GNG 1103 Project Deliverable F: Prototype I and Customer Feedback

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Objective

The group is tasked to develop their first prototype and devise a test plan for the second whilst having customer feedback for prototype improvements.

Introduction

Hearing customer feedback directly has proven beneficial for the development of a prototype. While client meetings that are held to gain feedback may not always be in person, nevertheless, a profound relationship between the team and the client can be made via video-chat as a means for improved communication. Through this, project teams can better visualize the impact of their ideas since customer feedback ensures any complications and/or dependencies of the project have been addressed. Otherwise, individuals become more intuitive of their client needs and are better prepared to tackle any problems before they come up. As a result, the project's execution is more seamless.

Client Feedback Summary

In the client meeting, a few pieces of feedback were given. Our client meeting was more of a presentation of several ideas to get confirmation from the client of something that will work for them. At the time we have very few specifics as to how we are measuring what we were measuring. We didn't know if they had any previous infrastructure, we had no idea what the process lines would look like and how many cans we could be reading at the same time. Despite the fact that we had several possible design ideas, we had no idea which could be integrated into their pre-existing conveyors. Thankfully the client gave clarification, lasers became the preferred proposed method. This is because it is a method that can span across several different types of conveyor lines, the cans may not be moving single file. They may be moving more than 16 cans across and the laser can span that far and still be triggered. If our system were to be implemented, Mill St. Brewery already has a similar type of laser detection system in place, it is just not as thorough and is not interfacing the inputted data. After the client meeting we finalized our decisions of how the information would be inputted, uploaded(via wifi link), where it would be stored (cloud based software, thingspeak), and how it would be presented (website). Thingspeak connects up to Matlab and is able to interface multiple data inputs at the same time. A website is preferred over an app because it is accessible both on a laptop, desktop and on the floor on a mobile device if those accessing it are moving around.

Analysis of Critical Components and Systems

Critical Component/ System	**Analysis**
Input/Upload System /Laser Sensors	- Made up of laser sensor that are used to track the cans on the conveyor - The numbers that are received from the lasers are uploaded to the cloud software - Using a WIFI module - Transfers data between devices using WIFI, in our cases the two devices would be the machines and the cloud server - Takes raw data from input - For prototyping, we're using an Arduino UNO R3 to connect the laser sensors to the program with the formulas
Cloud Software	- Using ThingSpeak, a cloud server that uploads every second (with the student version), the free version takes 15 seconds to upload which isn't ideal for this project since we need frequent uploads to maximize efficiency - Can be connected to Matlab to analyze data - With the analyzed data, it can be put into the formulas to calculate the most efficient speeds

Calculation Software	- Using excel for formulas
	  - Excel is a software that allows users to organize data with formulas and functions
	  - Taking an average from the given data from user to create the formulas
	- Once we have formulas, they will be input into a program that will automatically calculate the most efficient speeds at each part of the production line
	- It’s modeled after the v curve theory

User Interface	- Using a website that will only be able accessed by Mill Street - The uploading system and the user interface are connected, an

	extension of one another - The interface just displays the information to the users

Test ID	Test name	Test objective	Method of tracking	Goal
1	Light levels	To determine the light levels when the laser gets blocked	Breaking the laser with hand and observing what the light levels diminish to	To find an accurate light value to integrate into the code (light < number = tally)
2	Laser distance	To determine the at what laser sensor can function without lowering functionality	Begin at a distance of 1 can; break the laser with hand note results repeat process until the code stops working properly	To find the max distance the laser can function without inaccurate data. This will help keep the results of future tests more controlled
3	Cpm Cross reference	To determine the cans per minute being pushed through the lasers	Push soda cans through laser and calculate a cpm rate manually	To make sure the cpm rate found manually is equivalent to the cpm tracked via cpu
4	Data transfer accuracy	To determine if the data real-time data is the same as the data being stored on the cloud	Have cans break the laser and manually note down the values. After a few attempts cross-examine the values written to the values on the cloud	To make sure the data transfer system is functioning properly
5	Data transfer	To determine if the data real-time data is the same	Have cans break the laser and manually note down	To make sure the data transfer system is

	Accuracy (2)	as the data being stored on the cloud	the values. After a few attempts cross-examine the values written to the values on the cloud	functioning properly (this test is the same test as above just using different speed to ensure the results are consistent

Initial Calculations

Below is the link to the initial calculations for the pace of each of the sections of the line. It is incomplete but the beginning of the conditional statements are being tested.
https://uottawa-my.sharepoint.com/personal/khami024_uottawa_ca/_layouts/15/guestaccess.aspx?guestaccesstoken=eXcT%2F%2BdywMgUwtEs8Ym5pUfhU56of0gXy1w8ATwvMEE%3D&docid=2_0451fd56a52f14d82bac9ce0582e15c43&rev=1&e=WxwPoO

Wrike Summary

Below are screenshots of an updated Wrike task board that includes changes made in estimated task duration, completed tasks/ responsibilities, additional dependencies, and tasks assignees etc.

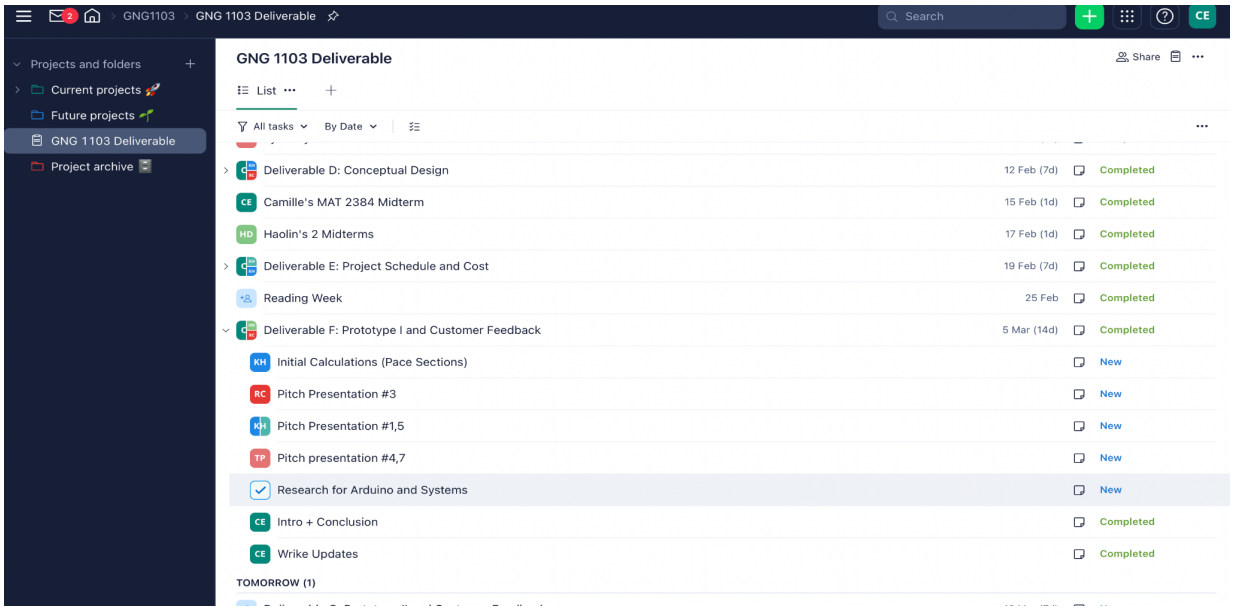

Figure 1. Future Tasks Overview

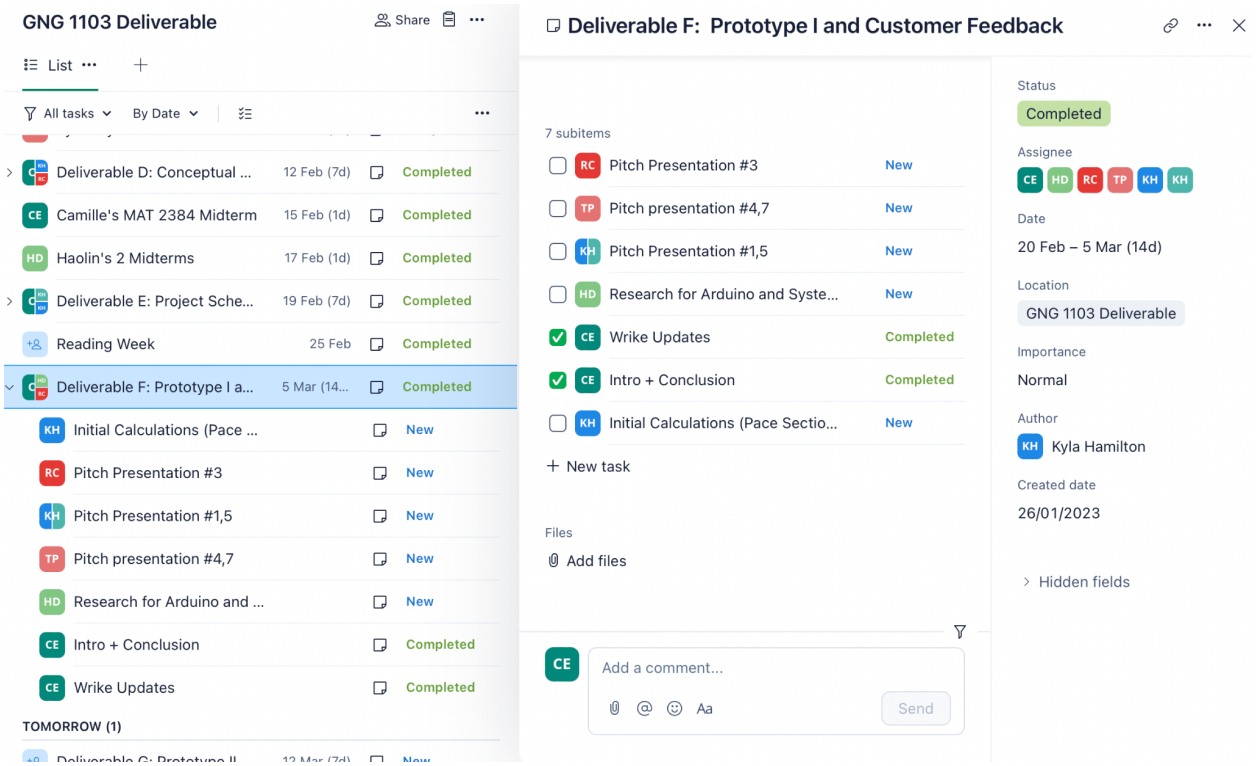

Figure 2. Project Progress Overview

Conclusion

A client meeting has provided clarification in regards to the project's current and future progress until the team's proposed idea is approved. Further project information such as present infrastructures and other critical components etc. that can be in conflict with the team's proposals is determined and has provided suggestions to how the team can proceed from hereafter. Following the team's previous design drawing that has consolidated the team's refined ideas into one chosen concept, the team is able to continue with the creation of their prototype whilst sticking to an approved budget. In conclusion, the team has developed a better understanding of target specifications and have produced a detailed design based on experiences and knowledge of engineering science.