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Virtual Wardrobe Management System

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Abstract: Virtual Robe was created to assist people to manage their wardrobe. Small or big, people use their wardrobe every day in some way or the other; be it to dress themselves, throw out old clothes or add new articles. Virtual Robe is an easy-to-use application that, as the name suggests, virtualizes a user's wardrobe in order to make wardrobe management less stressful, easy and fun.
Keywords: wardrobe, weather alerts, notifications, image processing, in-app communication**.**

I. INTRODUCTION

Social networking has come of age from Myspace to the era of Facebook and Twitter which allow users share variety of topics, images, videos etc. The rise of niche-like social networks has begun with success from Instagram and Snap chat. Users now want to be specifically catered to and have their phones make even day to day activities easier

This has not only led to a generation of individuals who require these automated systems, but also one with a need to share information and experiences with friends and family. This demographic is also considered to be more open to adopting a new system and be a proponent for it [1].

Virtual robe application is being built based on the ideology of this new generation to provide a mobile application that integrates both fashion and social networking features. It will help provide users with a virtual wardrobe and store the user's wardrobe items with the aid of using their smart mobile phones and also share their outfits, wardrobe with their friends/family.

The application will aid users in matching outfits for different occasions and days, provide weather notification based on user's location and suggest the most appropriate outfits to wear on the basis of all the information. The application also aims at allowing friends and family to suggest outfits by either posting comments or creating an outfit and sharing it with the users.

The aim of this application is to provide an interesting environment to virtually manage users' outfit with the use of an image processor to convert user's photo captured wardrobe items to 2D; an empty canvas to match items from their wardrobe to create outfits; an organized wardrobe category system to categorize wardrobe items and outfits and finally a newsfeed and messaging system to allow users share outfits, socialize and communicate with each other.

II. EXISTING RESEARCH/DEVELOPMENT

A. Cloth App

This mobile application was developed to manage user's wardrobe through the use of a personalized recommendation model that recommends outfits from the existing wardrobe items and allow users to view other user's outfits and be able publish and virtually share their outfits on blogs and social media platforms [2]

B. Pose App

This application allows users to see various top outfits by brands, celebrities. It works more like a digitized fashion magazine with additional social features such as the ability to share favorite outfits, follow celebrities and friends. It also offers an online shopping option within the application that allows users to purchase items from people they follow within the application and use the Google wallet for payment [2].

C. Stylebook

This is a single-platform mobile application that allows users to create outfits and assign these outfits to specific dates in order to avoid repetition of clothes or attires. It uses Apple iCloud to backup users file storage, does not allow users to take images of their outfits but rather uses online searches to find professional images of user's wardrobe items from online stores. It also allows users to email these images of their outfits to friends [3].

III. DESIGN

Users are required to register to the application either through their email or through one of the registered social networks on the application. On login, a user can access their profile page or create a new outfit.

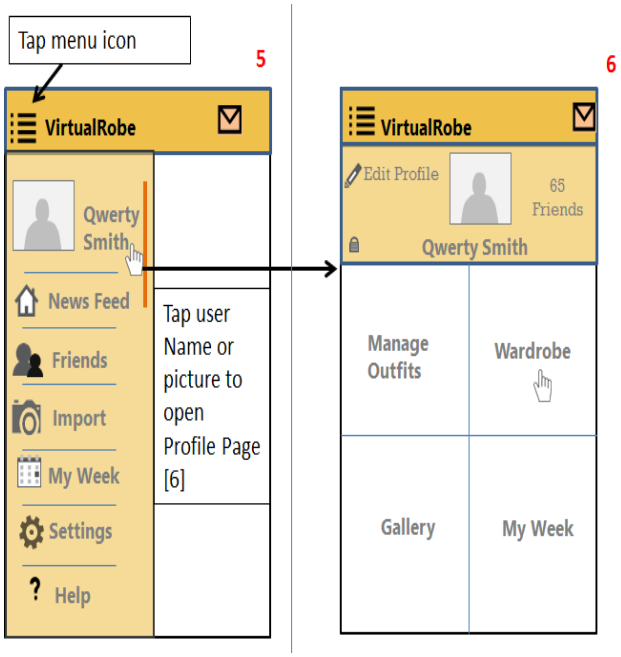

Figure 1

Users can match their outfit by accessing their wardrobe and selecting various items from the wardrobe to use to either match an outfit for the day or for future dates (Figure 2). In case of adding new items to the wardrobe, user can either access their wardrobe from their profile or from match outfit board.

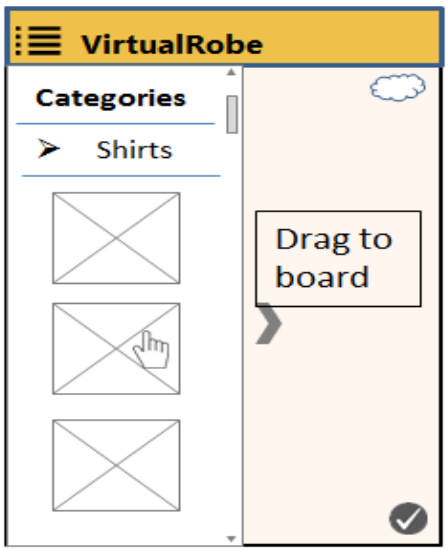

Figure 2

The profile page consists of the newsfeed, which displays new outfits created by them, friends and family, a messaging section to allow in-app communication between users with their unique identification and the user's personal wardrobe management system (Figure 3).

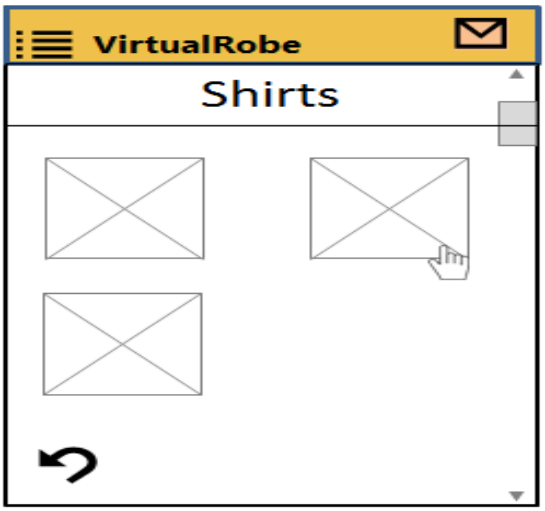

Figure 3.

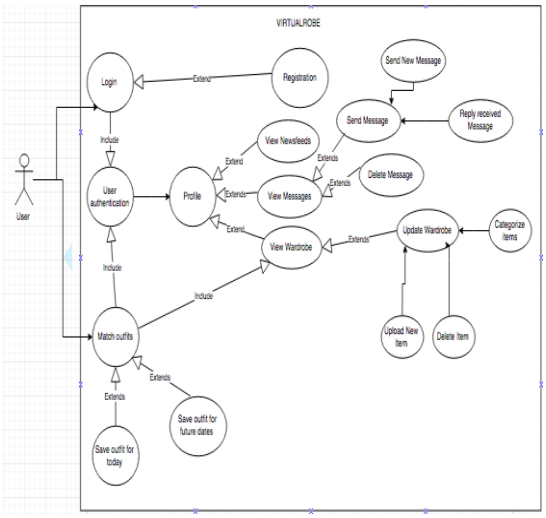

Figure 4.

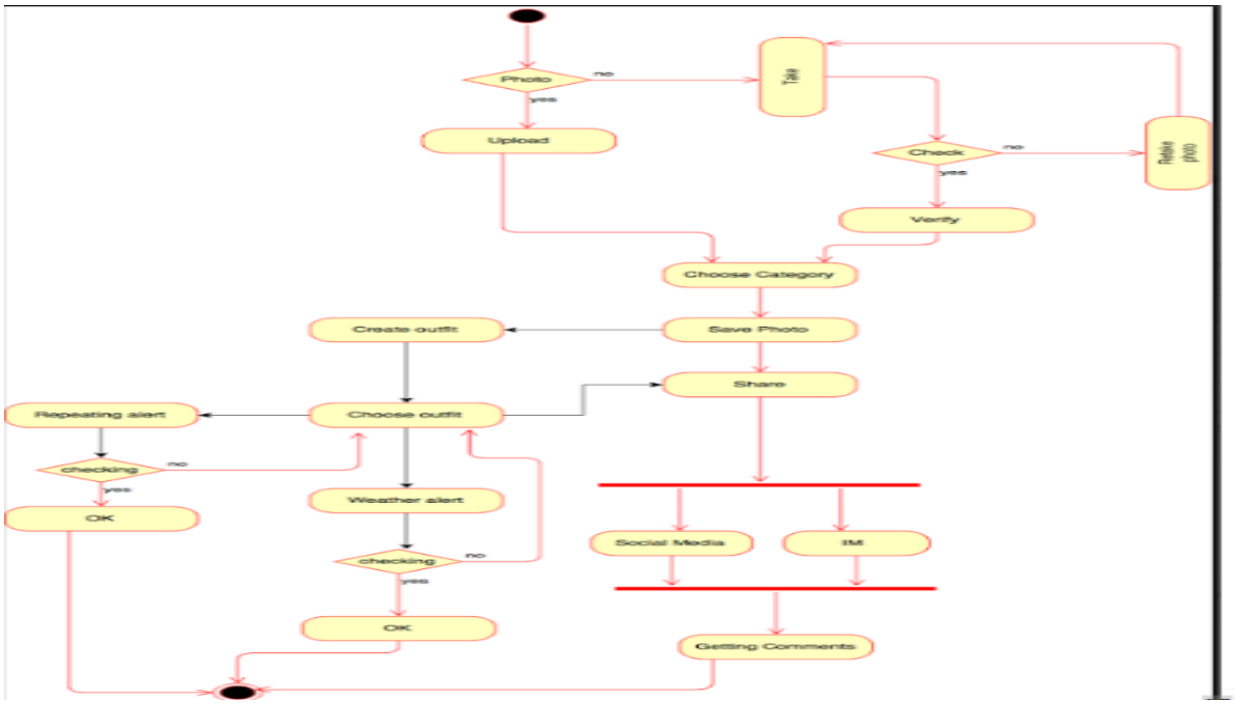

Figure 5

- Figure 4 is a use case diagram.
- Figure 5 is an activity diagram that shows how wardrobe items are captured into the application and used for social networking purposes/creating an outfit.
- Firstly, users capture images of their wardrobe items through their phone camera or select the item from their phone gallery. Secondly, this item is assigned to one of the default categories or user generated categories and finally save the item to their wardrobe.
- This item can be shared to friends and family through supported social media on the application or through the application's instant messaging system
- On creating an outfit, users can save outfits for specific dates. Choosing outfit for a specific date has two notification alerts—first being for repetition of outfits and the other being a weather alert on whether the outfit is conducive for the location or not.

IV. ALGORITHMS

The algorithms listed below show how the application virtualize and automates various features of the application

A. Image Capturing And Processing

Firstly, users have to capture images of their wardrobe items, these images need to be processed into a 2D image without a background in order for the image to be used in the application.

The application receives images from the user's camera or phone gallery, sends these images through to the cloud through the use of Amazon web service content delivery system. These images are then processed by locating the actual image size using 'imagemagick' an image processing library [4] that locates the lighter part and darker parts of the image and returns the size of each part of the image. The lighter part of the image is removed from any image color except white, and the darker part of the image is removed for all images with white or shades of white.

Therefore, the final output of the image is a 2D image without any background. After the background removal, the image is stored in two formats, a smaller format that serves as thumbnail and larger format as the actual image.

Finally, the thumbnail format is sent to the user's local phone memory to serve as easy access in user's wardrobe for users to use to create outfits, while the larger format is saved in the cloud and allows users to share their wardrobe items within the app and on various social media.

Users are advised to place their outfits on a lighter background when capturing an item except white items, which are placed on darker background.

B. **Weather Alerts/ Notification**

The weather alert system locates users using their phone location sensor, Global Positioning System or their Wi-Fi connection. This location is then sent to the Yahoo weather API [5], in order to accordingly present the use with the weather forecast for the day. The weather forecast result is then matched with allocated messages dynamically pre-configured on the application database and the weather forecast image set on the application.

The application then decides which outfit to suggest to the user from the wardrobe based on key words entered by the user on each outfit, title of outfit and the description of the outfit and matching theses keywords with weather forecast result to find the perfect outfit for the user to wear based on the weather

C. **Outfit Alerts**

1) **Outfit Repetition:** The outfit repetition alert notifies users on items previously worn by them, notifying them the specific date they wore the item and what item they wore.

This works through the aid of the users assigning dates to their outfits, also on registration users decide if they wish to repeat clothes on any periodic manner such as daily, weekly, monthly or yearly.

Firstly, the application checks if the outfit selected has been worn before by checking the database if the outfit has been assigned to a date before. If yes, it then compares this assigned date with the newly assigned date, if the time period is between the users pre-assigned period of non-repetition time, the user is alerted that the outfit was worn on a specific date.

2) **Outfit Reminder:** This helps to remind users on outfits they pre-assigned for future dates.

The application allows users to set a time period before the assigned date to be alerted on a specific outfit being assigned to a specific date.

The application then calculates these allocated time period with the assigned date and saves the date to alert users on their specific allocated outfits.

3) **Laundry Basket Notification:** The laundry basket notification helps users to avoid creating outfits with items in their laundry basket.

The application allows users to assign clothes to the laundry basket section of the application; these items are then set as inactive on the wardrobe and will not be visible to users inn their wardrobe. The notification system will notify users on items still in their laundry basket on a periodic basis assigned by the user.

Acknowledgement

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Authors Profile

Seun Mathew is a software developer for Virtualrobe Incorporation and an ICT consultant for Harold Young consultancy. He received his associate degree in Bio-chemical engineering from University of Manitoba in Canada and his Bachelor of Information Technology from University of Wollongong in Dubai.His research interest lies in Artificial Intelligence application to mobile technology. In recent years, he has focused on building AI bots for mobile apps to help improve mobile application performance and information processing.

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Jashmeh Hormuz is currently studying at University of Wollongong in Dubai majoring in Management Information System. She worked in the research for the image background removal algorithm for Virtualrobe mobile app. She currently focuses on improving her knowledge in Software development and Computer networking.

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Fay Al Braich is a graduate of Information technology from University of Wollongong in Dubai. She worked on designing and building the relational database design and architecture for a social wardrobe management mobile application.

Her interest is in Database development and administration and currently focuses on building her career in the Information technology world.

Dr Soly Mathew Biju is currently an Associate Professor in the Faculty of Engineering and Information Sciences, University of Wollongong in Dubai. Dr Biju has achieved the Chartered IT Professional status which is a symbol of excellence in the field of IT. She is also an ISTQB-certified software testing professional. She is also an active BCS Approved CITP Assessor. She was awarded UOWD excellence in Teaching in 2015. Her research interests include software testing, cryptography, e-learning, and innovations in teaching, agile software development, data science and programming techniques. She has papers published in reputed journals and books and presented and reviewed papers at national and international conferences.