

JENNELLE WONG

PORTFOLIO 2016

Hi, I'm Jennelle...

I'm a recent graduate of Mechatronics Engineering at University of Waterloo. I like to build and tinker and I'm looking for a full-time position.

During my undergraduate, I've worked a total of 6 co-op placements at a number of tech companies in Toronto and San Francisco.

I am now looking to pivot from my UX and software experience to bring my passion to product design and solutions.

SKILLS

design

Low/High Fidelity
Wireframing
A/B Testing
Usability Testing
UI/UX Design
Narrative Design
Adobe CC Suite

embedded

Rhino
Keyshot
SolidWorks
AutoDesk Inventor
AutoCAD
Cadence

development

Java (Android)
C
Ruby
HTML CSS JS
PHP

EDUCATION

BACHELOR OF APPLIED SCIENCE HONOURS MECHATRONICS ENGINEERING (CO-OP)

University of Waterloo
Sept 2010 - June 2015

HOBBIES + INTERESTS



tinkering + diy



software development



design



woodworking



adventurous eater

EXPERIENCE

ANDROID DEVELOPER

Wattpad | Toronto, Ontario | Sept 2014 - Dec 2014

SOFTWARE ENGINEER INTERN (ANDROID)

if(we) - formerly Tagged | San Francisco, California | Sept 2013 - Dec 2013

MOBILE PAYMENTS SOFTWARE ENGINEER INTERN

Visa Inc. | Foster City, California | Jan 2013 - Apr 2013

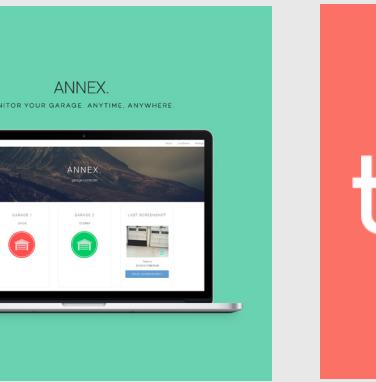
JR. PRODUCT MANAGER / UX DESIGNER

Communitech | Kitchener, Ontario | May 2012 - Aug 2012

AGILE DEVELOPER

points.com | Toronto, Ontario | Aug 2011 - Dec 2011

...and this is **some** of
my work



ANNEX.

Monitor your garage -
anytime, anywhere



tag'd

A portable laser tag system
with a textile twist.



Laptop Prop

An exercise in 3D-printing
and entrepreneurship



Wattpad Logger

Graphic tool for user-
submitted error reports



Kumquat

An alternative approach to
2-step verification

ANNEX.

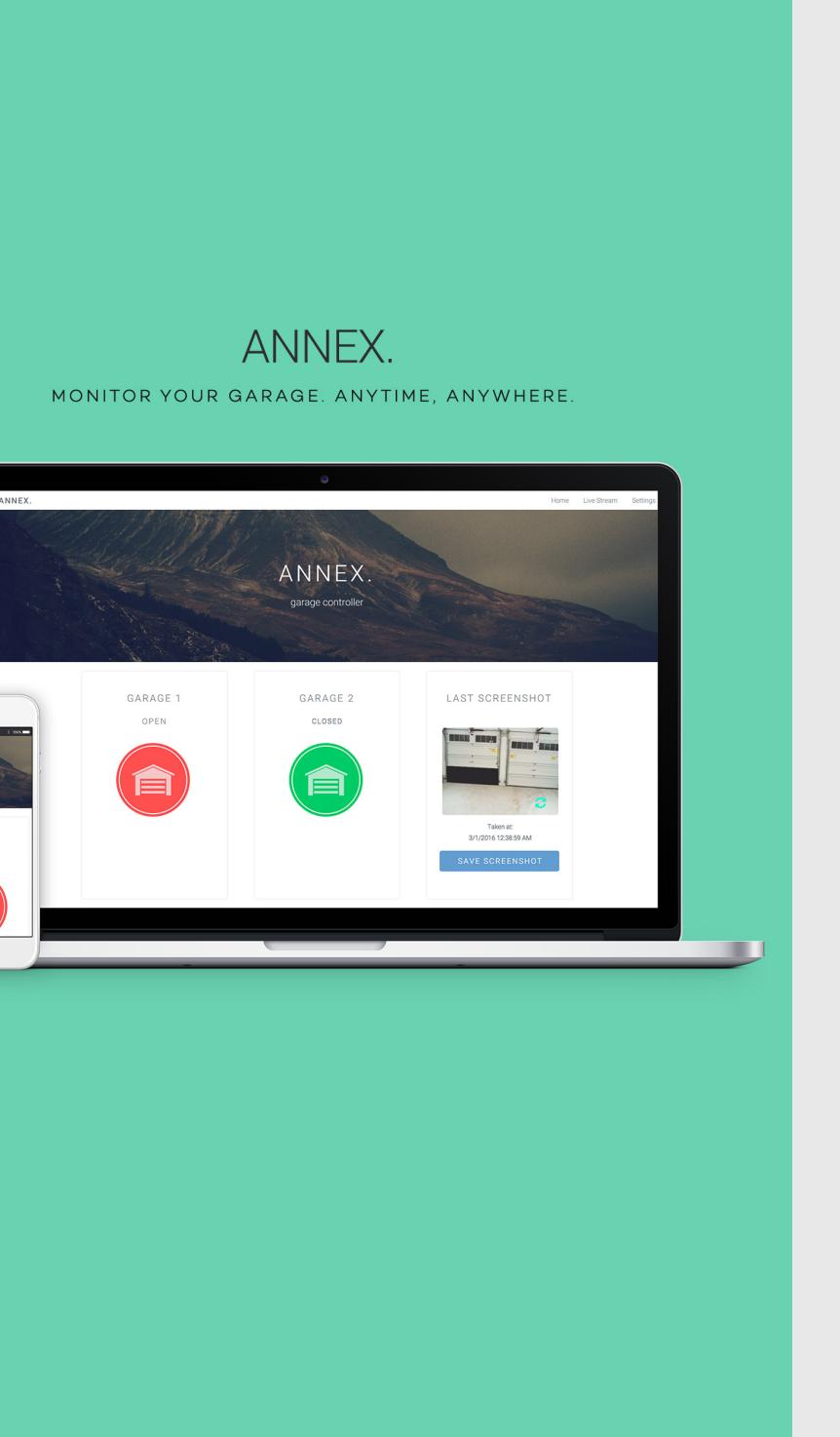
An open-sourced Arduino garage monitor

Left home and not sure if you've left your garage open? With ANNEX, you can monitor your garage - anytime, anywhere.

Version 2 is currently in the works to improve security through PIN verification and will include the addition of text notifications.

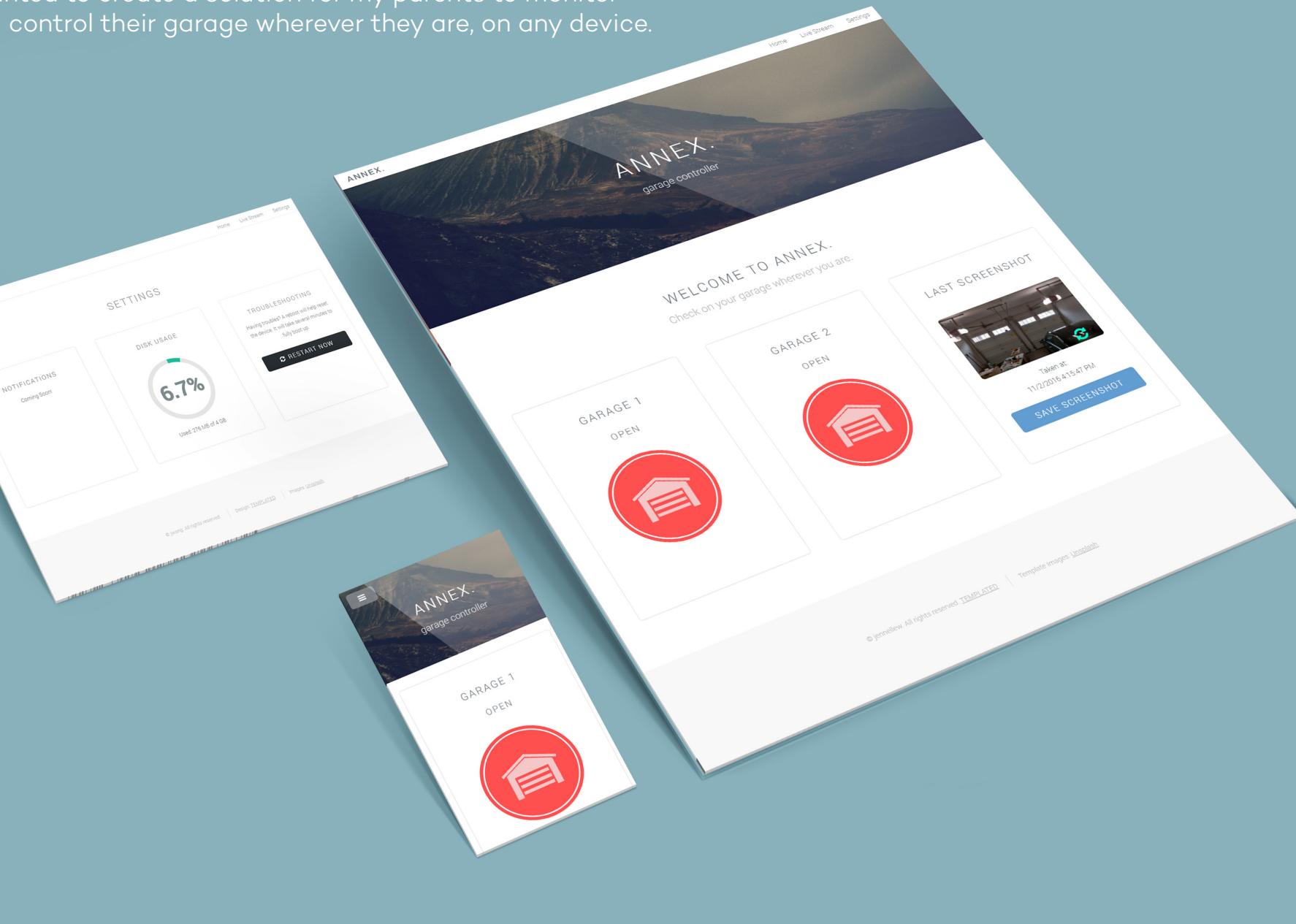
Visit the link below for the Instructables **community featured** tutorial!

www.instructables.com/id/Annex-an-Arduino-Yun-Garage-Monitor/

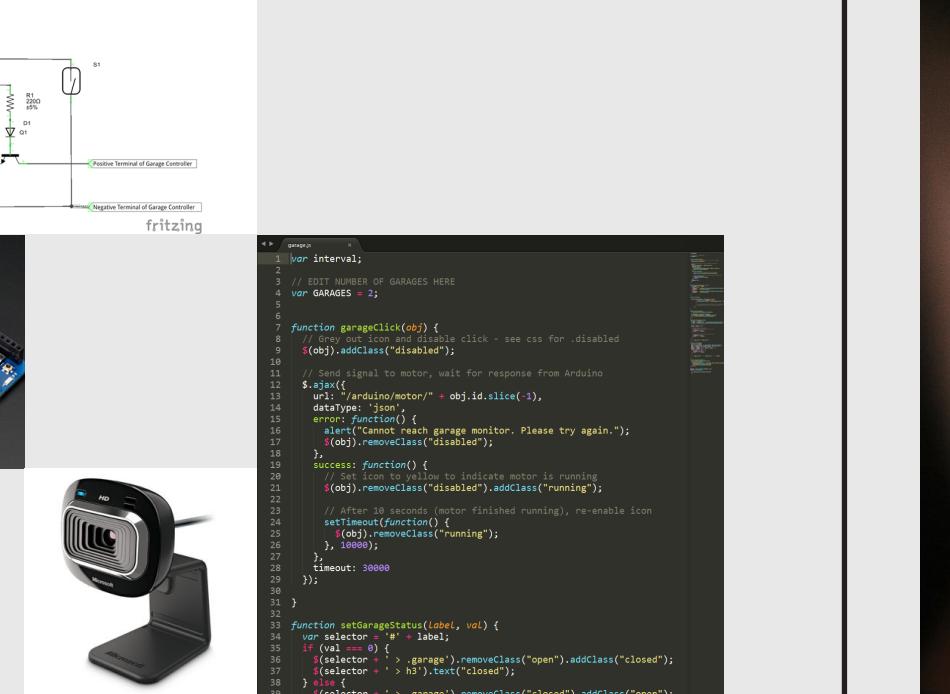
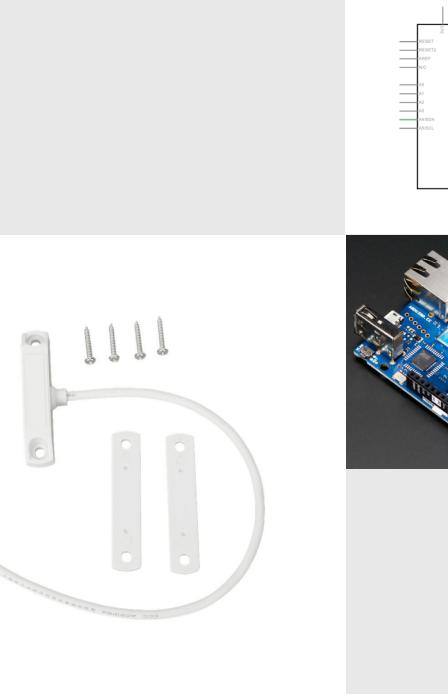


My parents often leave the house only to pull back into their driveway to check if they left their garage open.

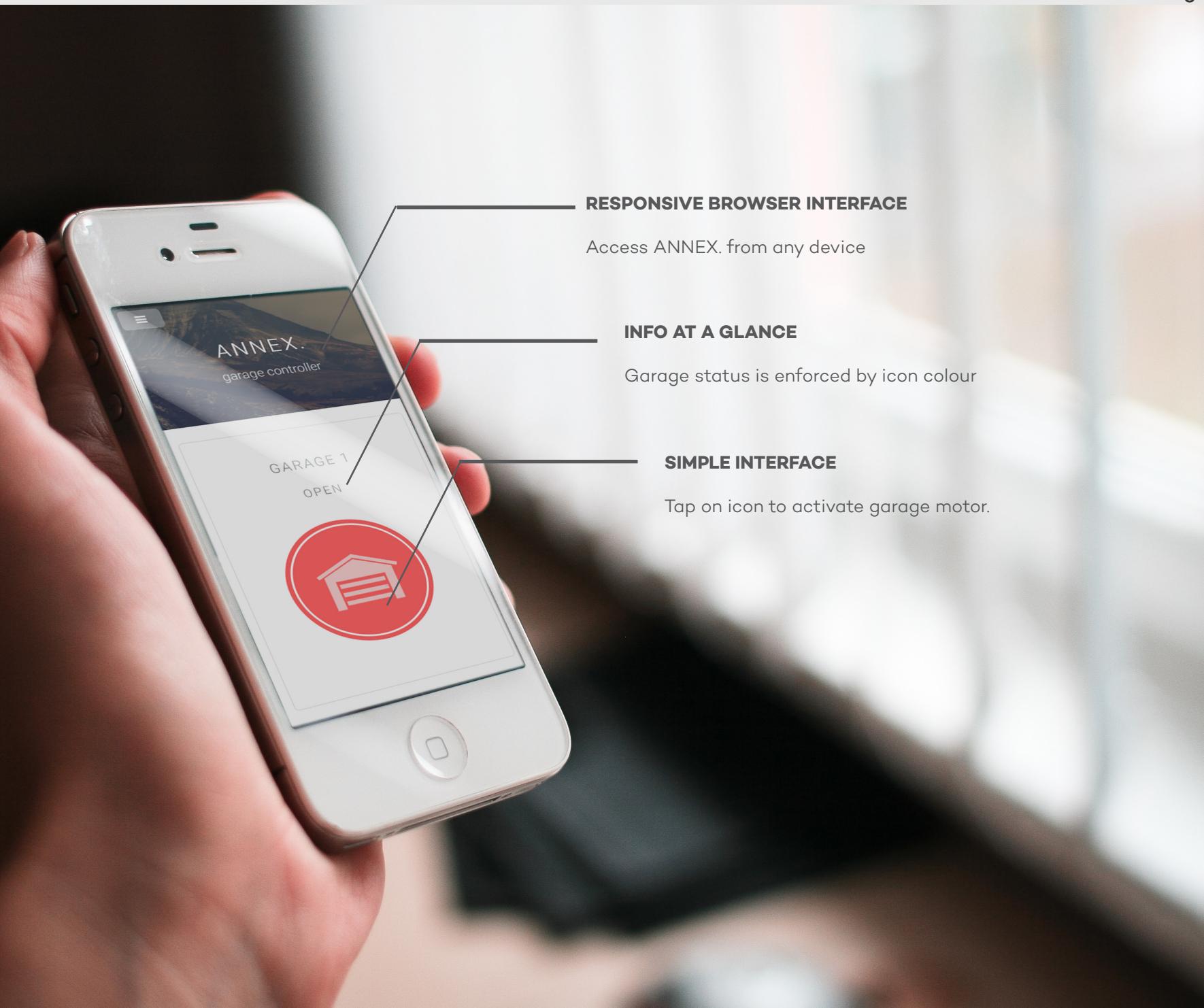
I wanted to create a solution for my parents to monitor and control their garage wherever they are, on any device.



03



04



tag'd

A portable laser tag system designed with a textile twist

Initially developed for combat training, laser tag has long been limited to the indoor arena experience. Its equipment is bulky and heavy, detracting from the overall gameplay experience.

tag'd aims to redesign and bring the key elements of laser tag to players everywhere.

I was the Hardware Lead and Lead Designer; I was responsible for the R&D, construction and software integration with custom sensors in our play vest and “shooter” glove combo.

This project was the culmination of Waterloo Engineering Capstone Project and was showcased at the **ECE Design Symposium 2015**.



Image provided by Laser-Tron



“I’m uncomfortable when I see kids running with shooters **resembling firearms**.”



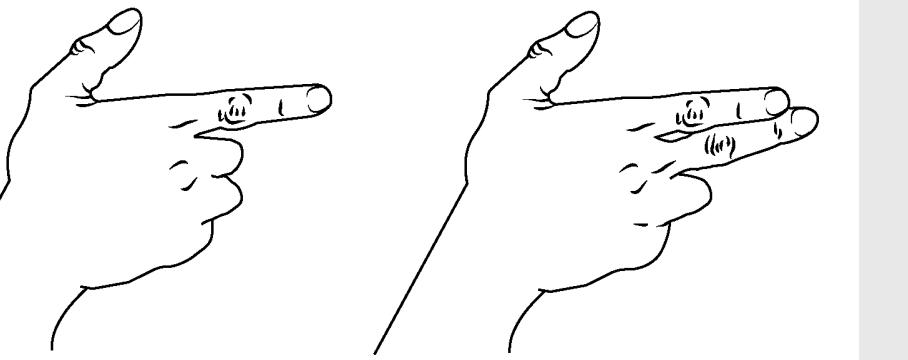
“It’d be nice to bring back the **nostalgia** of running around.”



“We want something **convenient** and **easy** to set up.”



ONE-HANDED SHOOTING GESTURES



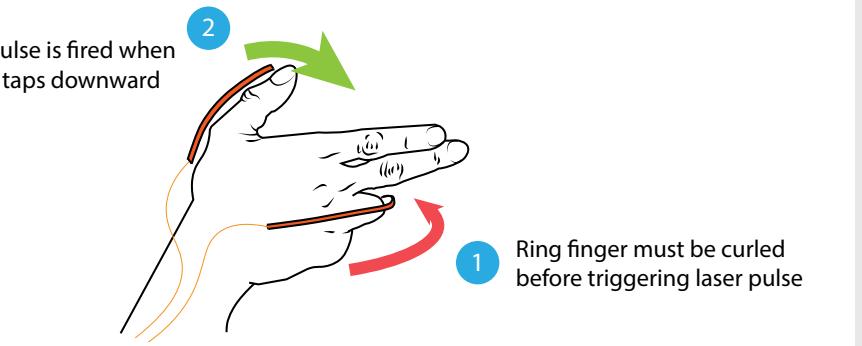
In place of the typical bulky shooter, tag'd uses a glove that detects a “trigger” action to shoot off a laser pulse.

The team toyed with the idea of one-handed aiming gestures and a natural gesture that would fire off a pulse.

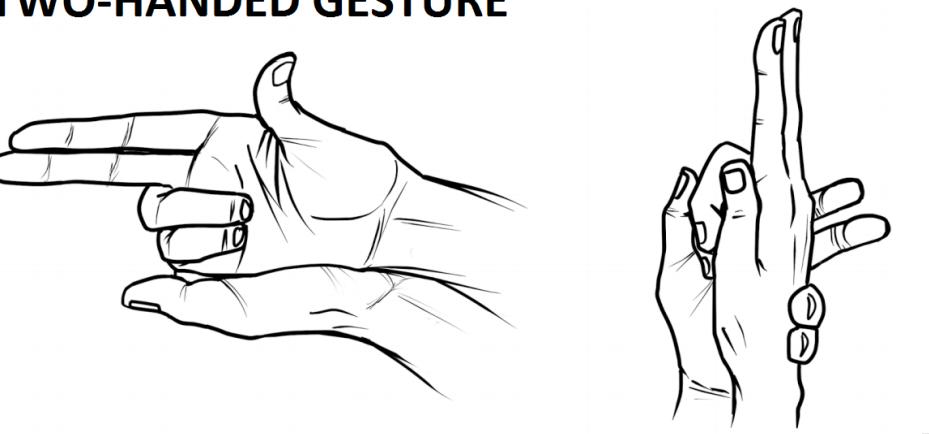
The first couple designs looked at flex and pressure sensors. They can be easily embedded into textiles, making them ideal for the application.

Unfortunately, preliminary testing proved response time was a debilitating issue.

FLEX SENSORS

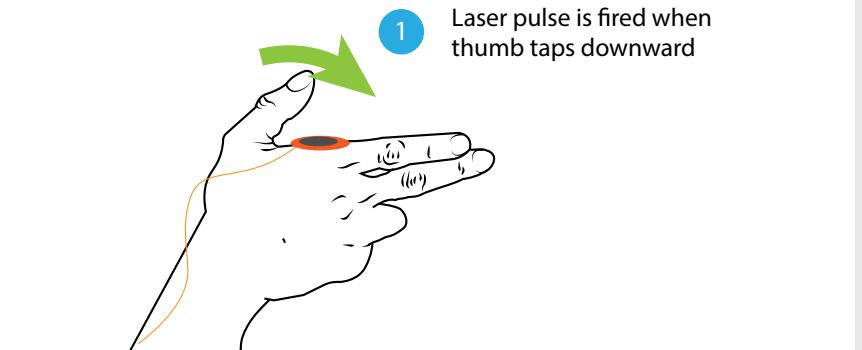


TWO-HANDED GESTURE



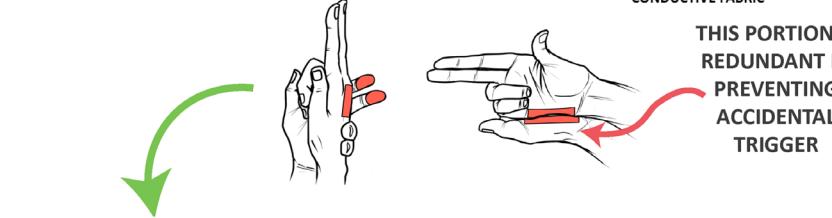
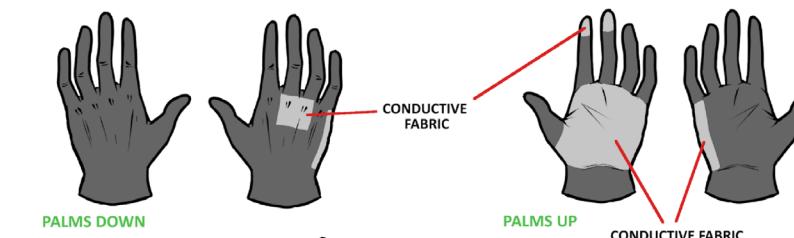
After some further brainstorming, the team explored the idea of a two-handed gesture. For those who wanted stability when aiming, it was natural to gravitate to a two-handed pose.

PRESSURE SENSOR

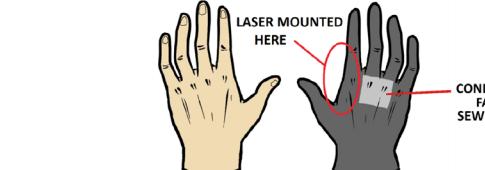


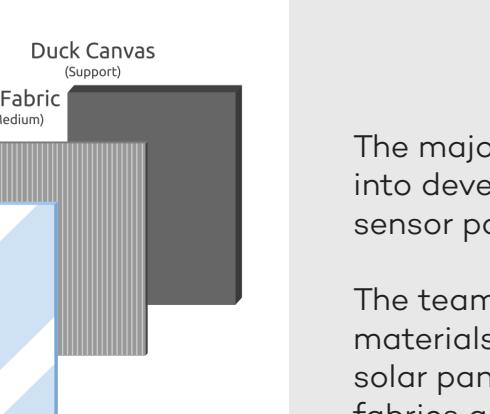
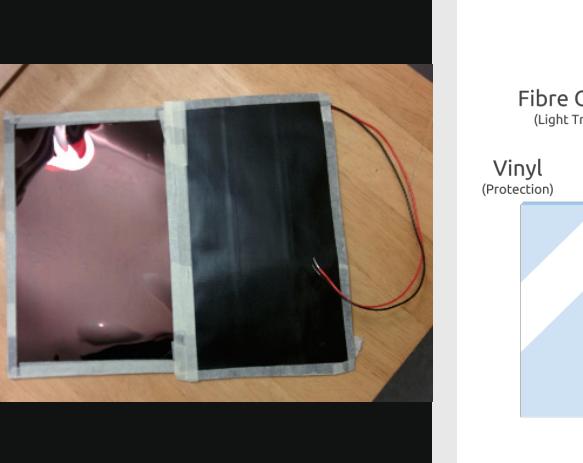
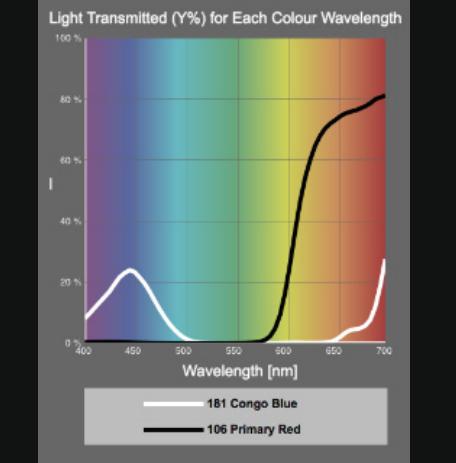
ITERATION 2 - CONDUCTIVE FABRIC

ORIGINAL DESIGN - "COMPLETE-THE-CIRCUIT"



REDESIGN - TEXTILE CAPACITIVE SENSOR





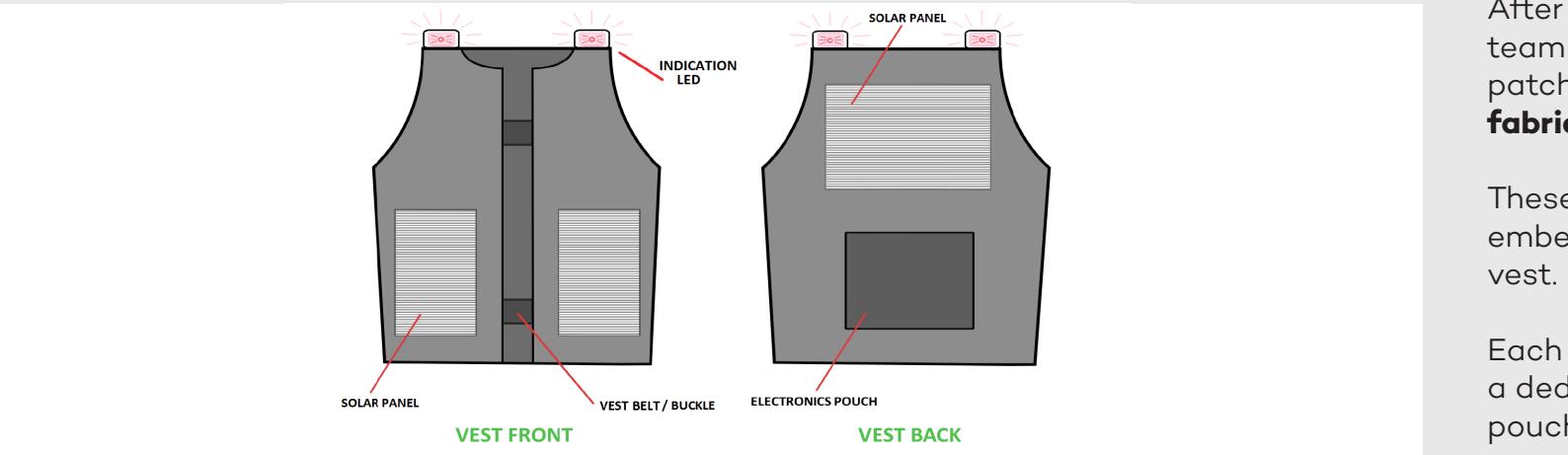
The majority of R&D went into developing an **all-textile** sensor patch.

The team tested a number of materials including: flexible solar panels, reflective fabrics and light filters.

After months of testing, the team developed a sensor patch using **fibre optic fabric**.

These patches were then embedded in our template vest.

Each individual vest has a dedicated electronics pouch that handles all the processing for hit detection, communication with the base station and houses the battery to provide hours of endless gameplay.



The base station ties the tag'd system together. This is the heart of tag'd - setting up an arena, allowing players to modify game settings and view scoring.

The base station has can set up a wireless field up to 85 ft in radius for gameplay and a **local WIFI** network to access the game portal from any mobile device.

Using the portal, users can configure the gameplay (Capture the Flag or Free-For-All), view score breakdowns and manage other settings.

TAGGED

Settings

GAME DURATION: 10:00

GAMEPLAY MODE: Free for All

Roster

TEAM A PLAYERS

1
3

TEAM B PLAYERS

2
4

Roster

PLAYER POINTS

1 0
2 2
3 2
4 1

CAPACITIVE TOUCH SENSOR
Conductive fabric allows for touch detection while maintaining dexterity of the hand

LED INDICATORS
Provides visual feedback on player's status

IR LED
900 nm IR LED to shoot IR beam

FRONT OF VEST

BACK OF VEST

VEST FRONT

VEST BACK

IR BEAM FIRING GLOVE

- Traditionally bulky equipment replaced by slim, lightweight glove
- Glove's IR beam triggered by capacitive touch sensor
- Fibre optic fabric acts as medium for light to travel through
- Connected to IR photodiode which detects IR beams fired from glove

FIBRE OPTIC FABRIC SENSOR

- Lightweight, flexible and truly wearable fabric light sensor
- Glove's LED indicators reflect the same information as those on the vest

BACK POUCH

- All electronics for the vest are safely and securely installed within a pouch on the back of the player's vest
- Contains: Arduino Uno, battery

NFC READER

- Stowed away in the front of the player's vest - used for registration and scoring

BASE STATION

- Creates a game 'arena' in the form of a network, with range 80ft, that players can join
- XBee 802.15.4 Wireless Communication [2]: Base station tells players game status
- Contains: Arduino Yun, XBee, LCD, battery

WIRELESS COMMUNICATION

- Bidirectional wireless communication of player and game information between player vest and base station via XBee using 802.15.4 protocol [2]

START

STOP

CLEAR

BACKGROUND

We just wanted to be able to take the fun with us wherever we went. What better way than to make a lightweight, flexible and durable laser tag system? Go ahead — toss it in your suitcase and take it to the arena of your choice.

GAMEPLAY

Team Mode (Capture the Flag)
Teams compete by trying to capture each other's flags.

Free-for-All Mode
Players attempt to scan the maximum number of flags.

tag'd

YOUR GAME. ANYWHERE. ANY TIME.

Laptop Prop

A simple, economical option to improve ventilation and ergonomics of laptops

Design a product and provide an analysis on customer needs, marketing strategies, the product's market segment and risks.

This project was a 2-week group exercise in developing experience with 3D printing, prototyping and roadmapping the development and bringing a product to market.

I was responsible for conducting market research, providing a marketing strategy and designing our product.

Laptop Prop



HIGH COST

PORTABLE



FIXED

BUDGET

Laptop stands on the market cater to workstation set-ups or fixed height, portable solutions.

There is an opportunity to create a **low-cost** product aimed at **portability**.



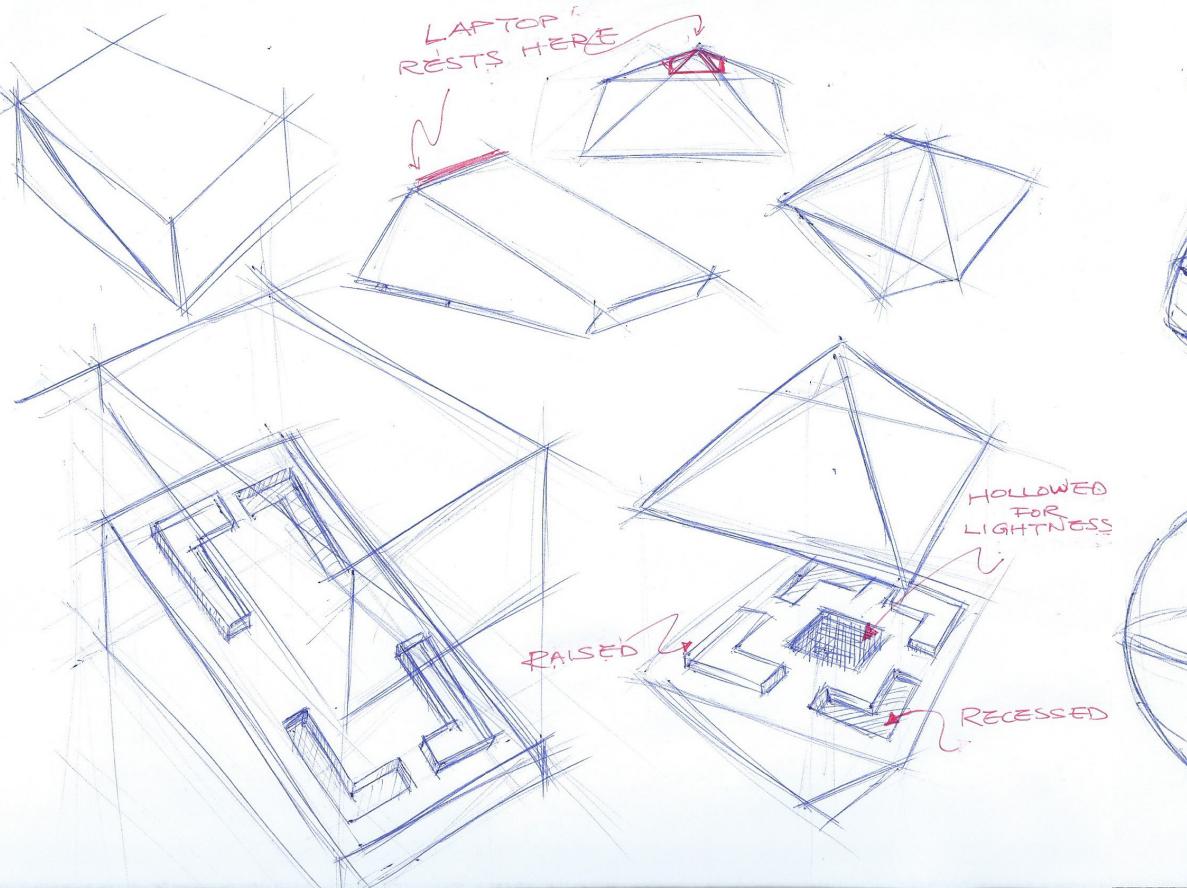
One of the proposed marketing strategy is to offer it as custom branded merchandise to corporations as part of their marketing effort. In place of branded pens, lanyards and mugs, LaptopProp could be a great alternative for tech companies.

The intention is to penetrate the young tech market, such as hackathons and technology conferences, where laptop use is crucial.

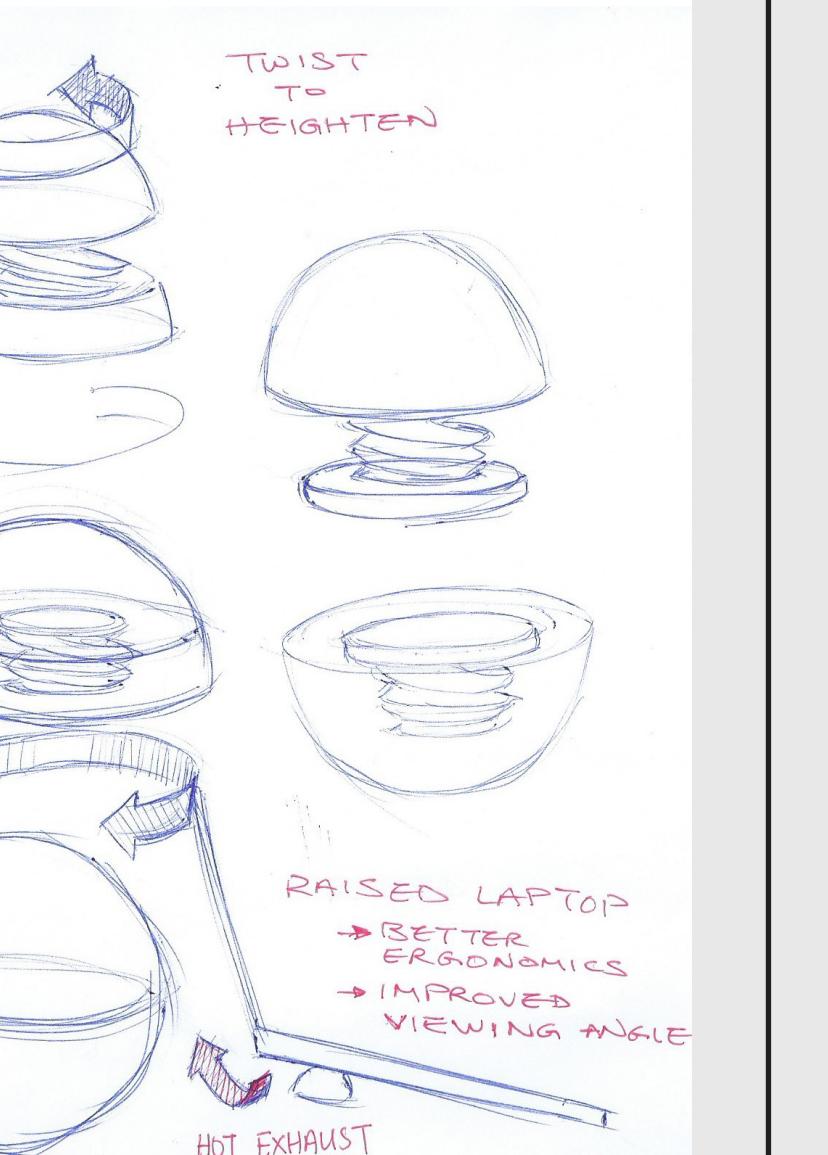


Prior to starting the ideation stage, I consulted some literature on ergonomic workspaces. For the typical sit-down setup, it is suggested that keyboards be inclined at an angle of 20° or less.

This information provided a basic metric for the product's height.



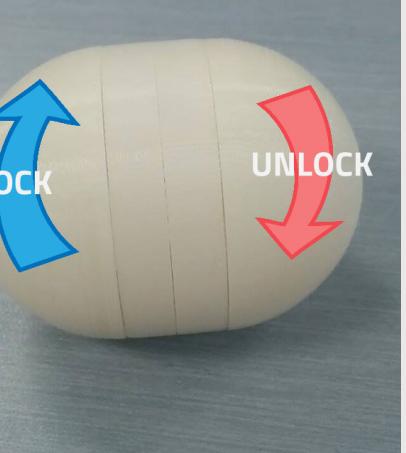
To drive the ideation phase, I decided to consider interlocking parts so the product could be stored away easily. I explored some simple geometric forms, keeping in mind that the final product was to be 3-D printed.



The group liked the idea of adjustable height and found the round design is snag-free when stowed away.



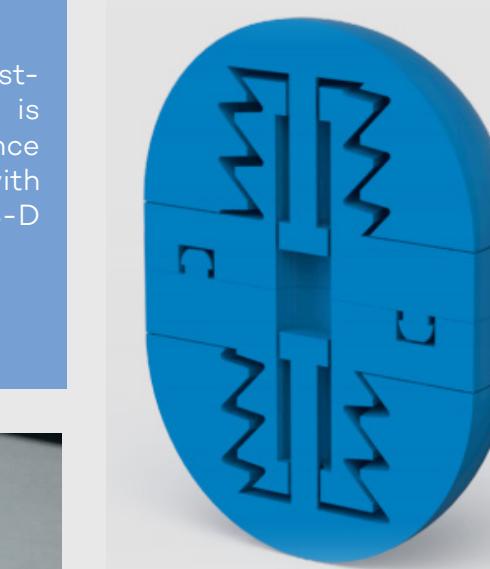
While modeling, the team member responsible for the CAD proposed a twist-to-lock action. We all agreed it was a great alternative and incorporated it into the final design.



An advantage of the twist-and-lock mechanism is eliminating the tolerance concerns when working with the low precision of 3-D printing.



If revisiting the idea, rubber grips would be added to the domed top and feet of LaptopProp to provide better traction.



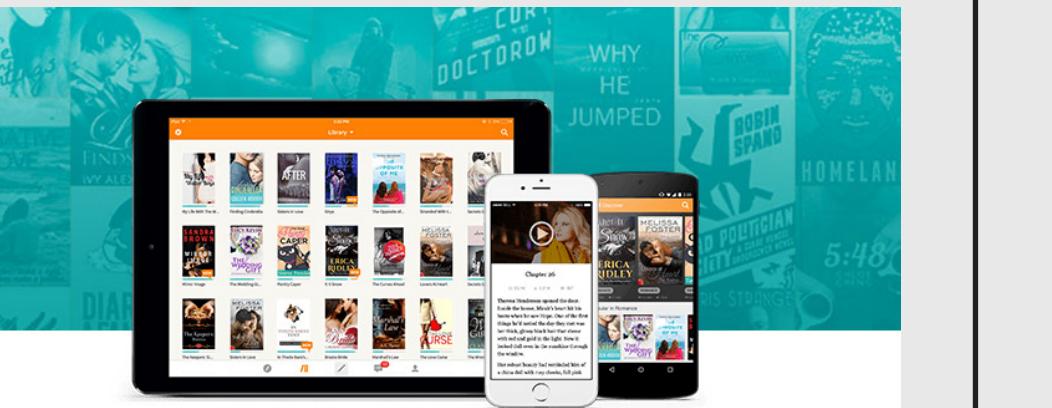
Wattpad Logger

A low-resource, asynchronous logger for user-submitted bug reports.

Wattpad is a social story sharing platform that relies on its mobile platform heavily.

Revamp the current logging system in Wattpad's Android app so that developers can get more meaningful information out of user-submitted bug reports.

This was completed in the last two weeks of my co-op placement at Wattpad as a developer on the Android team.



About Wattpad



Infographic provided by Wattpad



of the top 100 free apps have a rating of 4+ stars



will not download an app rated lower than 3 stars



leave a rating or review after a negative experience

To maintain Wattpad's momentum in mobile growth, it is crucial to address and fix debilitating bugs.
The largest resource stem from user-submitted reports. However, the original implementation makes it difficult to parse through.

Kumquat

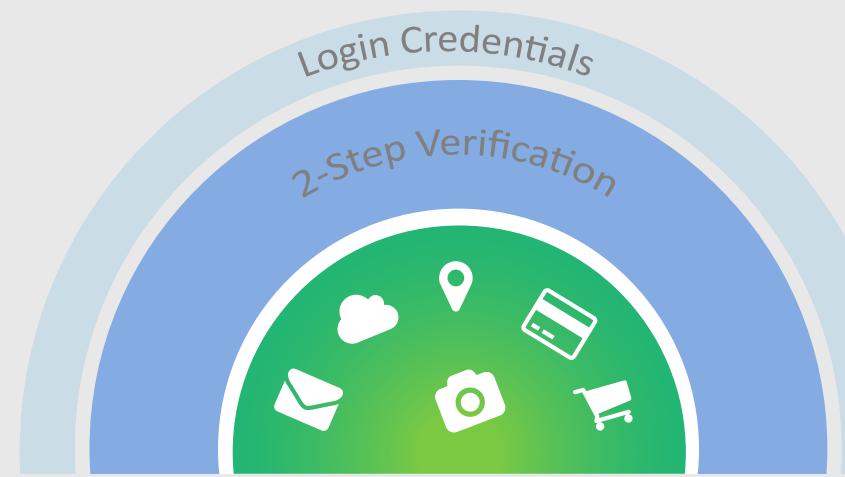
**Rethinking the traditional approach towards
2-step verification**

Identify a security problem. Propose a solution that considers the end-to-end security point of view.

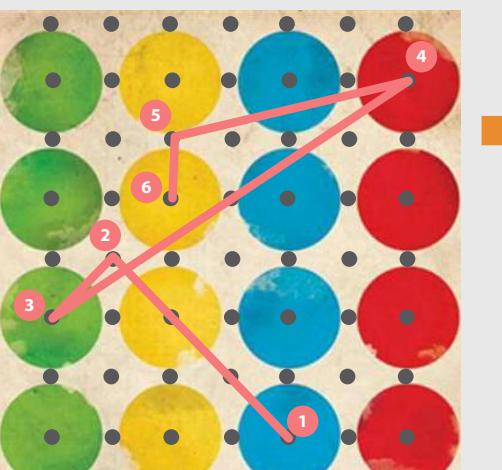
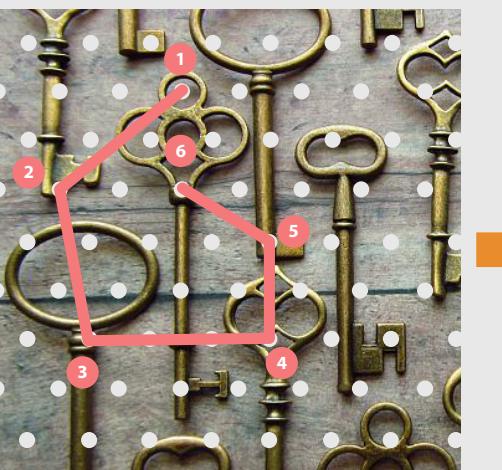
This was completed as the final project for ECE 458: Computer Security with a partner. In addition to a white paper, a proof-of-concept demo was created using Ruby on Rails.



2-step verification (2sv) has become the staple in providing an extra layer of online security. The traditional method usually entails answering personal security questions or sending a code via text or voice call.

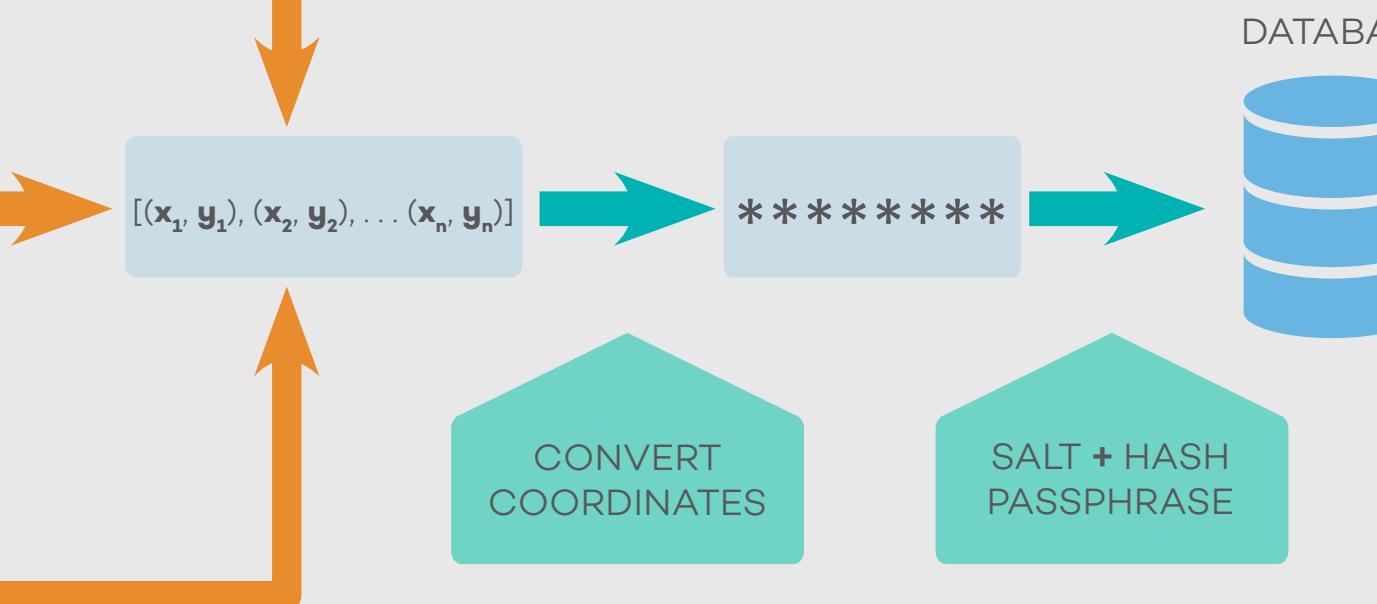


The user is typically the source of most vulnerabilities. It is not easy for a human user to create and remember a long, complex passphrase. As such, human behaviour must be anticipated when designing a user-facing security feature.



Inspired by the recent security innovations introduced on mobile platforms, Kumquat intends to bring a similar user experience to traditional web portal sign-in authentication.

Kumquat aims to combine a simplified interface that engages the visual cortex through **graphical passwords** to generate a password that would be at least equivalent in strength as a traditional password with complexity and length.

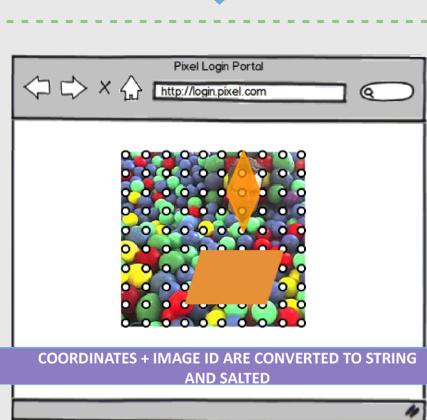


TYPICAL USER FLOW FOR LOGIN USING KUMQUAT AS 2SV

FIRST FACTOR



SECOND FACTOR



IF THE USER IS UNSUCCESSFUL AFTER 3 TRIES, THE USER WILL BE REDIRECTED TO A NEW IMAGE.

THE NEW IMAGE ARE PSEUDO-RANDOMLY PICKED FROM THE USER'S PRE-SELECTED BANK OF IMAGE PASSWORDS.

Using bits of entropy as the basis of analysis, it is proven that a password generated by Kumquat through selecting 6 points on a 11x11 grid is **equivalent** to a 10 character ASCII password with high complexity (letters, numbers and symbols).

The bits of entropy scale exponentially against Kumquat's grid size but risk a decrease in usability.

-  jennellew@outlook.com
-  www.jennellew.com
-  ca.linkedin.com/in/jennellew
-  +1-(226)929-9271