PetWatch Executive Summary

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An injured pet can be an extreme stressor and source of anxiety when the pet owner can not stay with their pet through the entire recovery period. The purpose of PetWatch is to allow a pet owner to monitor the activity of a pet recovering from surgery or another ailment that gives it limited mobility even when the owner must be away from their pet. This is accomplished by a wearable device that is strapped near the injury site to monitor the activity of the pet. This device gathers information on the pet's movement and relays it, via Wi-Fi, to a desktop website and an android app. The website stores the collected movement data by date so it is easily navigable for the user. The website also allows the user to calibrate the system to send a notification through the app when the device senses significantly more than average movement for the specific pet being monitored. The android app provides a real-time graph of the pets movement data and allows the user to view the last 24 hours of their pets movement data. Both the website and the app also store basic information on the pet and user such as names of both and the age and breed of the pet. The features of this project are meant to alleviate some of the anxiety that a pet owner deals with when being away from their injured pet.

This project was approached in a holistic way, taking into consideration the responsibilities and strengths of each team member when devising how to plan the project. Project specifications were defined through various meetings with the project partner, instructors, and team members. The initial responsibilities of each team member were put into the context of the project and a role was devised for each member based on their strengths and backgrounds. The team consisted of two CS students and three ECE students so the project's software and hardware needs could be addressed with some level of expertise.

During fall term a preliminary project timeline was created, along with an initial block diagram and a definition of the engineering requirements the project would need to fulfill. In addition to these technical aspects the team developed standards for communication between team members, for quality of work, and for risk assessment. The majority of fall term was focused on cohesive teamwork and strategizing. Toward the end of the term the focus began to shift to individual work as each team member was expected to come up with a design for one of the blocks of the project they were responsible for.

Winter term focused mainly on individual work and the development of separate pieces of the project. Along the way the project scope changed multiple times as different hardships were encountered; In fall term the project initially included a human wearable component so that the user could receive notifications without having their eyes on their phone. This component was removed in winter term due to unforeseen complications with using bluetooth from both the software and hardware teams. A significant portion of the hardware had been developed for this component and had to be scrapped by the end of winter term, the scope of the PCB had to be edited as well. By the end of winter term the various pieces of hardware and software that made up the final product had been tested and developed and nearly all of the pieces were ready to be integrated into the final product.

Spring term focused on bringing these pieces together and documenting the development process for ease of communication. Creative solutions had to be formulated to

bring the project together and overcome the current remote circumstances. Some pieces of the project had to go through redesigns in the beginning of the term, but thankfully all of the intended functionality, excluding the human wearable, was acquired in the end. After creating the final product and proving that the product met all the given design specifications the team then moved on to reflecting on the design process. The culmination of the reviews and reflections of all of the team members of PetWatch is synthesized through the project showcase page that this document is housed in. The timeline depicting the previously described flow of events is shown in the following two pages:

ECE 441: PET MONITOR PROJECT

TEAM MEMBERS	Zavi Kaul, Ricky Heidrick, Walter Agra Neto, Shayla Tran, Quinn Campfield
GROUP AVAILABILITIES	(Fall Term) Tuesdays 6-8pm, (Winter Term) Thursdays 5-6pm, (Spring Term) Wednesdays 5-6pm
PROJECT PARTNER	Ingrid Scheel

TASK TITLE	TASK OWNER	DUE DATE	TASK COMPLETE?	TURNED IN?	PHASE
WEEK 1					
-	-	-	-	-	
WEEK 2					
Introductory Email & Initial Discovery Inquiry	Full Team	10/8/2020	✓	✓	
WEEK 3					
Team Protocols and Standards Document	Full Team	10/15/2020	✓	✓	
Biweekly Progress Videos	Software Team	10/15/2020	✓	✓	
Executive Project Summary	Full Team	10/15/2020	✓	✓	
Engineering Requirements Draft	Full Team	10/15/2020	✓	✓	
WEEK 4					
Biweekly Progress Videos	Software Team	10/22/2020	✓	✓	
Project Partner Update	Full Team	10/22/2020	✓	✓	
WEEK 5					
-	-	-	-	-	
WEEK 6					FALL TERM (Planning)
Scope and Requirements Meeting	Full Team	11/5/2020	✓	✓	
Team Communication Evaluation	Individual	11/5/2020	✓	✓	
Biweekly Progress Videos	Sofware Team	11/5/2020	✓	✓	
Block Diagram Draft	Full Team	11/5/2020	✓	✓	
WEEK 7					
Project Charter Assignment	Full Team	11/12/2020	✓	✓	
Project Partner Update	Full Team	11/12/2020	✓	✓	
Instructor System Architecture Meeting	Full Team	11/12/2020	✓	✓	
WEEK 8					
Biweekly Progress Videos	Software Team	11/19/2020	✓	✓	
Teamwork Reflection Paper	Individual	11/19/2020	✓	✓	
WEEK 9					
Engineering Requirements	Full Team	11/26/2020	✓	✓	
Block Diagram	Full Team	11/26/2020	✓	✓	
WEEK 10 (Dead Week, woohoo!)					
Biweekly Progress Videos	Software Team	12/3/2020	✓	✓	
Block Validation	Individual	12/3/2020	✓	✓	
Project Partner Update	Full Team	12/3/2020	✓	✓	

WEEK 11				
-	-	-	☐	☐
WEEK 12				
First Technical Cohort Collaboration	Individual	1/15/2021	☑	☑
Project Database Update	Full Team	1/15/2021	☑	☑
WEEK 13				
First Block Validation	Individual	1/22/2021	☑	☑
Login features, User Interface completed	Software Team	1/22/2021	☑	☑
Research Implication Report (complete draft due)	Individual		☑	☑
Initial PCB design sent to FAB	Hardware Team	1/22/2021	☑	☑
WEEK 14				
First Block Check-Off	Individual	1/29/2021	☑	☑
Research Implication Report (peer review due)	Individual	1/29/2021	☑	☑
WEEK 15				
Calibration, Data Analysis, User settings all functic	Software Team	2/5/2021	☑	☑
Second Technical Cohort Collaboration	Individual	2/5/2021	☑	☑
WEEK 16				
Second Block Validation	Individual	2/12/2021	☑	☑
Testing initial PCB completed	Hardware Team	2/12/2021	☑	☑
WEEK 17				
Final PCB design sent to FAB	Hardware Team	2/19/2021	☑	☑
Second Block Check-Off	Individual	2/19/2021	☑	☑
WEEK 18				
Third Block Validation	Individual	2/26/2021	☑	☑
WEEK 19				
RIR Final Draft	Individual	3/5/2021	☑	☑
PCB Assembly	Hardware Team	3/5/2021	☑	☑
WEEK 20				
Third Block Check-Off	Individual	3/12/2021	☑	☑
WEEK 21				
Send PCBs out to all team members	Hardware Team	4/2/2021	☑	☑
WEEK 22				
Elevator Speech Assignment	Individual	4/9/2021	☑	☑
WEEK 23				
Design Impact Assessment	Individual	4/16/2021	☑	☑
WEEK 24				
Initial System Checkoff	Full Team	4/23/2021	☑	☑
WEEK 25				
Complete draft of Project Closeout	Full Team	4/30/2021	☑	☑
WEEK 26				
-	-	-	☑	☑
WEEK 27				
Final System Checkoff	Full Team	5/14/2021	☑	☑
WEEK 28				
Project Closeout	Full Team	5/21/2021	☐	☐
Project Showcase Assignment	Full Team	5/21/2021	☐	☐
WEEK 29				
Project Voting (Extra Credit)	Individual	5/28/2021	☐	☐
WEEK 30				
-	-	-	☐	☐

WINTER TERM (Implementing) — applies to Weeks 11–20

SPRING TERM (Documenting) — applies to Weeks 21–30

The team worked well together for the vast majority of the duration of the project. There were slight hiccups along the way, as any team experiences, but they were worked through and the team delivered a functional product at the end of the year. The stakeholder now has a working wearable pet monitor that tracks the magnitude of movement and displays the data through a website and an android app.

Through this experience, our team members have learned a lot. We've learned about the challenges and advantages of working on a project in a remote environment, that even widely

used technologies may not be straightforward to implement, and that it's possible the basic requirements may need more attention than the complex ones. Working with a team remotely emphasized just how important strong communication and self-evaluation is to a project. If a team member feels underprepared for one of their tasks and they don't reach out to the rest of the team early it will likely cause complications and invoke undue stress. Popular technologies like Bluetooth seem like they should be easy to get information on and implement, but if they are still under patent it can be nearly impossible to incorporate them into projects with modest budgets. Lastly, a simple function and interface does not guarantee a component is simple on the inside, every aspect of a project should be thoroughly researched early on to get an accurate estimation of the time each component will take to complete. Overall, PetWatch was an enriching experience that the team would not have gotten from traditional curriculum.