California University of Pennsylvania

CSC 490: Senior Project I

Video Doorbell

Requirements Document

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Instructor Comments/Evaluation

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Abstract

The Video Doorbell is the project we decided to choose for a couple of reasons. The first is, our group has both Computer Science and Computer Engineering Technology majors so, we knew that we had to pick something that involves a piece of hardware utilizing some software. We sat down and thought about the most useful and practical ideas when we decided we wanted a security/surveillance type project. That's where the Video Doorbell idea comes in. The Video Doorbell is simple enough because it is just a doorbell with a couple of extra features that help make your home safer and even make life more convenient for you.

The doorbell will come with a bluetooth/wi-fi module that gives the ability to connect to wi-fi. The doorbell requires wi-fi because it contains a microphone and a camera. The camera can take pictures and record a video. The doorbell takes a picture and sends a notification if someone presses the button. If you open the notification, you will see who pressed the button. You can also talk to the person at your door.

This document explains the requirements of our project and informs you of how we are going to accomplish it. First, there is an introduction, after that, is the Application Domain and then the Initial Business model. Finally, we will talk about the initial requirements.

Introduction

Background/Overview of Project

The video helps not miss package deliveries or other people that come to the house daily. This product solves the problem of having to drive to the warehouse for a package or waiting until the next day to receive the delivery. The video doorbell is a great way for busy people to keep track of who comes to the house while they are away. Our project aims to solve these issues. The Video Doorbell notifies the owner that someone is at the door. Then, it takes a photo of the visitor and then notifies the owner. The owner can then talk to the person if they choose. With these features, the doorbell aims to rid most people of everyday issues associated with owning a house and missing company.

Objective of Project

The objective of this product is to provide consumers with a way to interact with people who ring their doorbell while they are away or too busy to get to the door. The consumer can interact with a person at their door. The user can interact with a person at the door. The user can record a video if they need to. The doorbell is to monitor who comes to the door and not security.

Team Details/Dynamics

Every team member has Computer Science in common as a Major/Minor. We also have one Computer Engineering major in our group. Our main method of communication is through the use of the following:

- Text message
- Email
- Discord (Chat)
- Google Docs

When we are not communicating through those means, we meet up weekly to discuss any updates or ideas with the project. We have an overlap of free time on Mondays, Wednesdays, and Fridays after 3, and Tuesdays and Thursdays after 11. We thoroughly believe that a quality product will be a result of the meetings in person and communicating outside of work.

Application Domain

Project Context

The Video Doorbell is for anyone that wants to see their front porch from any device. The doorbell syncs with your devices and goes on any door you choose. It can immediately start taking pictures and contact you for communication. Every 2 seconds, when someone presses the button, the doorbell will take a picture. As for the live video, when someone presses the button, the doorbell sends a notification to the user. Then the user can answer, and talk to the person, or ignore it and temporarily shut off the doorbell. The user could then ignore the person or answer the door.

Initial Business Model

Operational Environment

The Video Doorbell will use at least the following languages for coding the project:

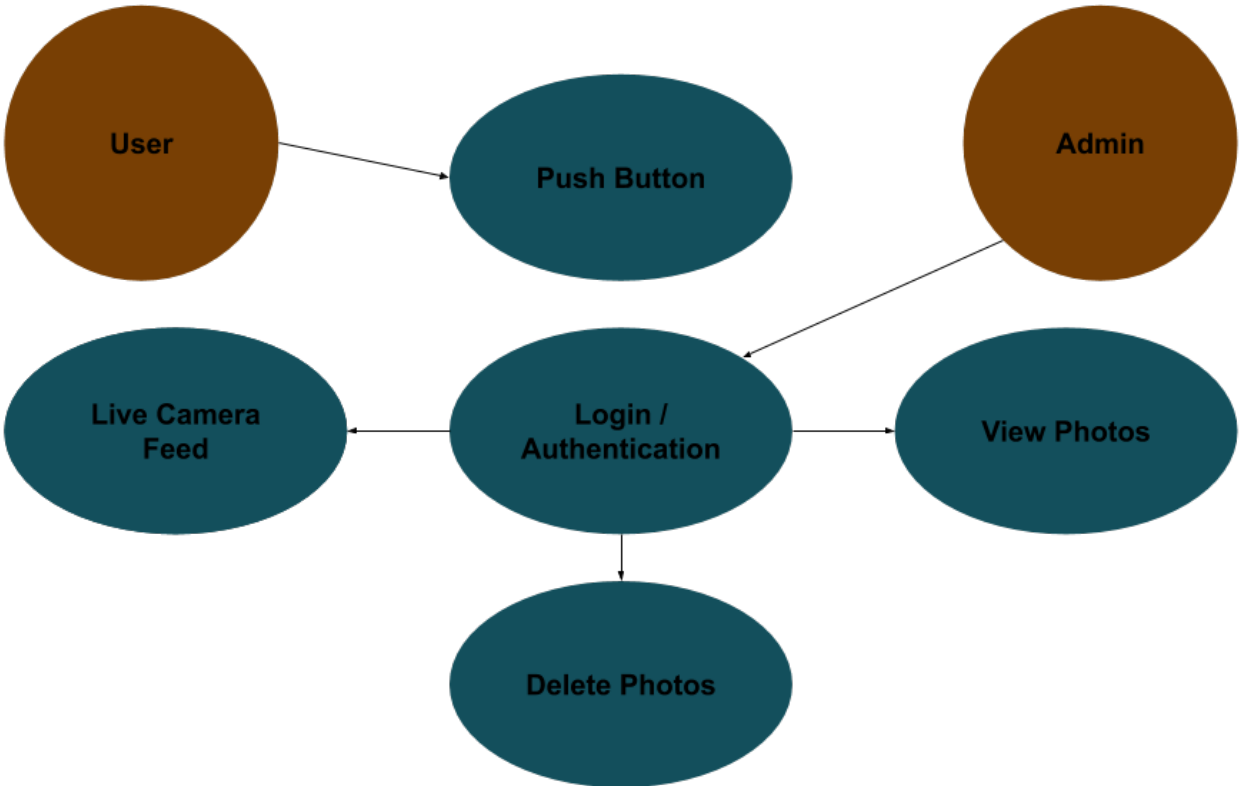
- Java
- C++
- HTML

The Product will require the users to connect the Doorbell to their home wifi and download an app that will allow connectivity between the two. The Smartphone application will work for both Android and IOS operating systems.

Description of Data Sources

The Video Doorbell requires user and admin input in order to achieve the complete functionality of the product. Users will need to press a button which transmits a signal to the camera as well as the admin account. In turn, the camera takes a picture while the admin gets notified of a button press. Furthermore, admins can view the live feed upon a transmitted signal from the button and view or delete any photos from the camera.

Use CASE Diagrams



Any users push the button and wait for a response from an admin. Any admins who interact with this product login to their account and have the ability to do the following: interact with a user at the door and view or delete images.

Initial Requirements

The hardware components and the software component make up the final product. The hardware includes:

1. Raspberry Pi or similar.
2. Camera and Microphone (combination or separate)
3. Push-button

4. Speaker
5. Wi-fi/Bluetooth module

The software component needs to take pictures/videos and save them in memory and to be accessible by the owner. It must also make use of the audio feature to produce a live feed to the visitor (user).

Functional

1. Take a picture of the visitor (user).
2. Notify the owner's device that there is a visitor.
3. Owner can then enter the video feed portion of the application.
4. Video feed cuts off after a few minutes or when the owner ends it.
5. All pictures taken are saved in the app for up to a week unless the user saves them for use.

Non-Functional

1. Fast response times
    a. Less than a second to take the picture
    b. 10 seconds or less for picture to be available
    c. 5 seconds or less for phone to be pinged for video
2. The front end will run on iOS or Android, preferably both.
3. Front end final product must be clean and easy to understand.

Testing/Revisions

The team will run tests through every phase of the project. Team members will test the hardware design and the code design for any functional flaws. This ensures that team members can resolve all design flaws well before the project deadline. Following many tests on the prototype, team members can fix any flaws found. Functional tests will occur throughout the entire process.

Appendix A: Technical Glossary

Admin - Short for Administrator.

Android - Mobile operating system developed by google.

C++ - A programming language used for main operation of the product.

Discord - A desktop application that is used to chat and screen share with group members.

HTML - Hypertext Markup Language.

iOS - The iPhone Operating System.

Video Doorbell - The title of our project to provide a solution to missing visitors at a person's home.

JavaScript - A programming language used for app functionality.

Owner - Described as the person that operates the application.

Raspberry Pi - A small computer that has input and output functionality.

USE Case - Visual description of the how the product operates.

User - Described as the person interacting with the physical product.

Push Button - Physical button that the user will press to initiate device operation.

Appendix B: Team Details

This document was created, revised, and finalized by the following individuals:

Trey Brown - Trey Brown's role was the leader for this document. He started by dividing up the sections based on specific strengths of each member. He worked on the Initial Requirements, Testing/Revisions and Appendices sections. Trey made sure all required information was in the document and then he scheduled the Writing Center revisions.

Michael Cheng - Michael was responsible for the Initial Business model as well as the case diagram. He used google drawing software to create the diagram section. Michael also was responsible for a proofread of the document.

Brittany Marietta - Brittany was responsible for the title page, the introduction, and the table of contents. In addition, Brittany helped ensure that all of the formatting and grammar was correct and according to the specifications.

Jesse Jento - Jesse was responsible for the abstract and an integral part of the main proofread of the final document. His main job was to reduce punctuation errors that may cause confusion in the reading of the document.

Appendix C: Workflow Authentication

I, Trey Brown, hereby attest that I have performed the work as documented herein.

________________________ ________________________ ____________

Printed name Signature Date

I, Michael Cheng, hereby attest that I have performed the work as documented herein.

________________________ ________________________ ____________

Printed name Signature Date

I, Brittany Marietta, hereby attest that I have performed the work as documented herein.

________________________ ________________________ ____________

Printed name Signature Date

I, Jesse Jento, hereby attest that I have performed the work as documented herein.

________________________ ________________________ ____________

Printed name Signature Date

Appendix D: Report from the Writing Center

Cal U Vulcan Learning Commons Report

Client: Trey Brown,

Staff or Resource: Richelle S.

Date: October 22, 2019, 9:00am - 9:30am

What course was serviced by this visit?: CSC 490

Did the student request that the instructor receive a visit report?: No

Please provide any additional comments relevant to this session.: Overall a very solid project, needed slight if any changes, was clear and direct, and nicely formatted.

How did the process of this consulting session address the established goals?: Reviewed paper for organization and format, slight advisements on the abstract, few typos/grammatical changes.