**Final Report:**

My Discovery-

The All in One Museum of Discovery and Science Interactive Android Application

Submitted by:

Project Manager: Christopher Hoyek

Project Manager: Oliver Zavala

Graphics Designer: Maxwell Carter

Java Programmer: Nailane Oliveira

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**ABSTRACT:**

The Museum of Discovery and Science stressed its imperative need to be "at the forefront of technology" to enhance its visitor experience in terms of ease, appeal and information. We aimed to help the museum achieve this goal through our My Discovery interactive application. The Museum originally used paper maps to aid its visitors, however these proved have to be fragile, lacked information, and wasted paper. We hoped to turn the tables around with our My Discovery app, which can be run on a visitor's android device and provides the user with two dimensional interactive maps of both floors of the museum, an interactive map of nearby parking lots and their prices, and a simple, yet addictive game that addresses an environmental issue that the museum has been promoting awareness to. The My Discovery app was built upon Google's Android platform using both Java and Processing and provides an immersive feel to the user though our simple and intuitive interface and explorer-themed graphics.

**BACKGROUND:**

As technology progresses, so does the ease of making people’s life easier. In present day, there are more tools that can be integrated to make a better product. Since the early 2010s, as smartphones became more popular and cheaper to buy, more apps have been developed, many of them being informative and service apps. A lot of businesses have started to move from the paper age to technology age. Also, with the global warming issue we are currently facing, we are now looking for ways that are green and would cause less environmental damage, but at the same time give us the same or better product and quality as the regular method. Instead of having something like a paper map, the fundamentals of mobile application developments can be applied and compressed to make a mobile application that would have more features than just an ordinary paper map and it could always be used anytime, anywhere. Also, an important principle that should be applied when developing a mobile application is the purpose of it, how it will make a user’s experience much efficient and easier. By also customizing the mobile application to the user’s needs, it would make the user feel more welcomed and relieved that their voice was heard to make the mobile application the way they like it and understand it. A lot of this can be achieved by looking at the demographics of target audience and taking it from there. If the organization is trying to communicate a message with the users, then it is vital to find the best way based on the demographics such as age and language to be able to communicate the message effectively. By using the software available, such as Processing, Ellipse, and Photoshop, the creation of such an application can be possible.

**RESULTS:**

All of the team members in the group completed their parts effectively and in a timely manner. In our game, Manatee Mania, there was trial and error in developing the game, but eventually we were able to get the game working and customized so that the user could have a good experience with the game and at the same time the game representing something that occurs in real life. If the manatee eats the seaweed, you gain more points. If the manatee eats litter, then it will die and the game will be over. We also added fact page on manatees living in Florida and how pollution is indeed affecting them at the end of the game. This is all a message the Museum of Discovery and Science is trying to convey with its visitors, and we have implemented that in our game. In the My Discovery application, making it bilingual as suggested by one of the group mangers (Oliver Zavala) was successful as the museum’s paper map was only available in English and Spanish is the second most spoken language in South Florida. In the application, users can find the nearest parking areas and the fees so don’t have to spend a lot of time looking for a parking space, yet a cheap one. The group’s artist (Maxwell Carter) suggested the idea of adding the structures visitors would see in the museum, to the interactive map to make it easier to look for a specific exhibit. Once the visitors randomly click on any exhibit, they would get a brief description of the exhibit and a real picture of the exhibit, so they have an idea of how it looks like, saving their time looking for it as some exhibits don’t have a sign with the name. We also ended up putting the age category of each exhibit as some were not suitable for all ages. We used all tactics and resources to create a unique application that is customized to assist the user in the best way and make their experience much more enjoyable and convenient.

**METHODS:**

The brainstorming that led to the development of My Discovery originated during our first visit to the MODS (Museum of Discovery and Science). During this visit we toured the museum and took notes on things that were hard for us to do or understand about the museum. Some of these things were finding a paper map, navigating the museum using the paper map, finding out all of the things to do in an exhibit, and finding a way to bring awareness to the environmental issues presented in certain exhibits. Eventually we wanted something that could encompass and eliminate all of these difficulties at once. Our answer to this was an interactive map with clickable icons that redirected the user to additional information regarding the exhibits. This map had to be three dimensional though, so that the reader can identify where they are using physical features rather than exhibit names. This would be large advantage over the brief two dimensional maps that were provided to visitors. Additionally, to educate people about certain exhibits and their purposes, we needed to create a simple game (with an about page), such as something that relied on accelerometer readings to move a character around in order to consume different items. To gain the necessary data to create these features, we had to visit the museum again. The interactive parking map was born during our second visit, when we encountered a lot of traffic in parking lots along with a variation of prices and remembered a comment regarding parking issues at the museum from Adrian Kruss. In addition, one of the project managers (Oliver Zavala) suggested that due to the large amount of Spanish speakers in South Florida and not all of them being able to understand English very well or for the tourists coming from foreign countries in which Spanish is spoken, that we develop a Spanish version of the application. Once we figured out what we were going to create, the project managers split up the work evenly based on everyone's strengths and set deadlines so that no one would procrastinate. The Java programmer was responsible for putting the app together, creating the Java code and helping debug. The artist was responsible for the mockups, storyboards, taking pictures, editing them, and creating the app screens and buttons. The managers were responsible for planning out the project, creating the Processing code for Manatee Mania (our game) and the Interactive Parking Map, helping with editing the images, helping with the storyboard, and gathering exhibit information for the app. Everything was submitted and documented on our group's Confluence wiki at smart.eng.fau.edu.

Our My Discovery app was built using an amalgamation of Processing code and Java code. The technical tools we used to make this possible were Eclipse and Processing-2.0.3. Manatee Mania (a game where the user tilts his or device to move a manatee and feed it seaweed while avoiding pollutants, that educates the user about growing dangers to Florida's wildlife and manatee population) and our interactive parking map (an imported Google Map with pinpoints that can be tapped for information and prices regarding the closest places to park at the museum) were built in Processing and imported into eclipse for integration into our Java code. The interactive maps and exhibit information along with all other screens were images that were linked together with buttons in Java code. Our assets for this application (including all screens, the theme, and game images) were created using Adobe's Photoshop and Microsoft's Paint.

**DISCUSSION:**

We encountered a few predicaments while developing My Discovery. Among these were figuring out how to integrate Processing code as a component of our Java code, and figuring out how to create a file on the user's android device that stores and loads their Manatee Mania high score after they restart their device or exit the app. Our Java programmer (Nailane Olivera) was able to figure out how to import Processing code into Java code into Eclipse with the help of Victor Gallego. She made the combination between these two applications using the package manager. In this way, she created a new Intent that opened the package from the Processing application. To create a high score for Manatee Mania that saves to the user's device, one of the project managers (Christopher Hoyek) had to implement saveString and loadString into Manatee Mania's processing code, along with a void function to detect what the high score is and when to update it.

In the future we plan to expand My Discovery by adding a simple game to each exhibit's page to help entertain and educate those who play them. These simple games will each possess a public leader board (using Parse.com). Another idea is to add Portuguese, since there are many Portuguese speakers in South Florida. We also hope to include a button for each exhibit page that can be clicked to generate random facts about the information that an exhibit presents, NFC tags (see Appendix D) and even a GPS that directs you to certain locations and can detect which floor the user is on.

**CONCLUSION:**

In the first time that the Museum of Discovery and Science talked with the class, they told us to create apps that could enhance the visitor’s experience. The first thing that we thought was that we should create better maps and descriptions of each exhibit. However, just these tasks it would create a boring app. Then, the ideas started to emerge, the game, the different language versions, the parking application and of course, a three dimensional map for both floors of the museum.

We already have some ideas about how to improve the application, but we are glad about the results that we achieved in so short time. We hope that My Discovery can help and improve the experience of each new visitor at the Museum of Discovery and Science, Fort Lauderdale.

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