Closet Assistant: An Android Application

by

Itobore Odje

Submitted to
the Faculty of the School of Information Technology
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Technology

Itobore Odje — April 20, 2015 (Date)

Xuetao Wei — April 20, 2015 (Date)

University of Cincinnati
College of
Education, Criminal Justice, and Human Services
April 2015

Table of Contents

Illustrations

Figures

Tables

Abstract

The Closet Assistant application will ultimately change the way outfits are put together and the way a person gets dressed. In a very technology connected world the Closet Assistant will utilize the Android platform. With this app a person can also select out an appropriate outfit for the day or the person can use the app to randomize an outfit. A person can find that perfect outfit that is already in their closet, can share their outfit with friends, and it will assist with finding the perfect outfit. People in need of inspiration can get it from Pinterest, linking them to seasonal boards. Overall putting together the perfect outfit will be easier and take less time.

Problem Need

Picking out the perfect outfit can sometimes be overwhelming. Some people will tear their whole closet apart before actually putting together the perfect outfit. Tearing apart a closet can be time consuming and often turn into a mess. There has to be an easier solution for those who struggle to put together the perfect outfit along with the perfect accessories. When a new season approaches, it can also be hard to find an outfit that is trendy and appropriate for that season.

I developed an app that reduces the time it takes to get dressed, The Closet Assistant. The users are able to upload their closet onto their phone and pick out outfits accordingly. There is also an outfit randomizer that will ultimately suggest the perfect outfit for the user using a color wheel. There are a few other fashion apps out there but none of them that randomize outfits or let the user compile an outfit for the day. For example, in the Chicago Tribune newspaper there was an article naming some useful fashion application available. One mentioned that is closely related to the Closet Assistant is Pickn' Tell. Pickn' Tell is an app that allows user to take picture of themselves and send to their friends for their opinions. It also offers users to virtually manage their wardrobe (Chicago Tribune 2013). Unlike Pickn' Tell the Closet Assistant offers inspiration along with randomization.

Technical Areas

This project focused primarily on software development specifically on the Android platform and also utilizes the SQLite database. The software development piece enables users to create closets on their phones with specific categories so that they are able to choose the appropriate clothing. As mentioned the project is

on the Android platform and uses Java as the programming language. At first the application used Eclipse as an IDE but due to problems with Eclipse, Android Studio took its place. The following things were taken into consideration while developing the application: user experience, usability, and adding more relevant features for future use.

Design Protocol

The Closet Assistant has one human actor in the use case and is the user. The user will upload clothes into the closet to be able to put outfits together and receive random outfit suggestions. How the user interacts with the application is in Figure 1, which is a use case diagram.

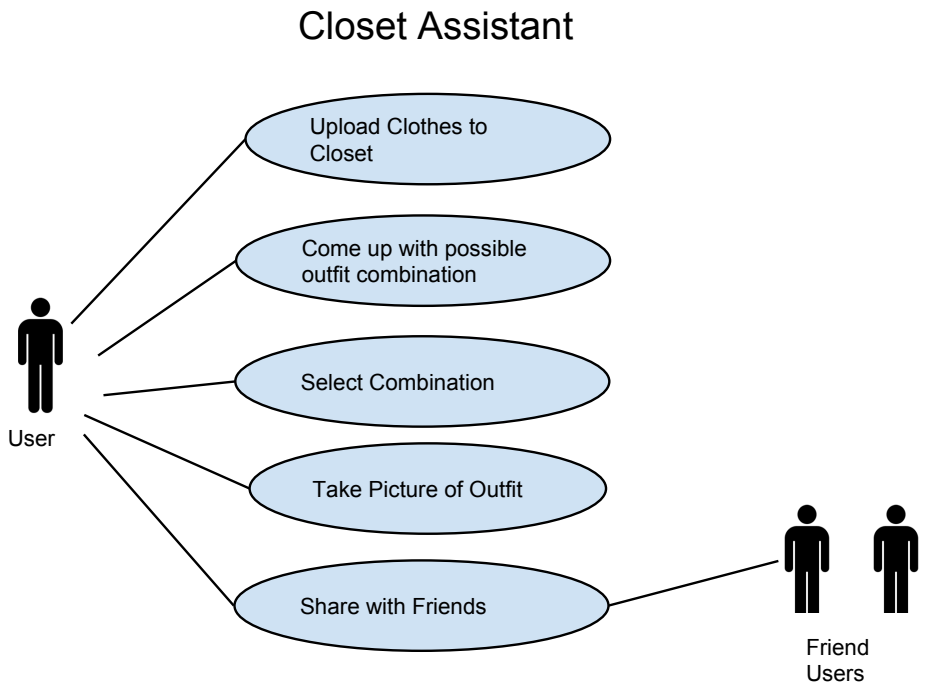

Figure 1: Use Case Diagram

Randomization Feature: The Art of Matching

The randomization feature uses a color wheel to see what items in the closet match. Isaac Newton was the first to make a color wheel, and what became of the wheel was categorizing color. There are primary colors and secondary colors (Massachusetts Institute of Technology). For every color there is a complimentary color to match that specific color. To make getting dressed easier the Closet Assistant uses a color wheel (Figure 2). To accurately get the matching colors, those that are 180-degrees from each other compliments the other color. If one were to go deeper even riskier matches could be mixed. The following examples are:

1. Colors that form 90-degree angles.
2. Colors directly next to each other.
3. Colors that form a T. (i.e. violets, yellows, and blue greens)
4. Colors that form an X (i.e. pinks, yellows, violets, and blue greens) (Fashion Bomb Daily)

In order to be on the safe side the lighter colors should be paired with the lighter complimentary colors, meaning those that form 90-degree angles. (Cosmopolitan). Another thing to add is that white, black, blue jeans, and even some shades of brown can go with anything on the color wheel (Fashion Daily Bomb).

Figure 2: Color Wheel

The Closet Assistant focuses on approximately 140 colors. It matches the clothing item to the closest color within the 140 different colors available. The code below shows how it is calculated using the mean squared error (MSE) (Figure 3) (Xiaoxiao).

```
    public int computeMSE(int pixR, int pixG, int pixB) {
        return (int) (((pixR - r) * (pixR - r) + (pixG - g) * (pixG - g) + (pixB - b)
                * (pixB - b)) / 3);
    }

public String getColorNameFromRgb(int r, int g, int b) {
    ArrayList<ColorName> colorList = initColorList();
    ColorName closestMatch = null;
    int minMSE = Integer.MAX_VALUE;
    int mse;
    for (ColorName c : colorList) {
        mse = c.computeMSE(r, g, b);
        if (mse < minMSE) {
            minMSE = mse;
            closestMatch = c;
        }
    }

    if (closestMatch != null) {
        return closestMatch.getName();
    } else {
        return "No matched color name.";
    }
}
```

Figure 3: Code Snippet

User Profile

Application: User wants to virtually prepare outfits before putting the outfit on. The user also wants to share potential outfit with friends and share what the outfit looks like on the user. The user is a person who has trouble deciding which colors match before putting the outfit on.

Potential Users: Fashionable and people that are unfashionable but desire to be fashionable.

Software and Interface Experience: Android application.

Experience with Similar Applications: User has experience with android applications and can follow along with technology.

Task Experience:

1. Upload individual clothing items in closet categories

2. Going through possible outfits

3. Selecting outfit or getting a randomized outfit

4. Sharing with friends

Frequency of Use: Uses when wants to look nice or if the user does not want to pick out an outfit.

Project Cost

The cost for developing the Closet Assistant application is low because a lot of open source software is being used. Android apps primarily use Java as a programming language. Eclipse IDE allows Java programming and is a free solution. Eclipse also allows for the installation of the Android Software Development Kit (SDK). When switching over from Eclipse to Android studio was not much different. In fact Android Studio allowed for faster testing. The application will primarily be tested on a Samsung Galaxy S5, which is the developers phone which is free of cost. Table 1 below shows the budget so far.

Software	**Budgeted Cost**	**Actual Cost**	**If Contracted**
Eclipse IDE	0	0	0
Android Studio IDE	0	0	0
Android SDK	0	0	0
Android Plugin	0	0	0
Hardware			
Galaxy S5	0 (Owned)	0	600
Development PC	0(Owned)	0	900
Development	0	0	$30.00/hr × 1300 hrs = $39000
Total	0	0	$40500

Table 1: Cost Analyst

Testing

Testing included various android devices. Samsung Galaxy S4, S5, an Android Tablet, and using the emulator for better variety of android screen sizes. Testing was performed when all functionality was completed. The types of testing used were unit testing, system testing, more specifically usability testing and functional testing within the system testing. The usability testing focused mainly on the users. Functional testing was performed along with the usability testing. Functional testing is thinking about anything that could be added to improve the application.

Unit Test

With unit testing only on key code was tested so it could be cleaned up for efficiency.

Usability Test

Users were given the application in its completed state and went through the motions of how they think the application works.

Functional Test

Functional testing was used to get the maximum usability and thinking outside of the box for new functionality that can be added to maximize the experience of the users and application. Also functional testing ensured that the current functions are working smoothly and if there needed to be any revisions.

Timeline

This project lasted an entire academic year, until the Senior Design presentations in the spring semester. The application design and functionality was planned to be complete by March 10, 2015, in order for testing and publishing to follow. However that was not the case, functionality was not fully completed until April 9, 2015. Testing was done at the same time of major functionality added to the application. The testing was also extended. The timeline below was the original for the development of the application and can be viewed in the Gantt chart below (Figure 4). The application was not published in the given Gantt chart below and it will be explained in the next section.

		Name	Duration	Start	Finish
1		Researching an Idea	31 days	8/25/14 8:00 AM	10/6/14 5:00 PM
2		Identify Stakeholders	1 day	10/6/14 8:00 AM	10/6/14 5:00 PM
3		Gather Requirements	1 day	10/7/14 8:00 AM	10/7/14 5:00 PM
4		Application Design	110 days	10/8/14 8:00 AM	3/10/15 5:00 PM
5		User Interface	12 days	3/11/15 8:00 AM	3/26/15 5:00 PM
6		Testing	10 days	3/27/15 7:00 AM	4/9/15 5:00 PM
7		Publish	1 day	4/11/15 8:00 AM	4/13/15 5:00 PM

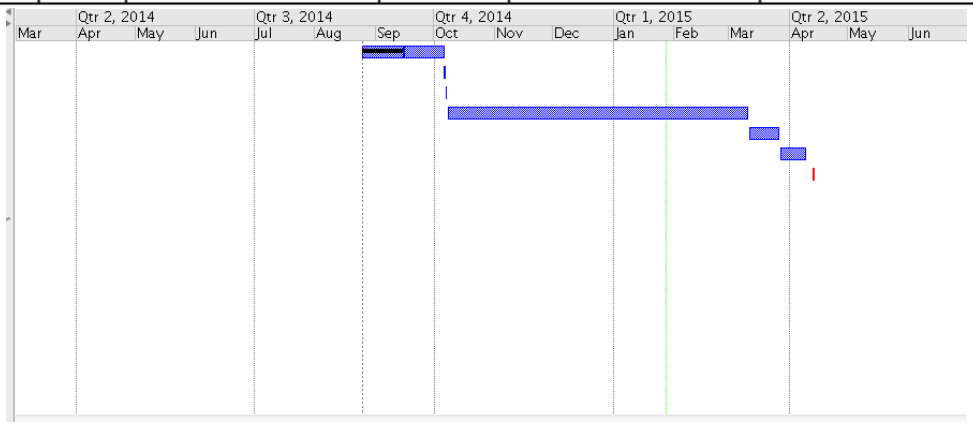

Figure 4: Gantt Chart

Conclusion: Looking Forward

There are many other features that will likely be added in future. Due to time constraints of the project, the scope was narrowed. Looking into the future in order for the application to be published the following things would make that feasible:

1. Perfecting the randomization feature by incorporating the weather along with occasions and style type.
2. There will be more categories included such as accessories and single piece clothing items for things such as dress and even suits added to the category.

Overall, The Closet Assistant application set the basis for allowing users to upload clothes into a “virtual closet”. The users are also able to pick out their own outfit, or get a randomized outfit and share it through any social media platform or through text or email. Lastly the user can get inspiration for the social media platform, Pinterest.

Works Cited

Color Theory. Massachusetts Institute of Technology (MIT). Web. 11 Nov.2014.

Shop savvy with coveted catalogs, virtual closets. (2013, Apr 21). *Chicago Tribune. University of Cincinnati Database (ProQuest).* Web. 30 Oct. 2014.

6 Super Simple Ways to Master Color Mixing. (2014, Feb 48). Cosmopolitan. Web. 11 Nov. 2014.

The Color Wheel: How to Combine Colors in your Wardrobe. (2010, Apr 16). Fashion Bomb Daily. Web. 11 Nov. 2014.

Xiaoxiao, C. February 14, 2014. Convert an RGB value/ HEX value/Java Color object to a Color Name in Java. Refracted Input. October 29, 2014, https://cindyxiaoxiaoli.wordpress.com/2014/02/15/convert-an-rgb-valuehex-valuejava-color-object-to-a-color-name-in-java/.