

Hidden Guardian

PROJECT PLAN

Team 9

Kelli Rout

Swamy Ponpani

Jennifer Frank - Team Lead

Keng-Yik Ho - Chief Engineer

Matthew Pedretti - Hardware Engineer

Tom Kirby - Backend Development

Jacob Stilwell - Computer Programmer

sddec18-09@iastate.edu

<https://sddec18-09.sd.ece.iastate.edu/>

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List of Symbols

Not Applicable.

List of Definitions

Not Applicable.

1.1 ACKNOWLEDGEMENT

Professor Swamy Ponpandi provided technical support and shall be acknowledged for assisting Team 9 in the development of Hidden Guardian.

1.2 PROBLEM STATEMENT

Kid's lives today involve online interactions more than ever. Their interactions with strangers invoke the risk of sharing unwanted personal information, password theft, receiving viruses, being cyberbullied and more. However, currently there is no practical parental monitoring system to keep track of these unwanted videogame interactions.

Our solution is Hidden Guardian. Hidden Guardian is a combination of a speaker/microphone for a gaming console. It will connect to the gaming console as well as the Hidden Guardian's mobile app. Through the mobile app the parent user will be able to input keywords, such as meet, phone number, address and will be notified if they are used in chats. The app will also provide live streams of the child's chats and specific clips of chats with those keywords. Hidden Guardian will only be able to be enabled or disabled by the parent.

Overall, our goal is to provide a system so that parents can have peace of mind that their kids videogame interactions are safe.

1.3 OPERATING ENVIRONMENT

The typical operating environment of Hidden Guardian is a household setting. Given that houses are typically well climate controlled the hardware component won't be subject to any extreme conditions. It will however be handled frequently and should be at least somewhat robust in order to withstand moderate impacts.

1.4 INTENDED USERS AND INTENDED USES

The intended user for this project will be for 2 targets, parents and their children. The children will be able to use to bluetooth speaker for their gaming uses or listening to music. The speaker will provide immersive gaming experience by providing high quality audio. The device will also have a mic to enable children communicate with other players online to improve gameplay.

Parents will be using it as a device to monitor their children activities. By using the mic on board, the device will record all conversations made by the kid when the device is turned on. Parents will be able to access logs of recordings using the app and find keywords of the recording such as phone numbers, address, to help improve the safety of their children.

1.5 ASSUMPTIONS AND LIMITATIONS

Assumptions:

- We don't have to worry about privacy laws, only the Xbox TOS.
- The maximum number of tracked voices will be 8 at a time.
- At the end of development, this product will not be commercially ready to consume

Limitations:

- We will only be able to cover one language, that being english.
- The amount of audio data that can be stored in the local object.

1.6 EXPECTED END PRODUCT AND OTHER DELIVERABLES

- Console App

The console app will be a data logging application for the xbox one console. Parents will be able to set up the app to record their child's audio and text chat conversations over xbox live. Access to the app will be restricted so that only the parent account can enable or disable it.

- Smartphone App

The smartphone app will allow users to review and search through the data collected by the console app. It will have a user friendly interface and provide a variety of tools for filtering through the stored data. These tools include things like being able to search for keywords or users and having all relevant conversations pop up.

- Hardware

A wireless speaker and microphone that allow a user to communicate with a gaming console. The speaker will have a set of controls for changing different channels of volume (e.g. game volume, chat volume). The speaker will run on a rechargeable battery and may be rechargeable via a usb cord.

The initial stages of each of these components will be delivered by May and the final versions will be delivered by the beginning of December.

2 Proposed Approach and Statement of Work

2.1 OBJECTIVE OF THE TASK

Our goal is to create a functional speaker/microphone, an android applications and a console application.

Hardware

Functional speaker and microphone - this hardware component will connect to the gaming console and mobile applications. It will act as a replacement headset for the child user and will receive all chat data to be sent to the software components.

Software

Console application - The console application will store all text chats, voice conversations, friends list and gather data about the child's gaming. It will be protected from allowing the child to enable or disable Hidden Guardian.

Android Mobile application - this application will communicate with the console app and hardware to present all the information to the parent. It will be very user friendly.

2.2 FUNCTIONAL REQUIREMENTS

The device will have the function to record conversations done by the kids and double as bluetooth speaker with wifi connection capabilities. Basic features of the speaker will be bluetooth connectivity, a volume button, a mute button, game volume, a power button and powered by a battery which is rechargeable. The main feature of the device would be hidden from the kids which is the ability to record conversations. Other feature will be an app the will enable parents to access the the conversations and chat logs from multiple platforms and find key words and phrases with a parental lock on the app so the kids do not remove the app accidentally or purposely.

2.3 CONSTRAINTS CONSIDERATIONS

We will want our product to be user friendly for parents who may not be very tech-savvy. Having a help option and using a language that is understandable to them.

We also have to consider the privacy of this product. Online members who participate in video game chat sign a release with XBox that they are willing to extend their privacy rights when using this product. This is meeting a standard, though may be considered

unethical. The product is helping parents monitor unsafe actions, cyberbullying and avoiding password theft but it is also recording others so it is in a grey area.

2.4 PREVIOUS WORK AND LITERATURE

Android Application

From our research, you plan to use android studio to host the android application. We will connect our java application to a mysql database using JDBC (Vogella). We realized that the sql database will not be able to store the actual audio files so it will just be used to store usernames, passwords, users that are blocked, keywords and the titles of audio files.

Bluetooth Speaker/Recording device

From our research, there have been several diy projects made by electronics enthusiast that are similar in functions but different in purpose. I realize that a simple Bluetooth Module is able to establish connection with any bluetooth device and so the speaker is not only limited to connecting to the xBox one. The research on the recording device made us realize that using a Arduino microcontroller is able to record and store the recordings in an SD card.

Current Similar Devices

Currently, there is no device with both functions. But there are devices that have seperated functions

2.5 PROPOSED DESIGN

Our proposed design consists of a wireless speaker and microphone to allow a user to communicate with other players while online gaming, as well as a console app that records the communications of the user and transmits that data to a database which can be accessed and searched using a secure smartphone app. The search tools will allow the user to filter through the data for specific keywords and flagged users.

2.6 TECHNOLOGY CONSIDERATIONS

- Mic might be too sensitive that it will pick up audio from the speaker but if using a less sensitive mic, might risk not be able to record voices
- One of the main choices made on the software side of the project is the choice of programming languages for the different software components. Different

languages have will have varying levels of support and available libraries to reference. We also want to optimize on our current knowledge of languages so that we don't spend too much time starting from scratch with a new language.

2.7 SAFETY CONSIDERATIONS

- Hardware needs to be safe to handle
 - no loose circuits
 - meets safety regulations of other speaker and microphone standards
- The information collected and stored must be encrypted as to not allow unauthorized access or tampering.
 - password encryption with database storage
 - hidden ability to enable/disable Hidden Guardian if you are not the parental user

2.8 TASK APPROACH

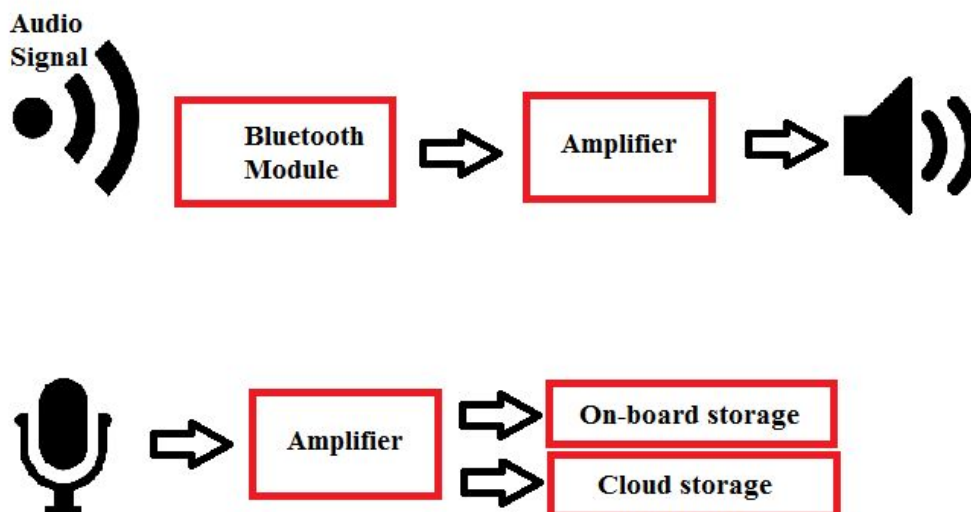


Figure 1: Speaker/Microphone system

The device will contain 2 systems. One will be the speaker system and one will be the microphone system.

- **Speaker system**

Signal from the console will be paired with the bluetooth module. The audio signal will be small so the signal will have to go through an amplifier. The amplified signal will be sent to the speaker providing high quality sound

- **Microphone system**

Conversations will be picked up by the microphone as signals. The signals will then be amplified through an amplifier. The signal will then be stored in storage device or cloud storage to be accessed by the app.

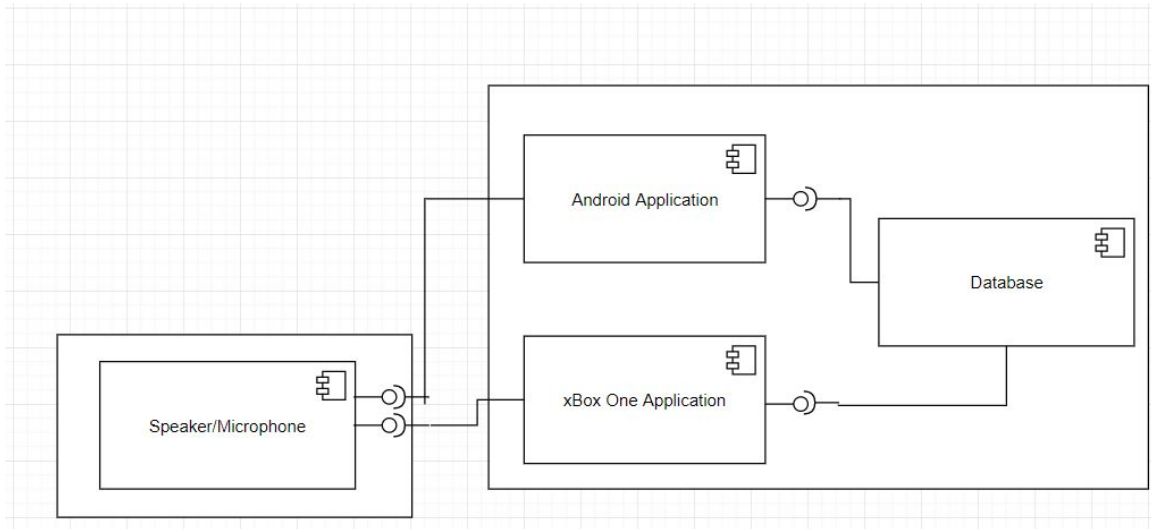


Figure 2: Complete system

The xBox One application will access the chat logs and store them in the database. The Android application will then be able to access the database including the recordings recorded by the microphone.

2.9 POSSIBLE RISKS AND RISK MANAGEMENT

- Team's lack of experience with console programming and inability to estimate development time costs
- Potential inability to receive essential information from the XBox Console
- Potential expensive costs in purchasing an XBox One console and development license
- Potential excessive costs to meet the audio storage requirements
- Muffled voices, extreme volumes (quiet or loud), distance away from speaker, and accents may affect the clarity of video recordings, false positives for keyword notifications and other accuracy issues

2.10 PROJECT PROPOSED MILESTONES AND EVALUATION CRITERIA

- Successfully collecting audio data from the console
 - Test conversations can be gathered by the app and correlate information like the current speaker and time of the conversation
- Successfully collecting text chat data from the console
 - Send test messages and verify that the app is gathering relevant information e.g. the content of the message, time and source of the message
- Storing collected data as a reference in a database

- Attempt to store test data in the database
- Accessing data from the database on a separate app
 - Attempt to read back test data that is stored
- Voice to text parsing
 - Parse sample audio recordings and ensure the audio is interpreted correctly
- Making stored data searchable
 - Search through data with known characteristics
 - Ensure all relevant data appears when those characteristics are filtered for
- Interfacing a wireless speaker with the console
 - Play a known sound file from the console and ensure it sounds correct from the speaker
- Interfacing a wireless microphone with the console
 - Use an existing console app with voice chat capabilities and use it to verify correct audio

2.11 PROJECT TRACKING PROCEDURES

Our project tracking procedures will be done through gitLab issues. We will have an agile board where we assign tasks and are able to comment about the issues and tasks via this platform. Gitlab issues allows us to tag items to certain milestones and goals, assign due dates, and add certain “weights” so we all know the priority. We have just started using GitLab Issues as our Project Tracking Platform, but with time we will start utilizing their features and filling up our task board. An example of our current board is shown in Figure 3.

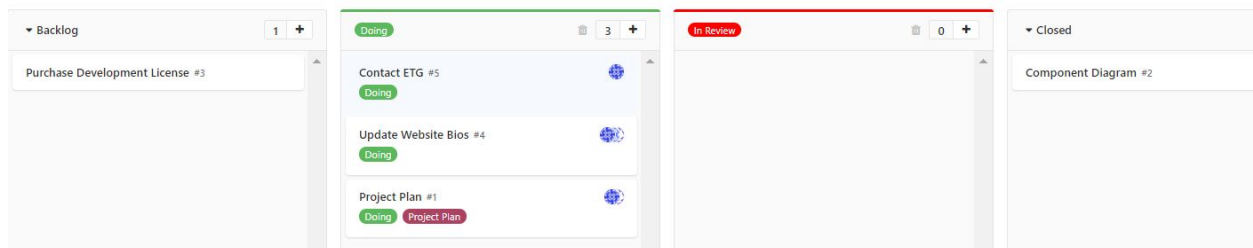


Figure 3

2.12 EXPECTED RESULTS AND VALIDATION

Our desired outcome of this project is a working speaker and microphone, a console app with the ability to log and transfer audio and chat communications, and a computer/smartphone app that provides a variety of tools for quickly and intuitively navigating the logged data. To ensure that the components each accomplish their task sufficiently we plan to focus on testing the functionality of each component individually before combining them into a single functioning system.

2.13 TEST PLAN

Provide a functional test plan for the present project version

Currently, we are in our projects research and planning phase while we wait on the approval of licenses. Once approved, we be testing items related to console data collection and finding the limits of what can be accessed.

3 Project Timeline, Estimated Resources, and Challenges

3.1 PROJECT TIMELINE

Week 4 1/27 - 2/2	Create schedule, come up with unique ideas, write down research notes on voice recognition api, what is accessible in XBox dev mode, hardware, systems that currently do something similar
Week 5 2/3 - 2/9	Practice using git, get our "board of tasks" up and running, finalize development first draft decisions (this matches up with our task to finish the project plan). (UML Diagram - component), write requirements (functional and nonfunctional)
Week 6 2/10 - 2/16	Continue testing software implementation, and researching the same topics as in week 4.
Week 7 2/17 - 2/23	Begin development testing on console while simultaneously continuing research.
Week 8 2/24 - 3/2	Continue development testing on console while simultaneously continuing research Begin development on amplifier while continuing research on bluetooth module.
Week 9 3/3 - 3/9	Introduce basic development of mobile app, and continue to work on console. Continue on the development of amplifier.

Week 10 3/10 - 3/16	Spring Break - continue development when possible
Week 11 3/17 - 3/23	In complete development mode at this point. Working on both mobile, console app and bluetooth module.
Week 12 3/24 - 3/30	In complete development mode at this point. Working on both mobile, console app and bluetooth module.
Week 13 3/31 - 4/6	In complete development mode at this point. Working on both mobile and console app. Prototype for speaker complete
Week 14 4/7 - 4/13	In complete development mode at this point. Working on both mobile and console app. Stop introducing new work and features and focus on producing a proof of concept and fixing bugs.
Week 15 4/14 - 4/20	Focus on producing a proof of concept and fixing bugs.
Week 16 4/21 - 4/27	Dead Week - presentation. At this point we want to have a proof of concept that consists of at basic: showing that we can get data from xbox and receive data from our speaker/app side, potentially without integration. At most we would have a general speaker, arduino, with a bread board for button/control usage, and simple functionality on XBox.

Table 1

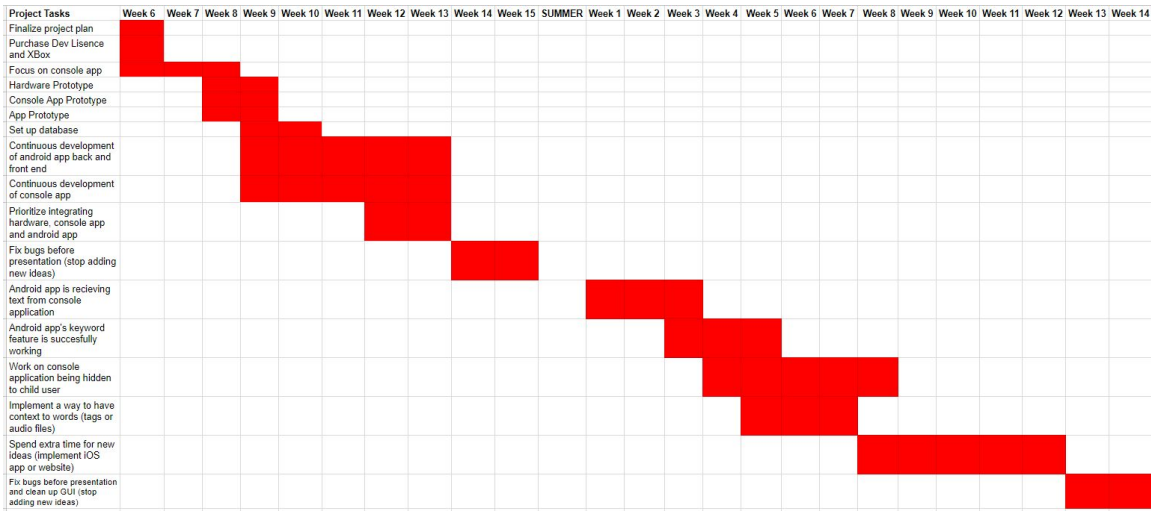


Figure 4

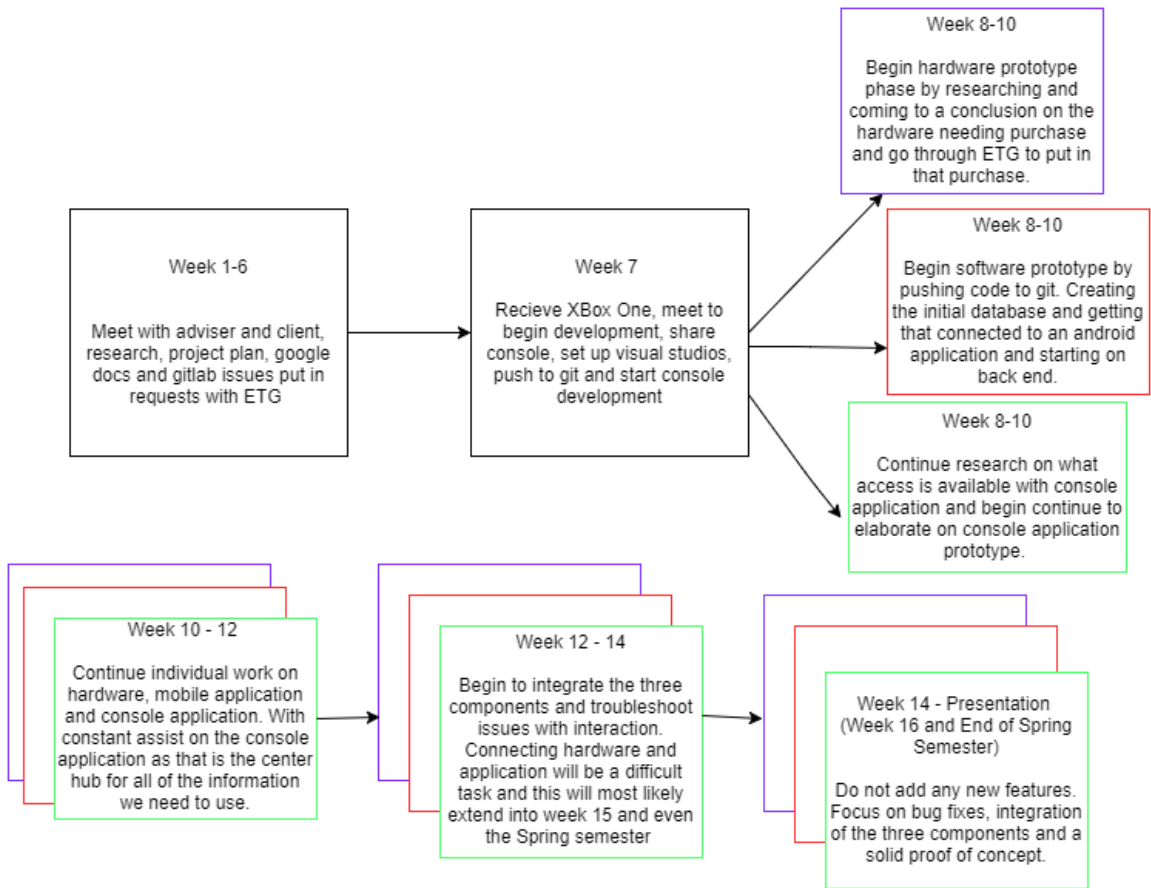


Figure 5

We have made a rough draft of our Gantt chart and WBS. They currently contain our main deliverables with some breakdown.

Our main goal with our project timeline is to get interfacing with the consoles to work first then extend to app, site, and hardware with an emphasis on starting back end first. Then after we are fully structured, focusing more on the frontend.

Our timeline breakdown focuses on the gaming console first because without knowing our accesses with the XBox Development system, we will not be able to know the scope of our abilities with our app as a whole. After that, we want to split our team apart in working on the gaming console as well as the mobile application to capitalize on our strengths.

We decided two weeks before our first semester presentation is when we should stop adding to our workload and focusing on bug fixes and making things look cleaner and presentable. We also decided that our bare minimum proof of concept would be showing our ability to receive and send data from the xbox and the same with our speaker application, even if they aren't integrated together quite well. We hope for more to be accomplished but this minimum goal will at least guarantee us a good start to finish implementation by the end of second semester.

In the Fall semester we plan to implement as much as we possibly can. Our first goal will be to get fully functioning console and mobile application that is user friendly and has modular code. From there we will extend our mobile application to a website and potentially iOS. As well as look into extending our XBox system platform to others. However, those are additional tasks that will be added once we get our bare minimum baseline down.

3.2 FEASIBILITY ASSESSMENT

We will have a speaker and microphone that works as intended and a mobile app that will work with the speaker. the main challenge is if the xbox already has API's for interfacing or if we need to create our own libraries.

3.3 PERSONNEL EFFORT REQUIREMENTS

Not fully implemented.

Create speaker	
Create microphone	
Group chat interfacing	

party chat interfacing	
text chat interfacing	
Create Database structure	
Develop DB interfacing	
Create website front end	
Create website back end	
Create app front end	
Create app back end	
connect app to DB	
connect site to DB	
connect DB to console	
connect Hardware to console	

3.4 OTHER RESOURCE REQUIREMENTS

Not applicable.

3.5 FINANCIAL REQUIREMENTS

We will potentially need an Xbox One to develop on - **\$200 - \$300**

Xbox Development License - **\$19.99**

Speaker/Microphone - **\$60-\$80**

4 Closure Materials

4.1 CONCLUSION

Our goal for Hidden Guardian is to create a platform where parents can have their minds at ease about their child's video game play. We plan to have a microphone/speaker that replaces the gamers headset, a console application and a mobile application. Between the communication of

these three components the parental user will be able to listen for keywords, listen to chats, and effectively monitor their child's video game play on a user-friendly mobile app.

4.2 REFERENCES

DIY Bluetooth Speaker/Voice Recorder

<http://www.instructables.com/id/DIY-Bluetooth-Speaker-PartyBar/>

<http://www.instructables.com/id/Make-Your-Own-Spy-Bug-Arduino-Voice-Recorder/>

Android Application

<https://www.androidauthority.com/android-app-development-complete-beginners-658469/v>

<http://www.vogella.com/tutorials/MySQLJava/article.html>

Financial Resources

<https://www.gamestop.com/browse/consoles/xbox-one?nav=28-xuo,13ffff2412-1e0>

<https://www.xbox.com/en-US/developers>

<https://www.parts-express.com/cat/midrange-midbass-drivers-full-range-speakers/16>

<https://www.digikey.com/>

4.3 APPENDICES

Not applicable.