

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

Wireframing
Rhino
Keyshot
SolidWorks
AutoDesk Inventor
AutoCAD
Cadence
InDesign
Illustrator

embedded

SMT Soldering
PCB Layout
PLC

development

Java (Android)
C
Ruby
HTML CSS JS
PHP

HOBBIES + INTERESTS



tinkering
+ diy



software
development



design



woodworking



adventurous
eater

EDUCATION

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

University of Waterloo
Sept 2010 - June 2015

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



Wattpad Logger

Graphic tool for user-
submitted error reports



tag'd

A portable laser tag system
with a textile twist.



Laptop Prop

An exercise in 3D-printing
and entrepreneurship



Kumquat

An alternative approach to
2-step verification

ANNEX.

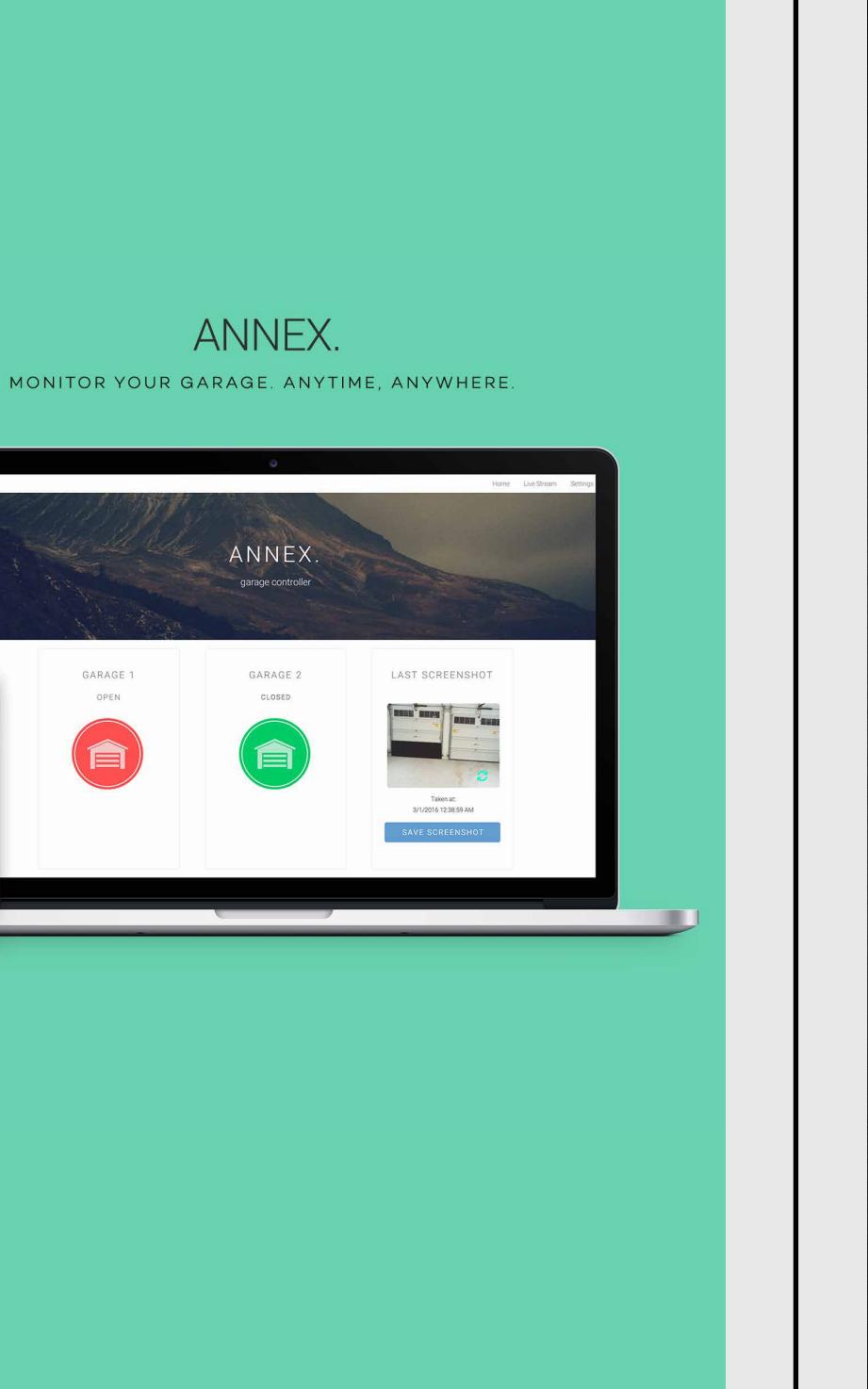
An open-sourced Arduino garage monitor

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!

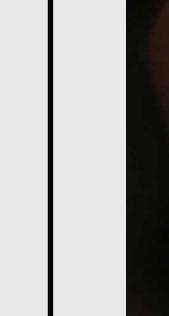
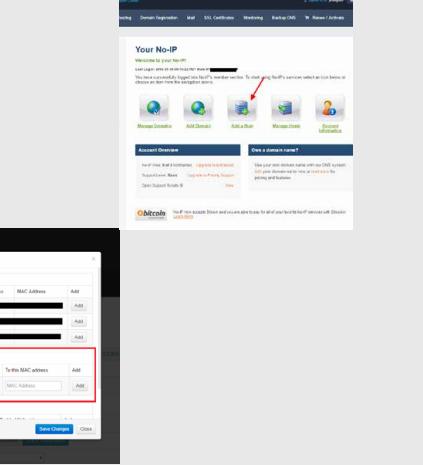
www.instructables.com/id/Annex-an-Arduino-Yun-Garage-Monitor/



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

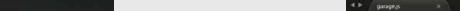
I wanted to create a solution for my parents to monitor and control their garage wherever they are.





```
// Sends the results of garage door sensors to web portal
else if (command == "inputs") {
    // Construct JSON header
    client.println(F("Status:200"));
    client.println(F("Content-type:application/json"));
    client.print();
    client.println(");

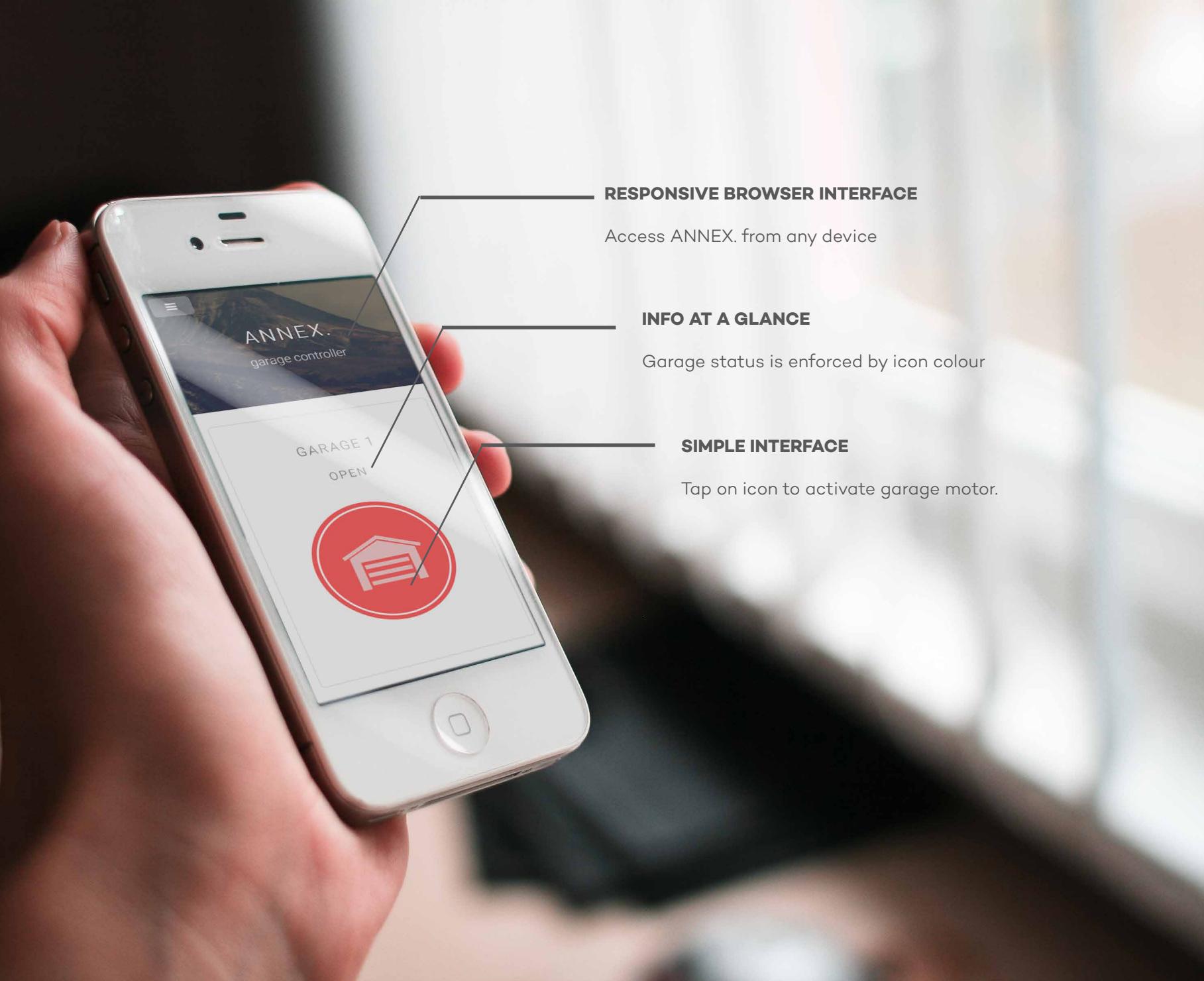
    /* loop (if required)
    for (int i = 0; i < GARAGES; i++) {
        client.print(F("\nsensor"));
        client.print(i);
    }
}
```



```
var interval;
// EDIT NUMBER OF GARAGES HERE
var GARAGES = 2;

function garageClick(obj) {
    // Grey out icon and disable click - see css for .disabled
    $(obj).addClass('disabled');
    $.ajax({
        url: '/arduino/motor/' + obj.id.slice(-1),
        dataType: 'json',
        error: function() {
            alert("Cannot reach garage monitor. Please try again.");
            $(obj).removeClass('disabled');
        },
        success: function() {
            // Set icon to yellow to indicate motor is running
            $(obj).removeClass('disabled').addClass('running');
            // After 30 seconds (motor finished running), re-enable icon
            setTimeout(function() {
                $(obj).removeClass('running');
            }, 10000);
        },
        timeout: 30000
    });
}

function setgarageStatus(label, val) {
    var selector = '#' + label;
    if (val === 0) {
        $(selector + '> .garage').removeClass('open').addClass('closed');
        $(selector + '> h3').text('closed');
    } else {
        $(selector + '> .garage').removeClass('closed').addClass('open');
    }
}
```



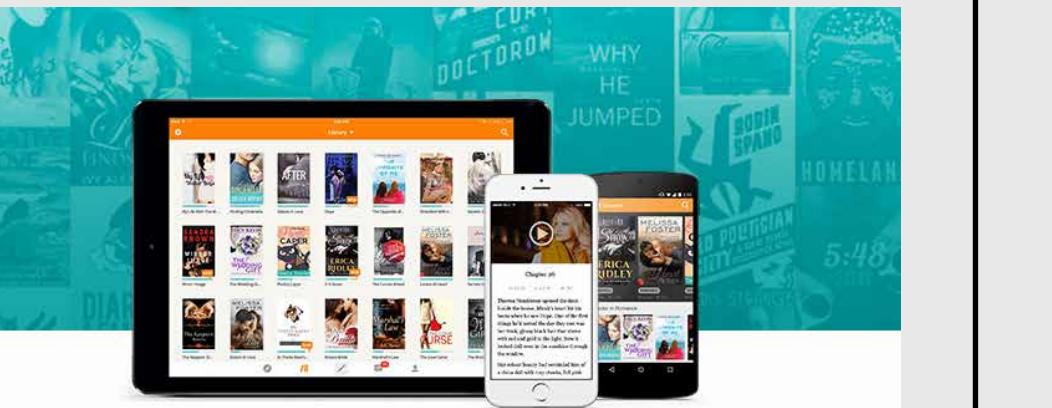
Wattpad Logger

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



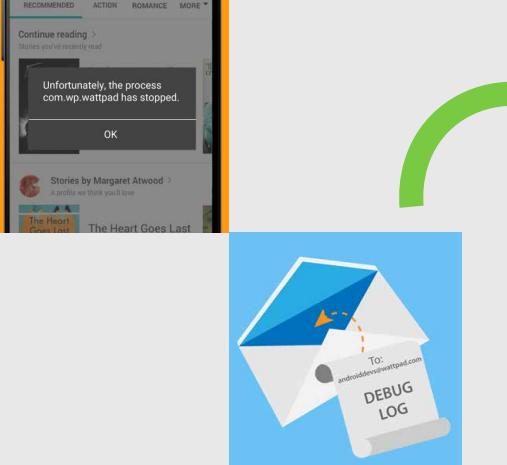
will not download an app rated lower than 3 stars



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.



```

1 [[ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/]

2 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/]

3 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/]

4 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/cover/]

5 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/]

6 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
not in cache http://www.wattpad.com/api/

```

Having personally worked through hundreds of logs, I was familiar with the shortcomings of the original logs.

There is an abundance of information, but not very helpful when trying to find where bugs occurred.

Often, developers would have to contact the user in order to recreate the bug.

This was a major bottleneck and has delayed the team on releasing a fix.



To address this, I drafted a standardized logging format to improve granularity.

Using feedback from my team and iOS devs, I refined my template so it could be implemented across both platforms and maintain a consistent design language.



As a bonus, I wrote a tool to generate a more visually appealing log for both developers and support specialists.

The tool colour-codes and provides filters, allowing developers to drill down to the source of a bug and reducing the amount of follow-up with users to resolve the issue.

**DEBUG
TOOL**

ORIGINAL LOGS

```

1 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/]

2 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/]

3 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/]

4 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/cover/]

5 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/]

6 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
not in cache http://www.wattpad.com/api/

```

No indication of priority (info, warn, error)

Timestamp unnecessarily long

Though not shown, logger was bottlenecked by lack of concurrency (all logging occurring on main thread).

To the user, this may cause app to appear unresponsive.

Difficult to read - relevant info easily missed or buried

Difficult to read - relevant info easily missed or buried

NEW LOGS

```

1 2015-01-05 10:42:06:655|1|UTIL|V|ImageUtils|Setting image http://a.wattpad.com/
2 2015-01-05 10:42:06:655|6918|MGR|V|BaseStoriesManager|saveStoryToDb()
3 2015-01-05 10:42:06:655|1|UIC|I|SmartImageView|checkBitmapRecycled() onDraw()
4 2015-01-05 10:42:06:652|6914|UTIL|V|BitmapMemoryCache|put() item into cache:
5 2015-01-05 10:42:06:648|6918|MGR|V|BaseStoriesManager|saveStoryToDb() part
exists. Updating

```

Timestamp up to 25% shorter

Improved granularity with new categories and priority levels

Timestamp converted to same timezone as servers to provide an accurate timeline of events

Logger given a dedicated thread to handle all logging tasks.

Smaller memory footprint, can hold 15% more lines

**DEBUG
TOOL**

HTML OUTPUT

Logs are colour-coded and can be filtered by category or priority			
Time	Category	Thread	Compon.
10:42:06:655	UTIL	V	ImageUtils
10:42:06:655	UTIL	V	SmartImageView
10:42:06:655	UTIL	V	BitmapMemoryCache
10:42:06:655	UTIL	V	BaseStoriesManager
10:42:06:655	UTIL	V	Activity
10:42:06:655	UTIL	V	Network
10:42:06:655	UTIL	V	Manager
10:42:06:655	UTIL	V	Lifecycle
10:42:06:655	UTIL	V	Fragment
10:42:06:655	UTIL	V	Other
10:42:06:655	UTIL	V	Fatal
10:42:06:655	INFO	V	ImageUtils
10:42:06:655	INFO	V	SmartImageView
10:42:06:655	INFO	V	BitmapMemoryCache
10:42:06:655	INFO	V	BaseStoriesManager
10:42:06:655	INFO	V	Activity
10:42:06:655	INFO	V	Network
10:42:06:655	INFO	V	Manager
10:42:06:655	INFO	V	Lifecycle
10:42:06:655	INFO	V	Fragment
10:42:06:655	INFO	V	Other
10:42:06:655	INFO	V	Fatal
10:42:06:655	WARN	V	ImageUtils
10:42:06:655	WARN	V	SmartImageView
10:42:06:655	WARN	V	BitmapMemoryCache
10:42:06:655	WARN	V	BaseStoriesManager
10:42:06:655	WARN	V	Activity
10:42:06:655	WARN	V	Network
10:42:06:655	WARN	V	Manager
10:42:06:655	WARN	V	Lifecycle
10:42:06:655	WARN	V	Fragment
10:42:06:655	WARN	V	Other
10:42:06:655	ERROR	V	ImageUtils
10:42:06:655	ERROR	V	SmartImageView
10:42:06:655	ERROR	V	BitmapMemoryCache
10:42:06:655	ERROR	V	BaseStoriesManager
10:42:06:655	ERROR	V	Activity
10:42:06:655	ERROR	V	Network
10:42:06:655	ERROR	V	Manager
10:42:06:655	ERROR	V	Lifecycle
10:42:06:655	ERROR	V	Fragment
10:42:06:655	FATAL	V	ImageUtils
10:42:06:655	FATAL	V	SmartImageView
10:42:06:655	FATAL	V	BitmapMemoryCache
10:42:06:655	FATAL	V	BaseStoriesManager
10:42:06:655	FATAL	V	Activity
10:42:06:655	FATAL	V	Network
10:42:06:655	FATAL	V	Manager
10:42:06:655	FATAL	V	Lifecycle
10:42:06:655	FATAL	V	Fragment
10:42:06:655	FATAL	V	Other
10:42:06:655	VERBOSE	V	ImageUtils
10:42:06:655	VERBOSE	V	SmartImageView
10:42:06:655	VERBOSE	V	BitmapMemoryCache
10:42:06:655	VERBOSE	V	BaseStoriesManager
10:42:06:655	VERBOSE	V	Activity
10:42:06:655	VERBOSE	V	Network
10:42:06:655	VERBOSE	V	Manager
10:42:06:655	VERBOSE	V	Lifecycle
10:42:06:655	VERBOSE	V	Fragment
10:42:06:655	VERBOSE	V	Other
10:42:06:655	DEBUG	V	ImageUtils
10:42:06:655	DEBUG	V	SmartImageView
10:42:06:655	DEBUG	V	BitmapMemoryCache
10:42:06:655	DEBUG	V	BaseStoriesManager
10:42:06:655	DEBUG	V	Activity
10:42:06:655	DEBUG	V	Network
10:42:06:655	DEBUG	V	Manager
10:42:06:655	DEBUG	V	Lifecycle
10:42:06:655	DEBUG	V	Fragment
10:42:06:655	DEBUG	V	Other
10:42:06:655	SUPER DEBUG	V	ImageUtils
10:42:06:655	SUPER DEBUG	V	SmartImageView
10:42:06:655	SUPER DEBUG	V	BitmapMemoryCache
10:42:06:655	SUPER DEBUG	V	BaseStoriesManager
10:42:06:655	SUPER DEBUG	V	Activity
10:42:06:655	SUPER DEBUG	V	Network
10:42:06:655	SUPER DEBUG	V	Manager
10:42:06:655	SUPER DEBUG	V	Lifecycle
10:42:06:655	SUPER DEBUG	V	Fragment
10:42:06:655	SUPER DEBUG	V	Other
10:42:06:655	INFO	I	ImageUtils
10:42:06:655	INFO	I	SmartImageView
10:42:06:655	INFO	I	BitmapMemoryCache
10:42:06:655	INFO	I	BaseStoriesManager
10:42:06:655	INFO	I	Activity
10:42:06:655	INFO	I	Network
10:42:06:655	INFO	I	Manager
10:42:06:655	INFO	I	Lifecycle
10:42:06:655	INFO	I	Fragment
10:42:06:655	INFO	I	Other
10:42:06:655	WARN	I	ImageUtils
10:42:06:655	WARN	I	SmartImageView
10:42:06:655	WARN	I	BitmapMemoryCache
10:42:06:655	WARN	I	BaseStoriesManager
10:42:06:655	WARN	I	Activity
10:42:06:655	WARN	I	Network
10:42:06:655	WARN	I	Manager
10:42:06:655	WARN	I	Lifecycle
10:42:06:655	WARN	I	Fragment
10:42:06:655	WARN	I	Other
10:42:06:655	ERROR	I	ImageUtils
10:42:06:655	ERROR	I	SmartImageView
10:42:06:655	ERROR	I	BitmapMemoryCache
10:42:06:655	ERROR	I	BaseStoriesManager
10:42:06:655	ERROR	I	Activity
10:42:06:655	ERROR	I	Network
10:42:06:655	ERROR	I	Manager
10:42:06:655	ERROR	I	Lifecycle
10:42:06:655	ERROR	I	Fragment
10:42:06:655	ERROR	I	Other
10:42:06:655	FATAL	I	ImageUtils
10:42:06:655	FATAL	I	SmartImageView
10:42:06:655	FATAL	I	BitmapMemoryCache
10:42:06:655	FATAL	I	BaseStoriesManager
10:42:06:655	FATAL	I	Activity
10:42:06:655	FATAL	I	Network
10:42:06:655	FATAL	I	Manager
10:42:06:655	FATAL	I	Lifecycle
10:42:06:655	FATAL	I	Fragment
10:42:06:655	FATAL	I	Other
10:42:06:655	VERBOSE	W	ImageUtils
10:42:06:655	VERBOSE	W	SmartImageView
10:42:06:655	VERBOSE	W	BitmapMemoryCache
10:42:06:655	VERBOSE	W	BaseStoriesManager
10:42:06:655	VERBOSE	W	Activity
10:42:06:655	VERBOSE	W	Network
1			

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**.

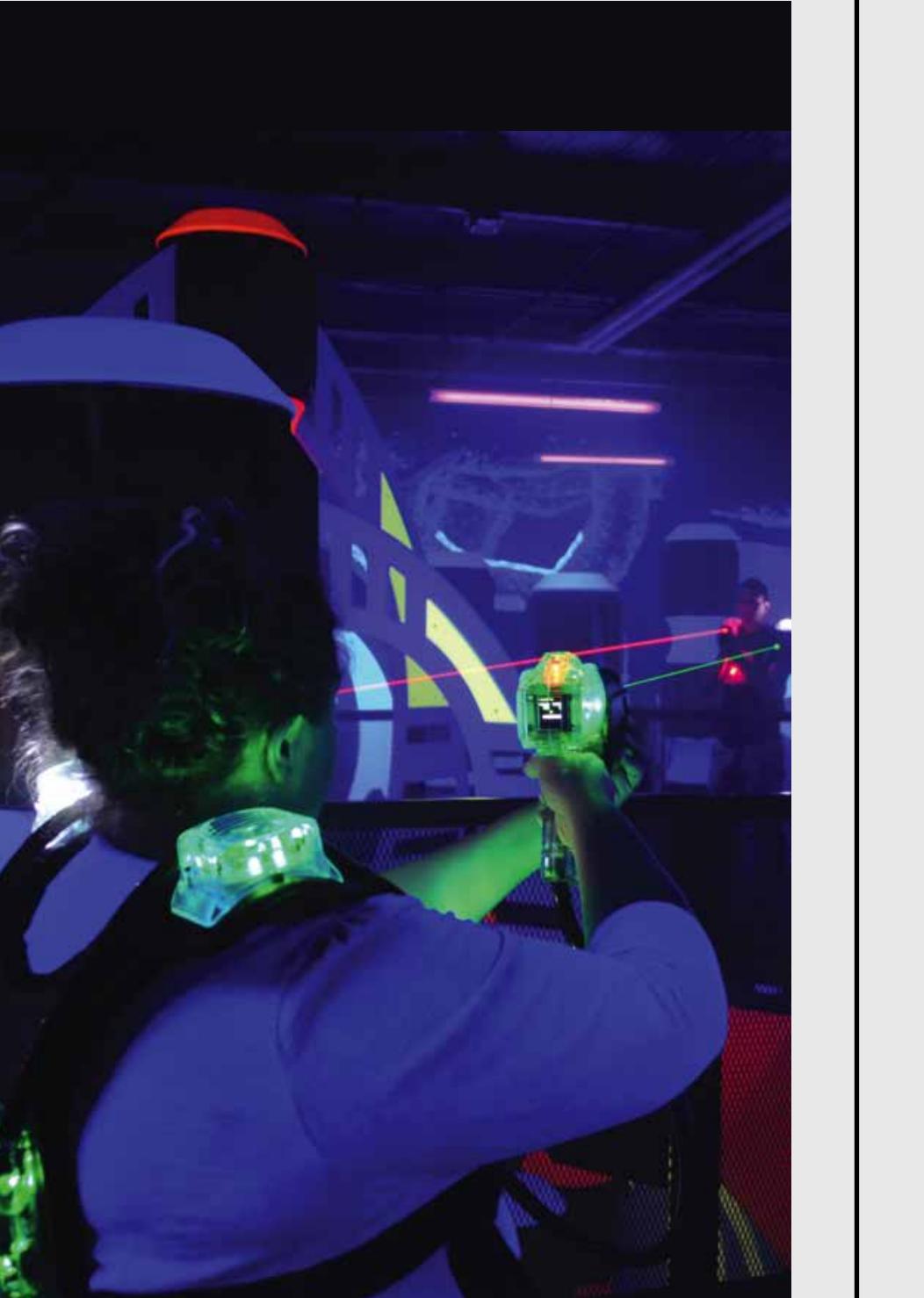


Image provided by Laser-Tron



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



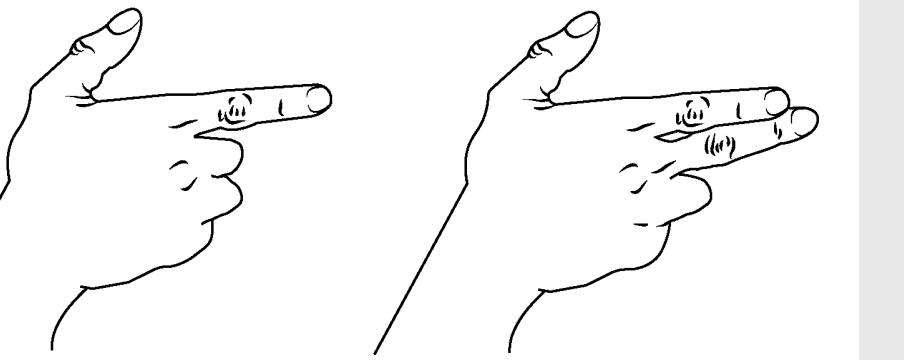
“It’d be nice to bring back the **nostalgia** of running around.”



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



ONE-HANDED SHOOTING GESTURES



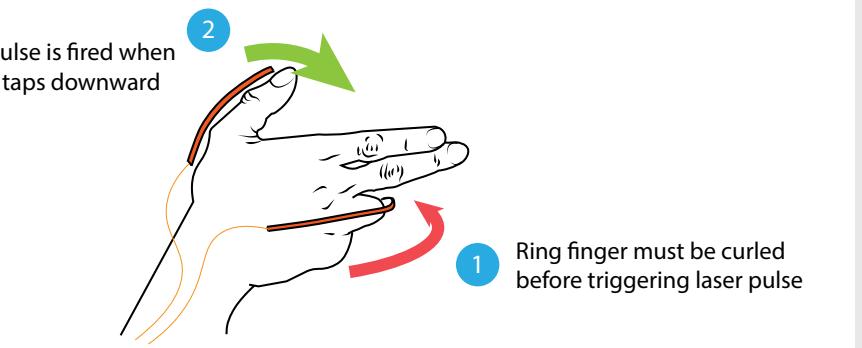
In place of the typical bulky shooter, tag'd uses a glove that detects a “trigger” action to shoot off a laser pulse.

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

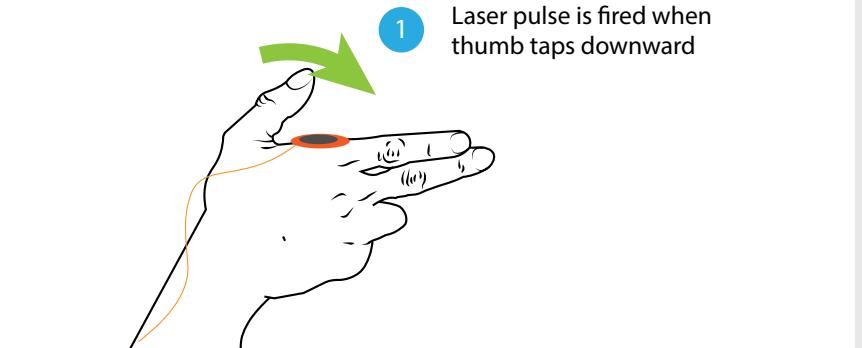


TWO-HANDED GESTURE



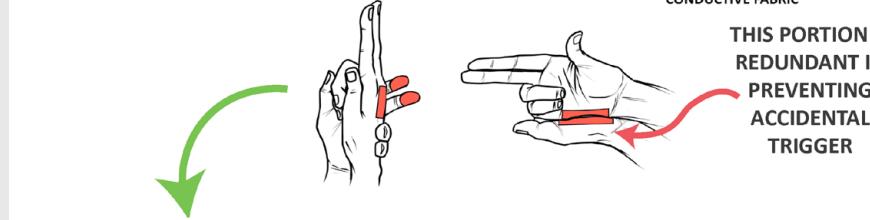
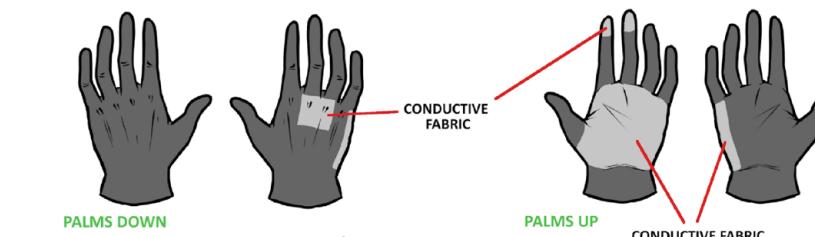
After some further brainstorming, the team explored the idea of a two-handed gesture. For those who wanted stability when aiming, it was natural to gravitate to a two-handed pose.

PRESSURE SENSOR

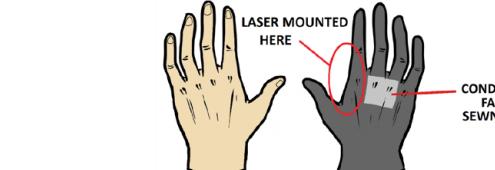


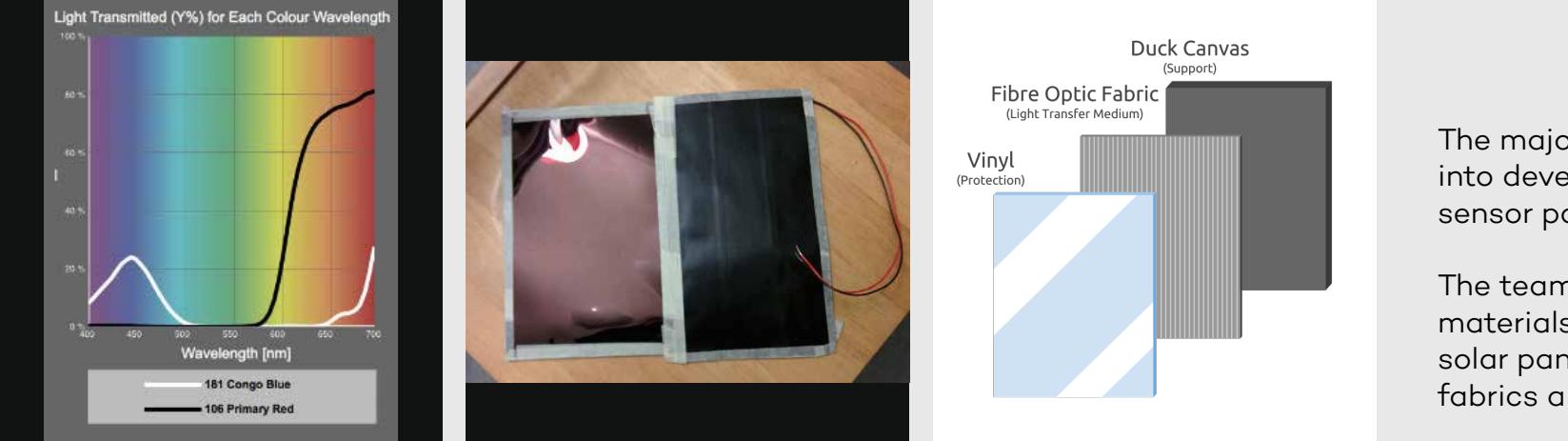
ITERATION 2 - CONDUCTIVE FABRIC

ORIGINAL DESIGN - "COMPLETE-THE-CIRCUIT"



REDESIGN - TEXTILE CAPACITIVE SENSOR





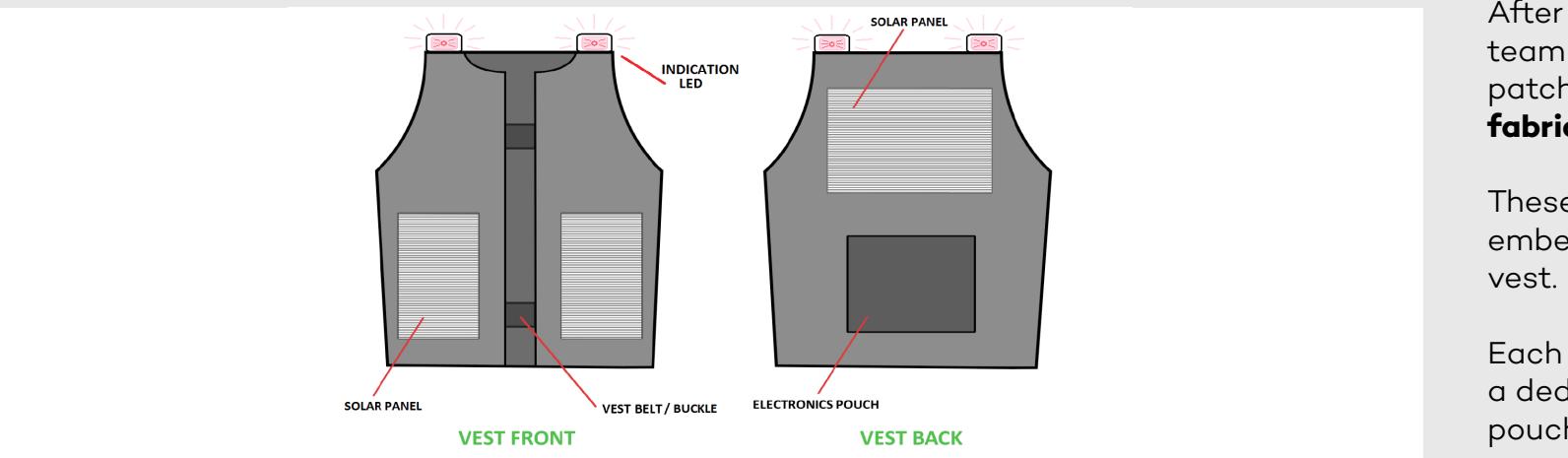
The majority of R&D went into developing an **all-textile** sensor patch.

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.

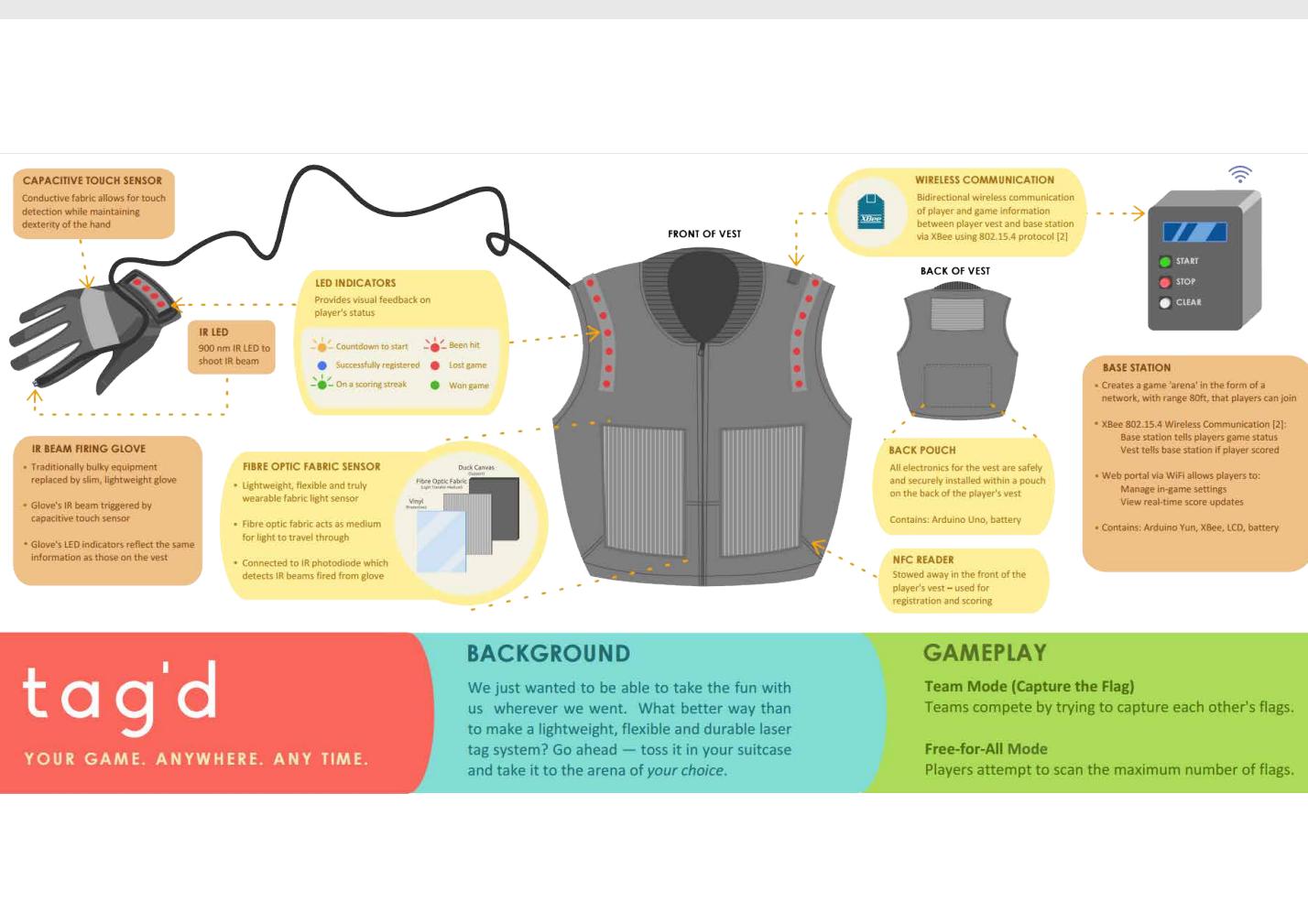
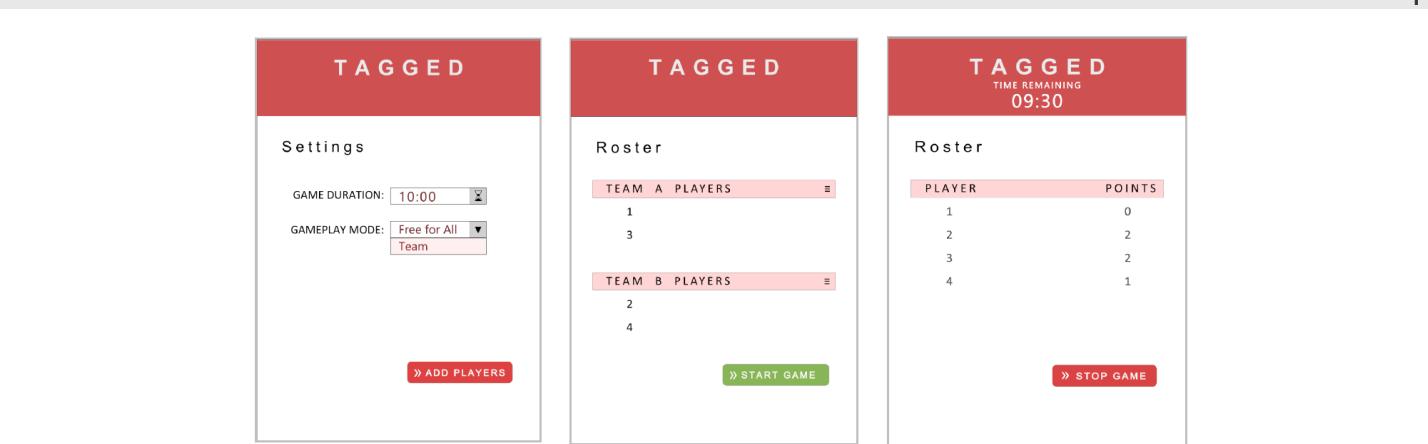
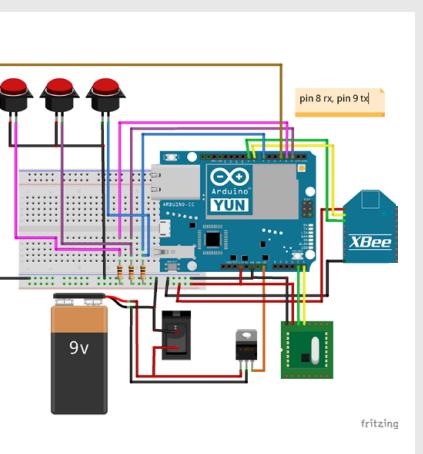
Each individual vest has a dedicated electronics pouch that handles all the processing for hit detection, communication with the base station and houses the battery to provide hours of endless gameplay.



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.



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.

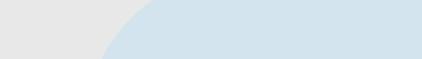
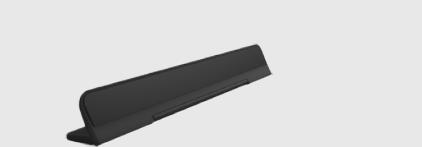
This project was a 2-week group exercise in developing experience with 3D printing, prototyping and roadmapping the development and bringing a product to market.

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

Laptop Prop



HIGH COST



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**.



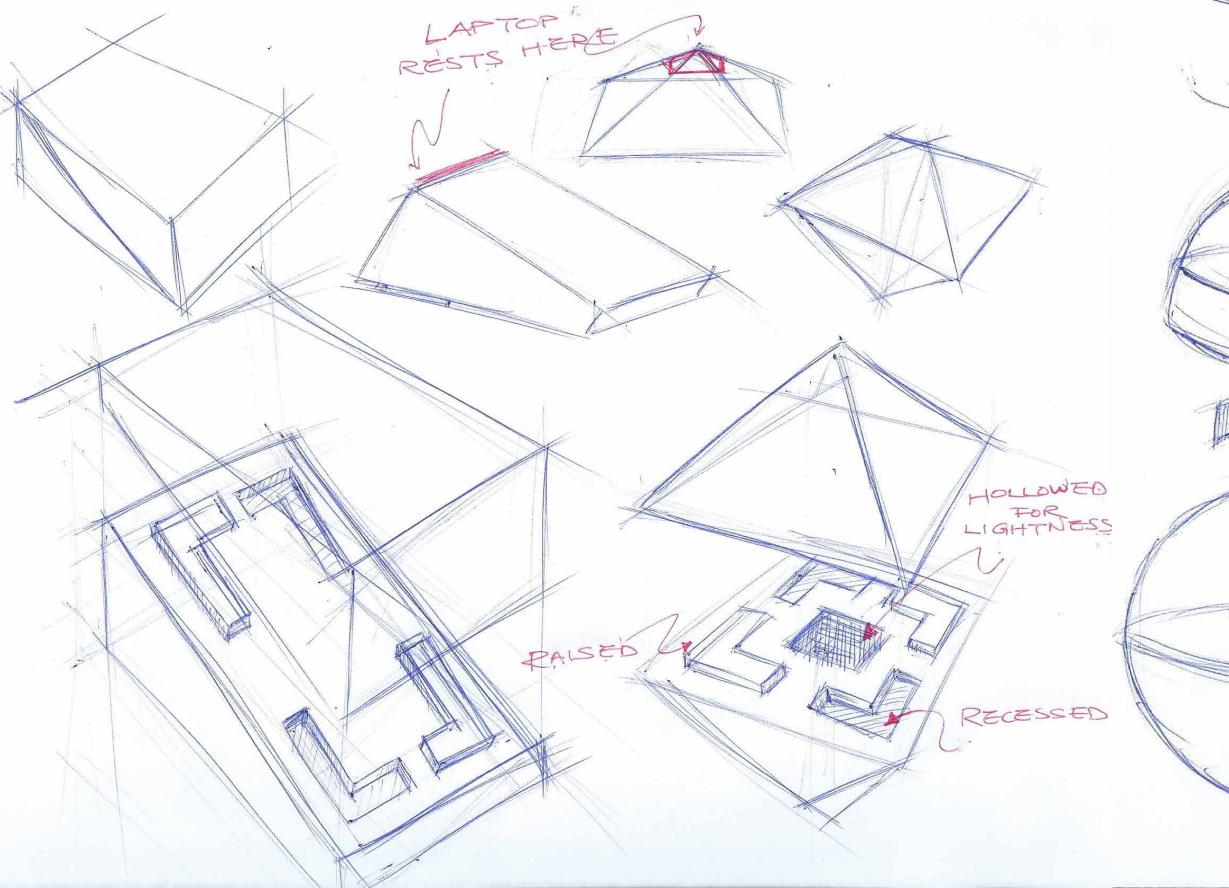
One of the proposed marketing strategy is to offer it as custom branded merchandise to corporations as part of their marketing effort. In place of branded pens, lanyards and mugs, LaptopProp could be a great alternative for tech companies.

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.

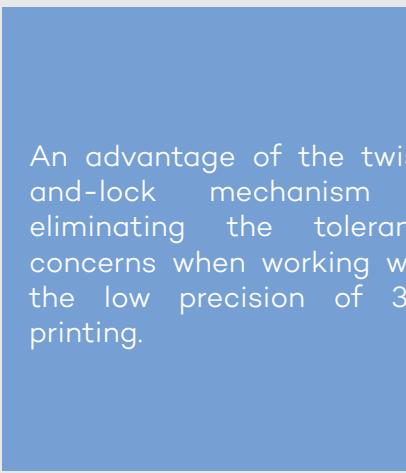
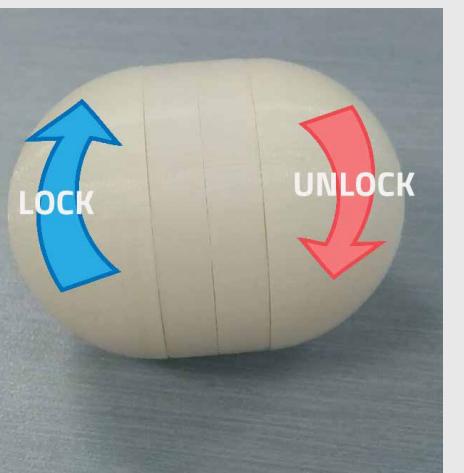
This information provided a basic metric for the product's height.



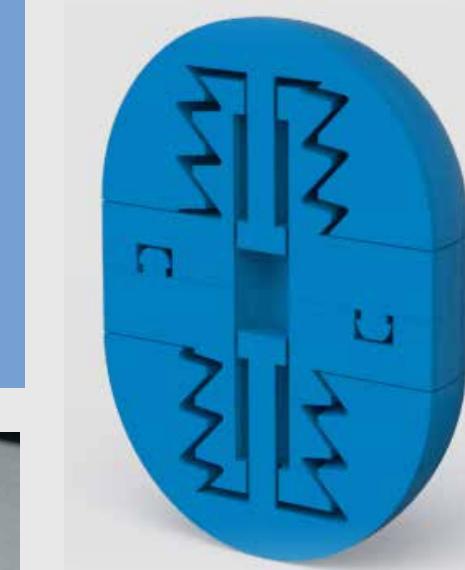
To drive the ideation phase, I decided to consider interlocking parts so the product could be stored away easily. I explored some simple geometric forms, keeping in mind that the final product was to be 3-D printed.



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



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



Kumquat

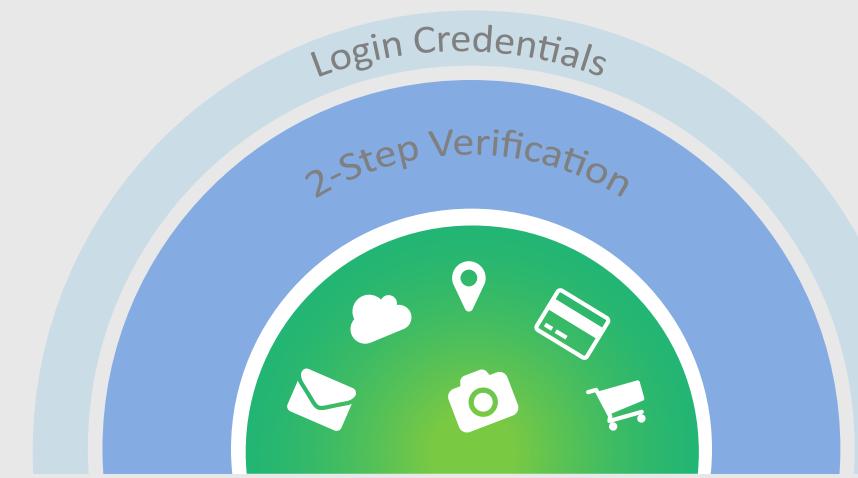
Rethinking the traditional approach towards 2-step verification

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

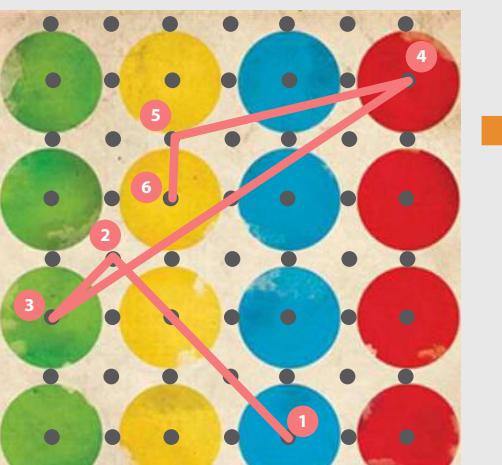
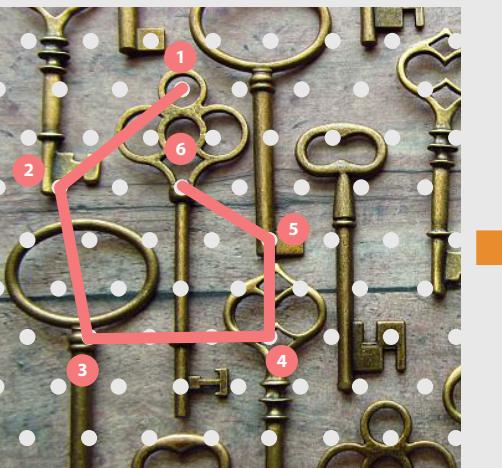
This was completed as the final project for ECE 458: Computer Security with a partner. In addition to a white paper, a proof-of-concept demo was created using Ruby on Rails.



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.

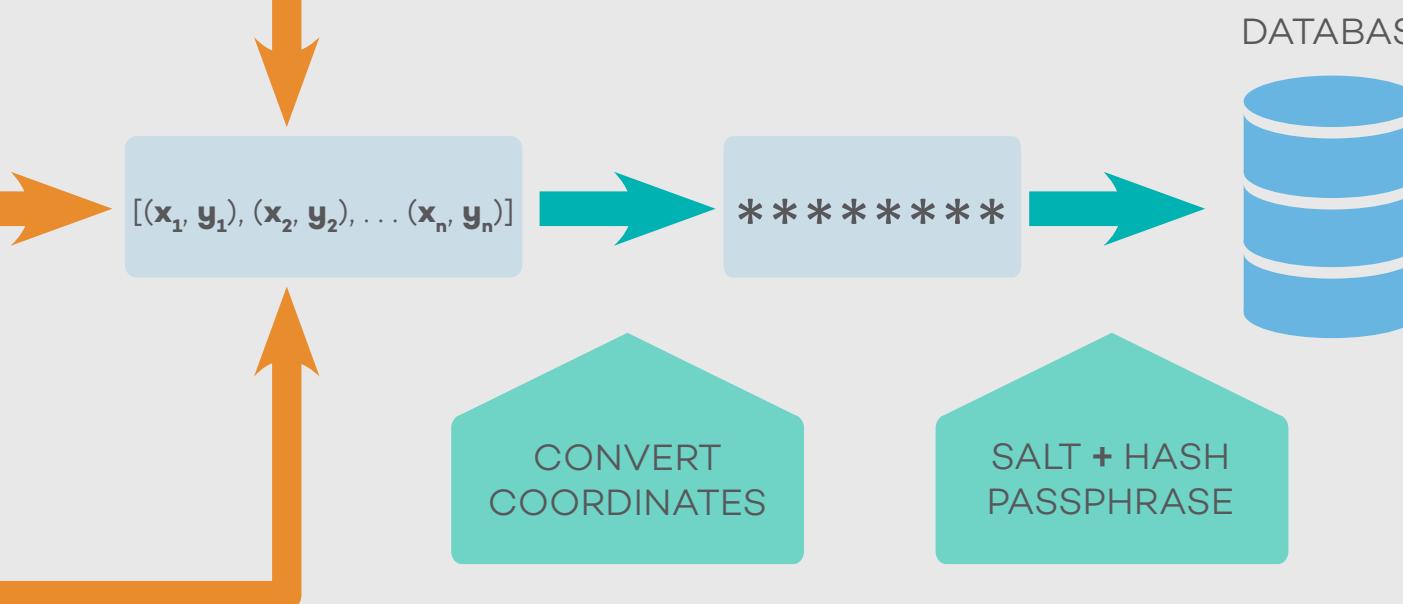


The user is typically the source of most vulnerabilities. It is not easy for a human user to create and remember a long, complex passphrase. As such, human behaviour must be anticipated when designing a user-facing security feature.



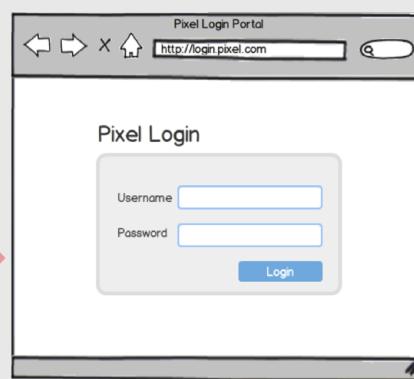
Inspired by the recent security innovations introduced on mobile platforms, Kumquat intends to bring a similar user experience to traditional web portal sign-in authentication.

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.

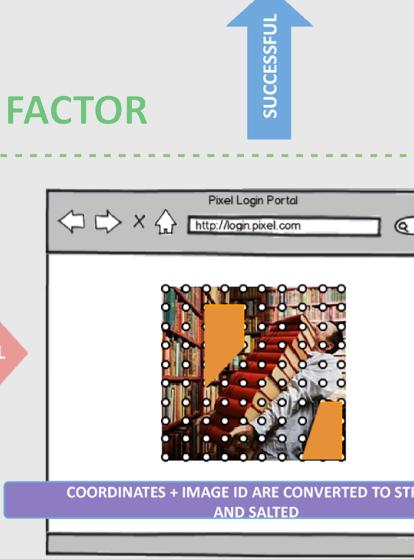
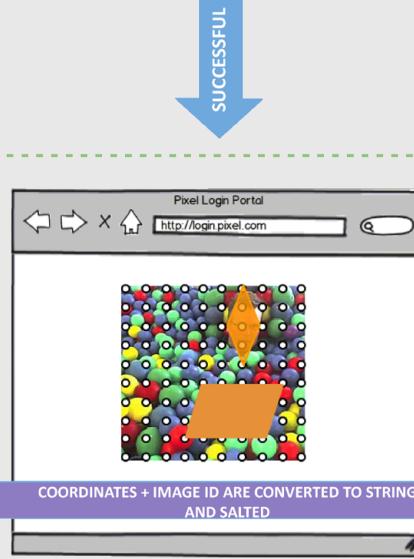


TYPICAL USER FLOW FOR LOGIN USING KUMQUAT AS 2SV

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