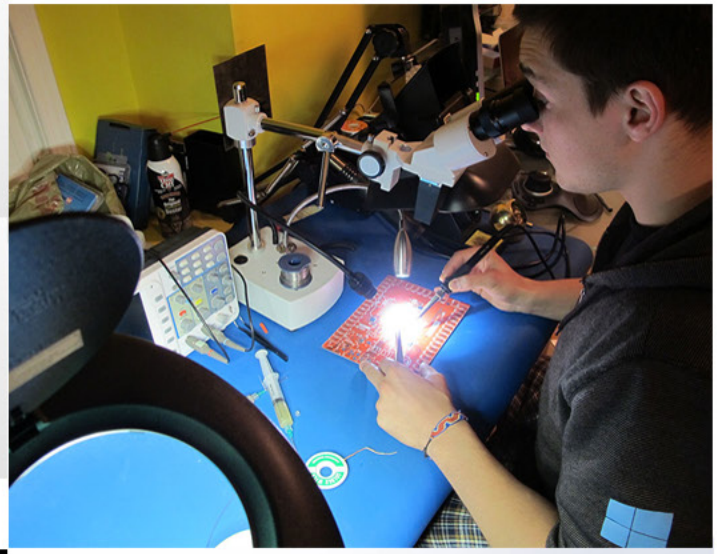


The next iteration of the Pulse Punching Bag is a slip-on sleeve to go over existing punching bags

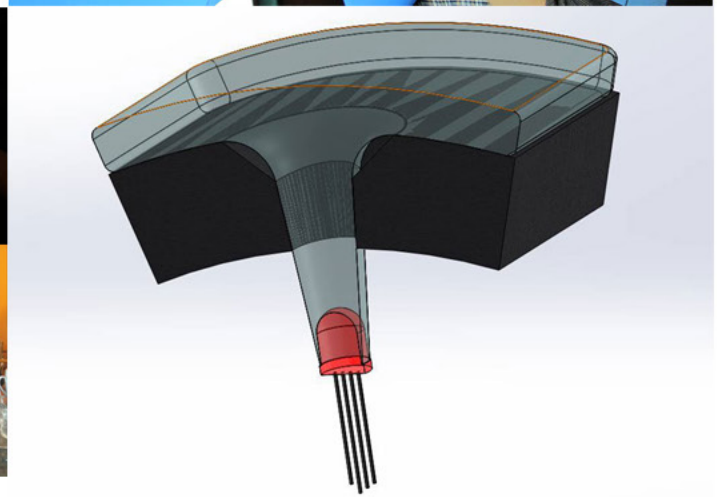
The mobile user interface and eco-system that accompanies the Pulse Punching Bag



The CAD of the electronic circuit boards in Pulse



Various prototypes of the Pulse punch module



A CAD cross section of our final punch module stackup

STIMPACK
POWER FASTER

Stimpack is a pocket sized portable battery pack that can quick charge your electronic device such as a smartphone with an extra hour of use. Its ergonomic design and durable materials provide a premium, high quality feel with contrasting colors for an excellent user experience. It has a rugged, weatherproof design for use in all environmental conditions.

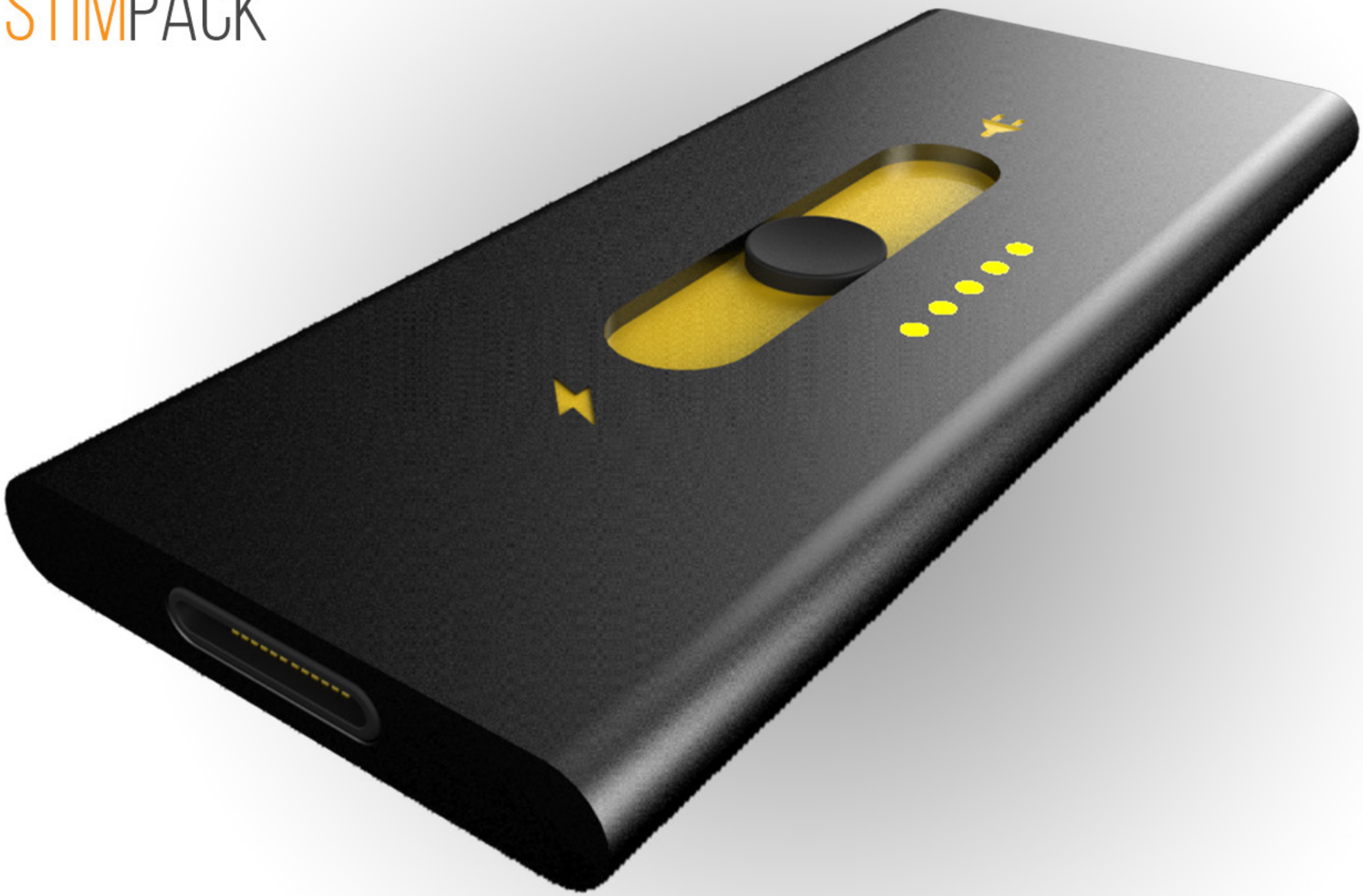
I created the idea for Stimpack after I found myself stranded in the middle of a mountain with my cell phone and GPS, both with low battery. In hindsight, I should have been better prepared, but if I had a device like Stimpack it would have saved me a lot of time and anxiety in the wilderness.

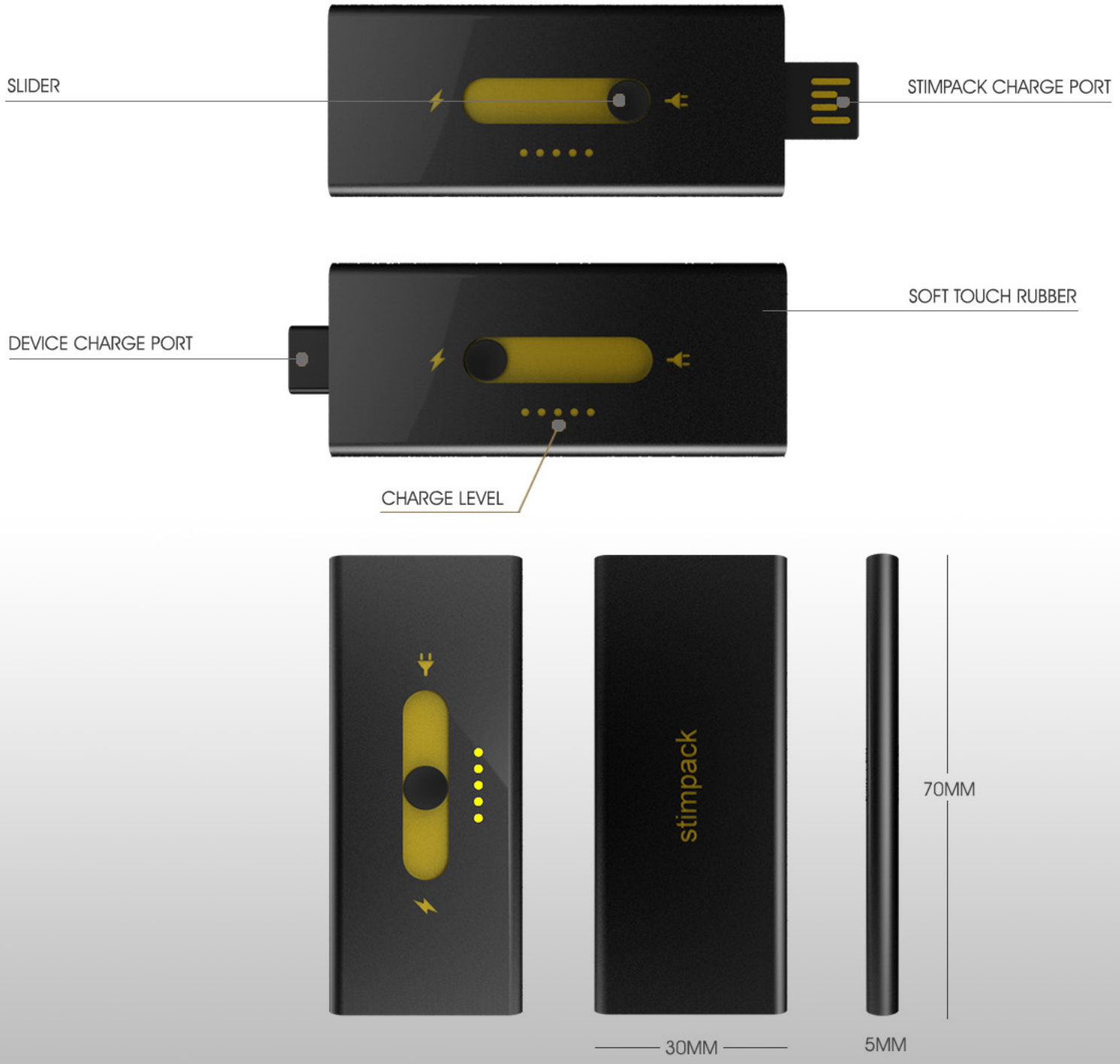
Skills: Industrial design, engineering, product design

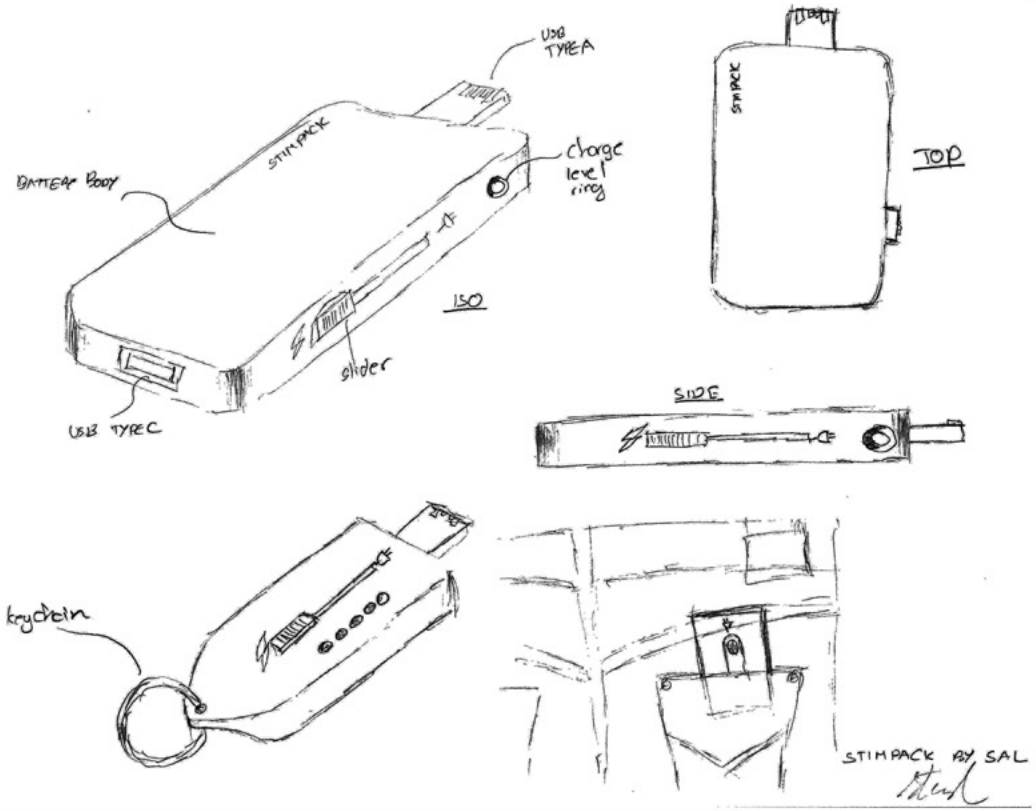
Tools: SolidWorks, Keyshot, Photoshop, Sketching

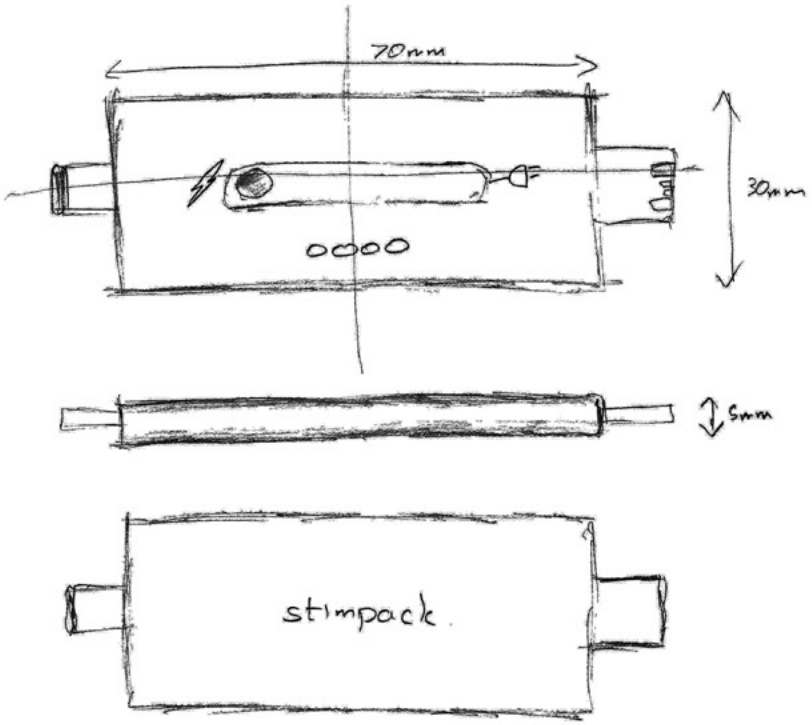
Status: Concept completed Dec 2015, waiting for product development

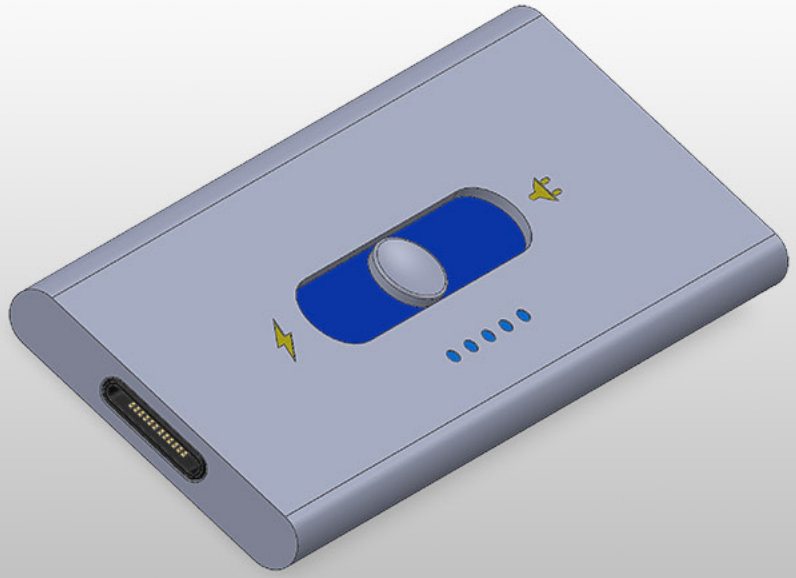
STIMPACK

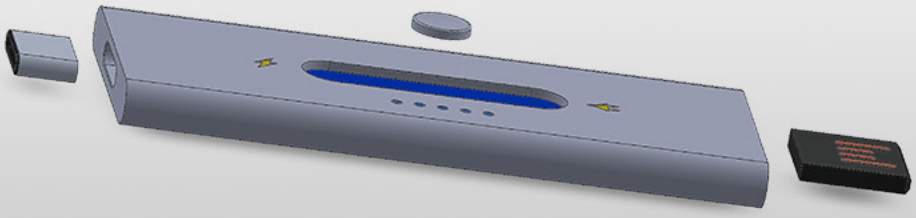



SLIDER
STIMPACK CHARGE PORT
SOFT TOUCH RUBBER
DEVICE CHARGE PORT
CHARGE LEVEL
stimpack
70MM
30MM
5MM


USB TYPE A
STIMPACK
BATTERY BODY
charge level ring
ISO
slider
USB TYPE C
TOP
SIDE
keychain
STIMPACK BY SAL


70mm
30mm
5mm
stimpack





EON SMARTWATCH

AN INDEFINITE AND VERY LONG PERIOD OF TIME

EON is a conceptual design of a smart watch. The watch will pair with your mobile device and act like a personal assistant on your wrist. EON is a watch first and smartwatch second.

I created EON because I am passionate about wearable devices. Ever since watching James Bond movies as a child, I wanted to create something similar but with some very unique features. I wanted EON to be rugged, premium looking, simple and efficient with its battery life.

The standout feature of EON is its smart wrist band. Most in-market implementations use a touch screen for the watch face. But the face is really small and if my finger is over the screen how am I supposed to see what's underneath it? The smart wrist band acts as the control instead of the watch face. Swipes and gestures on the band will interact with the content on the screen.

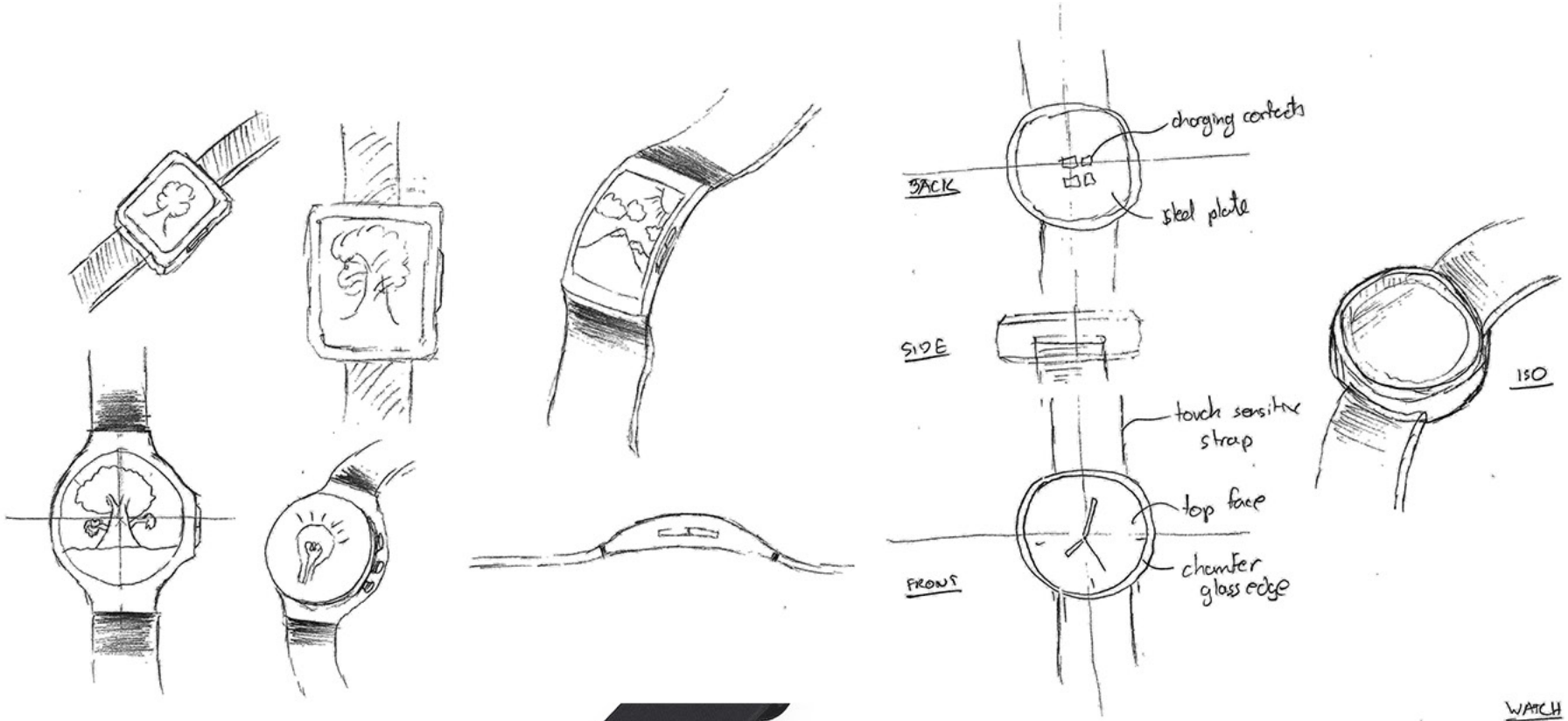
Skills: Industrial design, engineering, product design

Tools: SolidWorks, Keyshot, Photoshop, Sketching

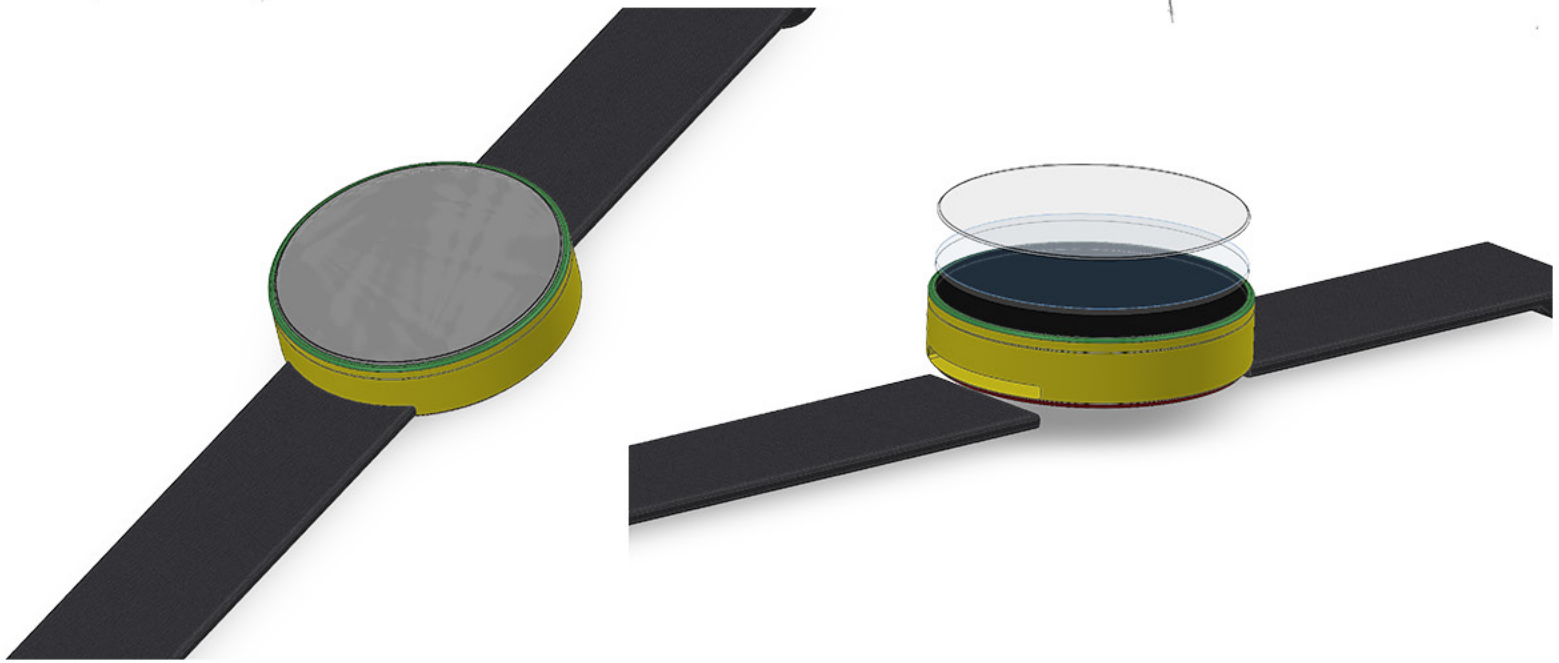
Status: Concept completed Jan 2016, waiting for prototyping

EON

CHROME ACCENT
CIRCULAR OLED LCD
DISAPPEARING BEZEL
SMART WRIST BAND
BRUSHED ALUMINUM
BUTTONLESS BODY
WIRELESS CHARGING
POLISHED STAINLESS STEEL


charging contacts
BACK
steel plate
SIDE
ISO
touch sensitive strap
top face
chamfer glass edge
FRONT

WATCH



TRAILVIEW
MAP YOUR ADVENTURE

TrailView is the equivalent of Google Streetview for hiking trails. It is a mobile user interface where users go on hikes and upload pictures of their adventure to their profile. They can earn badges and points based on how well they capture their experience and other user's recommendations.

I like to think I was born outdoorsy. Living in the state of Washington has opened up thousands of trails and mountains for me to climb. I set out to create this application with my teammate because I wanted to know if a hike I was going to take was going to be worth the time and effort.

I created the front-end user interface design, interaction design scenarios and promotional materials for TrailView. My teammate did the back-end development and programming.

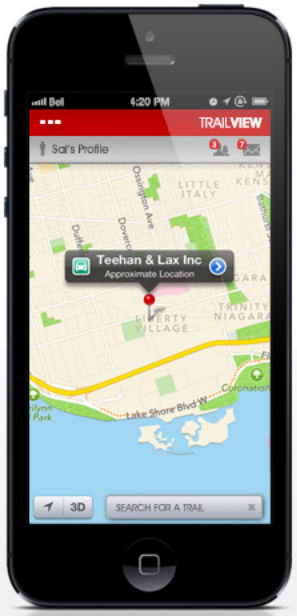
Click here to watch a video of TrailView.

Skills: UI/UX design, HTML/CSS

Tools: Notepad++, Photoshop, Illustrator

Status: Project completed and submitted Aug 2014

4:20 PM
TRAILVIEW
MAP YOUR ADVENTURE
LOGIN
REGISTER
RAILVIEW
EGISTER
GO BACK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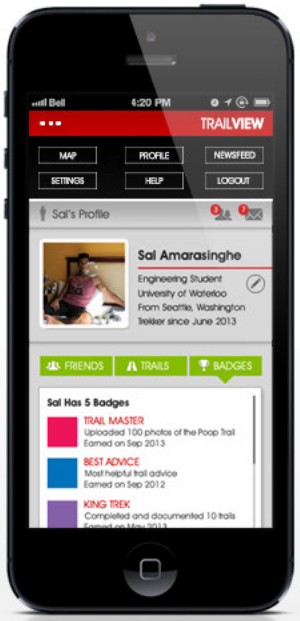
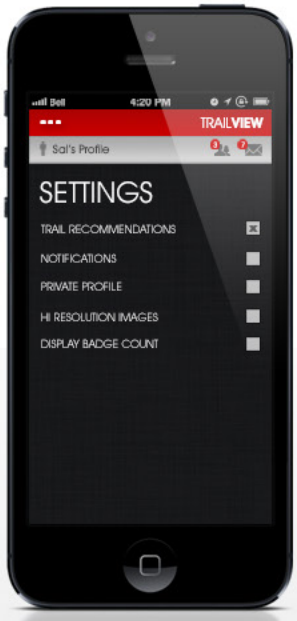
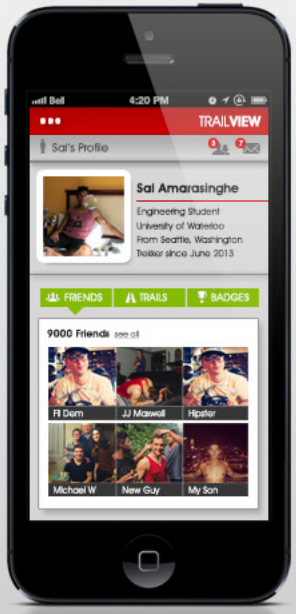
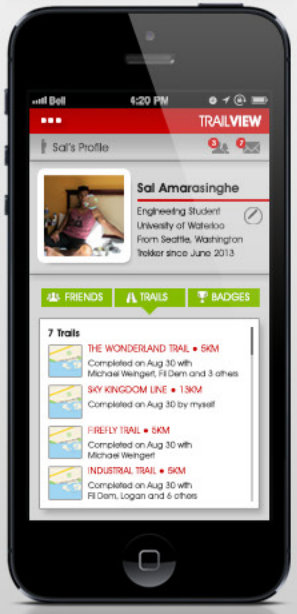
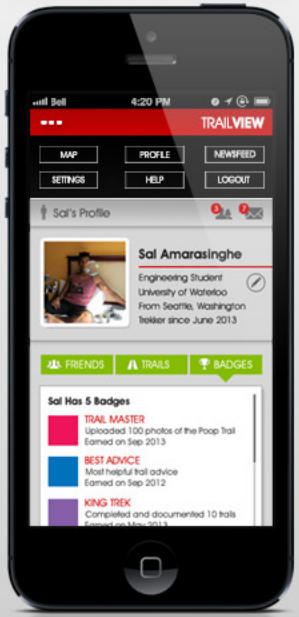
TRAILVIEW
Sal's Profile
Teehan & Lax Inc
Approximate Location
3D
SEARCH FOR A TRAIL


4:20 PM
TRAILVIEW
MAP
PROFILE
NEWSFEED
SETTINGS
HELP
LOGOUT
Sal's Profile
Sal Amarasinghe
Engineering Student
University of Waterloo
From Seattle, Washington
Trekker since June 2013
FRIENDS
TRAILS
BADGES
Sal Has 5 Badges
TRAIL MASTER
Uploaded 100 photos of the Poop Trail
Earned on Sep 2013
BEST ADVICE
Most helpful trail advice
Earned on Sep 2012
KING TREK
Completed and documented 10 trails


4:20 PM
TRAILVIEW
Sal's Profile
SETTINGS
TRAIL RECOMMENDATIONS
NOTIFICATIONS
PRIVATE PROFILE
HI RESOLUTION IMAGES
DISPLAY BADGE COUNT


4:20 PM
TRAILVIEW
Sal's Profile
Sal Amarasinghe
Engineering Student
University of Waterloo
From Seattle, Washington
Trekker since June 2013
FRIENDS
TRAILS
BADGES
9000 Friends see all
Fl Dern
JJ Maxwell
Hipster
Michael W
New Guy
My Son


4:20 PM
TRAILVIEW
Sal's Profile
Sal Amarasinghe
Engineering Student
University of Waterloo
From Seattle, Washington
Trekker since June 2013
FRIENDS
TRAILS
BADGES
7 Trails
THE WONDERLAND TRAIL • 5KM
Completed on Aug 30 with
Michael Weingert, Fl Dern and 3 others
SKY KINGDOM LINE • 1.5KM
Completed on Aug 30 by myself
FIREFLY TRAIL • 5KM
Completed on Aug 30 with
Michael Weingert
INDUSTRIAL TRAIL • 5KM
Completed on Aug 30 with
Fl Dern, Logan and 6 others


4:20 PM
TRAILVIEW
MAP
PROFILE
NEWSFEED
SETTINGS
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FRIENDS
TRAILS
BADGES
Sal Has 5 Badges
TRAIL MASTER
Uploaded 100 photos of the Poop Trail
Earned on Sep 2013
BEST ADVICE
Most helpful trail advice
Earned on Sep 2012
KING TREK
Completed and documented 10 trails

EARTH HOUR 2013
TURN OFF THE LIGHTS, LIGHT UP THE FUTURE

I created print and web material as part of a campaign to advertise Earth Hour 2013 in Singapore due to low participation. I volunteered my time to create a poster, brochure and website because I have supported, believed and participated in Earth Hour every since I first heard about it during my first year in university.

I had one goal in mind when creating the promotional materials, to enlighten the user about Earth Hour and what they needed to do at a particular date and time to participate.

The printed materials were displayed at bus stops, campus bulletin boards and local shopping malls. The website was created to be responsive and worked on multiple portable and desktop form factors.

Skills: UI/UX design, graphic design, web design, photography

Tools: Photoshop, Notepad++, Lightroom

Status: Project completed Jan 2016

MARCH 23 2013 8:30PM

TURN OFF THE LIGHTS, LIGHT UP THE FUTURE

TURN OFF THE LIGHTS FOR ONE HOUR TO DEMAND ACTION ON CLIMATE CHANGE

EARTHHOUR.ORG

WWF

FUTURE PROJECT
THE HANDSHAKE

The Handshake is an idea that I have floating in my head that I want to create into a product.

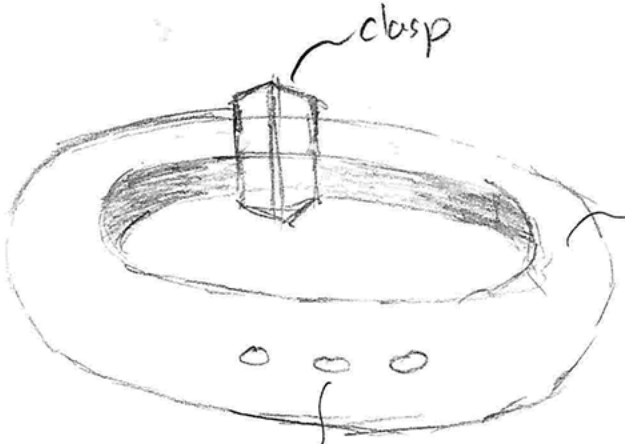
When I meet someone new, the first thing I do is shake their hand. It is the most basic of human custom and interaction. Unfortunately, due to my excitement, I almost always forget their name after the introduction. What the Handshake would do is everytime I shake someone's hand, it also remembers their name and creates a contact card for that person on my phone so that I know exactly who they are and how to contact them in the future.

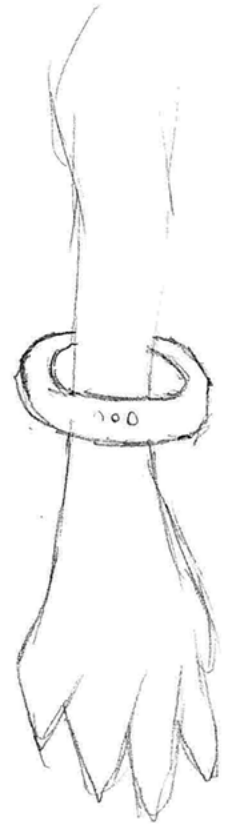
This product would have been very handy at the various conferences and job fairs I attended, so I decided to create it. The key to the Handshake is that it is very discrete and subtle, almost like a piece of jewelery.

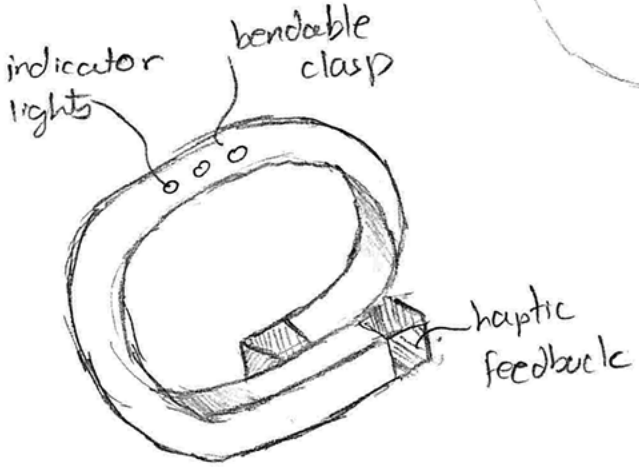
Skills: Industrial design, engineering, product design

Tools: SolidWorks, Keyshot, Paper & Pencil, Sketching

Status: Concept started August 2016, prototyping and CAD set for 2017


clasp
haptic feedback
indicator lights




indicator lights
bendable clasp
haptic feedback

Handshake

THE END

VIEW MY ONLINE PORTFOLIO FOR DETAILED PROJECT DESCRIPTIONS

WWW.BITSOFSAL.COM