**Final Group Paper**

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**Introduction and Statement of Research Problem**

Our research is based around the HCI design issues with mobile phone games. HCI design, or human computer interaction design, is the process of planning and designing the interaction between people and computers. The user interface which includes both hardware and software makes up the interaction between the user and the computer. The games that we focused on for mobile phones were both online and multiplayer. Knowing these facts about the interface and games, we needed to focus on a specific HCI design issue for these games. After our research, discussed in a later section, we decided to focus on the communication aspect of these games.

When comparing online games on mobile phones to online console games, mobile phone games have made great strides. The graphics on mobile phone games have increased in quality dramatically in recent years. Touch screen on phones have allowed the control to become more fluid and flexible. However, when you compare an online game on a mobile phone to that of an online game on a console system and look at the communication aspect of these games, mobile phones fall far behind. This is what caught our eye and sparked our research on this topic. Console systems have wireless microphone headsets that allow the user to speak directly to their ally or opponent when playing online together. This enables team play to become much more of a factor in games and team based games become easier to manage. Online mobile phone games do not have any features like the microphone headsets of console games. This is what inspired us to create a prototype of an application that allows the user to communicate with other players while playing their game.

**Research Methodology**

The first thing our group did was to establish a means of communication and worked on getting organized. We created a Google doc for all of us to post research and links into. We also opened a drop box account so we could share files and PowerPoints much easier. The drop box became very useful later into the semester as we were able to edit papers or PowerPoints individually and then upload them again. Literature research was the first type of research we conducted for this project. We each took a subject related to our topic, researched it, posted it in the Google doc and then briefed our team members in class and during meetings on the material of it. We began with researching battery life on phones, different voice and communication applications that were currently on the market, popular online mobile phone games, the issues of lag or latency and how applications mash up or work together.

The next research our group conducted was online surveys. These surveys were distributed online and to students in our class. The purpose of these surveys was to get a feel of how people view and use online games on their mobile phone. The results were tabulated and put into charts to show the results. We will show and discuss them later in this paper.

We also created a Google doc that was used as our schedule. It had tasks and components listed that we need to finish. It had deadlines and due dates for these components as well as the name of the person who was to complete this task. This Google doc was very helpful in keeping us on track and on schedule.

Another strategy we used on the research project was to assign roles to group members of what they needed to complete. Most of the times these were assigned based on the strengths of our group members. For example, MK is really good at creating videos so we decided that it would be best that he and Jun work on the video. Assigning roles like this allowed our group to work as effectively as possible and at a high level.

**Analysis**

Our process of analysis took our own research and online survey. Our most important thing is online survey because we can easily catch how people can think about our topic and our data comes from surveys we sent out to the I399 class and our own each friend to get feedback on our topic. Our survey questions are eight and following chats are only showing our main data. Our purpose is how many people are using smart phone, what types of games do they play and how much important communication problem when they are playing mobile game. From these questions, we can expect for our new prototype model and future work.

From this question, we can know almost people are playing game with their smart phones.

From this question, many people are playing arcade, strategy and shooting game. These games are need for communication tool.

Lots of people are using iPhone and Android like smart phones because these devices are very useful.

This question is one of most important in our topic. Half of people answered “yes” for this question. It means many people want to play the game with real time communication tool.



For our final video, there are four parts. First part, we want to show a history of video game from one player to multiplayer. Second part, we want to show current mobile games from single player to multiplayer. Third part, we can feel there is no real time communication tool with mobile game and last part we show our solution of prototype. Our final poster displays our purpose, method, and selected results of the surveys, along with our top suggestions and contributing features and uses for those to come.

**Results**

Having figured out real time communication tools to focus on, we decided to develop a mash-up of existing voice communication apps and online multiplayer game. Our decision to create this tool was based on the results of our surveys and each research. Also, we want to address the issues of lag and latency that can affect game play and communication software.

Prototype:



**Abstract and Related Work**

Since most of mobile based multiplayer online games do not support while playing games, we think it is in the best interest of mobile phone gamers to develop a way to make the connection between people through gaming applications. As a result of the survey provided above, having a communication feature within an online game application would give users more opportunities of enjoying the games with friends. For example, most of console system games support communication feature with wireless headsets and users have found that they have more fun playing with others while having conversations through the system together. Unlike the console system online multiplayer games, mobile-based online multiplayer games lost its opportunity of serving more fun with communication. We have attempted another type of research which included cases that show users trying to have conversation during mobile phone game playing. The results showed that users gather together in a same place to talk in voice directly while playing their games or they made a call first and played a game so that they can have conversations through phone call. Since Verizon wireless service company has unique signal technology which blocks users from making a phone call and connecting Internet service at the same time, there is an issue that cannot solve our solution with technical problems. Therefore, we think it is better to develop a new system that allows players to talk in real time to other players while playing mobile phone online games.

Furthermore, there is another issue that could appear with our solution, which is game lag. Unlike console system based online games; mobile device have a of capacity for bringing data through Internet connections. This limitation gives mobile phone a disadvantage of having conversation feature within the application when an application wants to performs well on other fields rather than voice communication supporting. Once the main purpose of an application is gaming, it is not necessary to have voice communication if it causes lag or any other sacrificing game flow. Therefore, we also had to think about solving the communication problems in mobile multiplayer online games while making sure it does not affect gaming functionality.

Since the lag problems are unpredictable until we see the real solution application playing on a device, it is still just assumption for us that it is only technical problems. However, to prevent lag out of our solution, reducing data size is one way we can go. Through our research, there was a proposal that gave us solution for communication and also reducing voice data size. One of the communication applications named ‘Hey Tell’ is using voice data as a message data. This application allows users to send a voice message in real time just like a walkie-talkie does. Through this way, connection is not needed all the time but only when using the connection for sending and receiving voice data. So if the interface contains interaction button to speak up, Internet connection is not continuously working and it reduces size of sending and receiving voice data while playing online games.

**Diagram 1**

1. Online gaming working with phone call functioning

**User 1** **User 2**

 Game playing

Voice data Voice data

2. Online gaming working with sending and receiving voice data

 **User 1**  **User 2**

 Game playing

 Voice data Voice data

 As seen in Diagram1, sending and receiving voice data while online gaming in mobile phone uses one time data delivery through Internet when the game is playing. This way, it is not only allowing the user to play the game continuously but also proposes users to talk to each other without disturbing game functioning. However, if phone call functioning were imported into game application, companies like Verizon Wireless do not allow voice calling and Internet connecting at the same time. The calling feature should be embedded as using Internet based talking to avoid this issue. It is clear that the on-calling feature disturbs the gaming functionality due to mobile phones having a limit of data handling capacity. Therefore, we see that communication problems on mobile phone multiplayer games should be solved but lag could be another issue and it would be possible to solve both issues together by handling voice data size in small quantities.

**Conclusion**

A phones primary function is to make phone calls, but our research shows that playing games is also a key function in smart phone usage. The average user in our survey spent anywhere from 1-2hrs daily just playing games on their phone so we were able to see that many users are not just using their phone to make a phone call. After analyzing the data collected from our surveys and research, we have come to the conclusion that the market for online multiplayer mobile games will drastically increase if a real time communication system is developed. Our data as well as observations conclude that multiplayer games are a big hit with many smart phone users since we don’t have to buy an additional piece of hardware or software to play the games on our phone all that is needed is a Wi-Fi connection and an app store that can be accessed with a few presses of a touch screen phone. Currently the only method of communication that is offered to players once inside of their game is a text window that will have delay when it comes to sending and receiving messages. We also wanted to focus on the user experience when talking with another player. We wanted to develop a system that didn’t force users to be in the same location as other players for convenience purposes. A lot of the time it will be physically impossible for two users to be in the same room to enjoy a game that they love to play. Many users enjoy the fact that with console games you can play from the comfort of your own home with players all around the world. We wanted a similar system to be added to mobile phone games because gaming is a way for a user to reduce stress and/or talk with friends about things that have nothing to do with the game but about plans for meeting up in the future. All of these aspects of communication played a key part in our decision to bring in a system that allows all mobile phone gamers a chance to speak with one another. A voice communication system like the one we have proposed does not yet exist due to efforts of fixing the issues of internet connectivity with mobile phones. We believe that once the issue of making voice data sent between users without the use of a phone call is addressed that users will get the best experience possible with no advantages held by other players with regards to the issue of lag, and a system that allows multiple users to communicate with one another.

**Future Works**

Looking forward into the future we would like to program a system like the one we have proposed using all that we have learned about application mash-ups as well as applications being run in the background while another app is running. Due to limited amounts of time we were not actually able to have a working function of our proposed system of communication only a detailed concept sketch that shows how the system is designed to work and how we arrived at the conclusion to use the applications that we chose to use. Our research was focused mainly on iPhone and Android users because our results showed that those were the primary survey takers phone of choice so we would like to include all phone types as well since there are more than just iPhone and Android users that play games on their phone. Finally, we wanted to develop a game for your phone that worked by listening to the sound of your voice. While testing many other games to see how you could not only talk to other players but move inside of the game, we noticed that sometimes your character would not react to where you were telling your character to go. This was very frustrating in games where moving large numbers of people to a certain location was involved. We believe that with a voice communication system that allowed the user to control large numbers by simply giving an instruction would be a game type that many users would enjoy. Strategy games on the android market ranked in the top 5 but looking through all the feedback given from users worldwide there were numerous complaints about the movement being off. We wanted to incorporate a voice command system to allow the user more freedom to control their character as well as provide the user with a unique experience that is currently unavailable in the mobile phone gaming industry. The future of mobile phone gaming looks brighter than ever before with new upgrades to current phone service such as 4G and better processing speed. Before long we will have the power of a computer and more all in the comforts of our pocket, which is why we believe the future of mobile phone gaming is as promising as we believe it will be.