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Augmented Reality in The Clothing Industry

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Abstract

In this report, the main focus is on a fast-expanding problem in the local and worldwide clothing industry as a result of the current covid-19 outbreak, as well as how 4th IR technologies may assist in eradicating the problem's origins. This report contains a quick description of what 4th IR technologies are and which technology will be the prime focused on. The project concept has been explained, additionally to how it may help the garment sector solve an issue. The primary problem has been explored in this report, as well as why this project is appropriate for it. The project's objectives, the project's expectations and limitations have also been reviewed. Some of the clients who will gain from this project have been described in this report, and why these clients will benefit from such a project. Finally, the cloud computing architecture employed for the project has been explored. Moreover, why it will aid in reinforcing the project's idea and structure, therefore benefiting the users. The 4th IR technology used has proven to be successful in eliminating the problem due to its great efficiency and user-friendly interface. The cloud computing architecture used has also been proven to be effective due to its appropriate application, services and safety provided. Augmented reality has been concluded to be the most effective 4th IR technology implemented for the presented project.

Introduction

The Fourth Industrial Revolution is built based on the Third Industrial Revolution. It is the Infusion of automation to manufacturing sectors through advanced digitization and advanced technologies which allow efficiency in mass productions. The world trade axis of production is shifting to ASEAN because of the advances in technologies and their convergence which provides opportunities to enable higher economic growth.

There are three reasons why today's transformation is not only the continuation of the Tertiary Industrial Revolution, but also the arrival of the Fourth Clear Revolution: speed, range, and impact on the system. The current breakthrough speed is unprecedented in history. Compared to the previous Industrial Revolution, the fourth is developing exponentially rather than linearly. Moreover, it disrupts almost every industry in every country. Today, blockchain technology, internet of things (IoT), and artificial intelligence (AI) are recognized as innovations that have the potential to improve current business processes, create new business models, and disrupt whole industries.

For this project Augmented reality was the best choice because it gives a better user experience by overlaying information and virtual objects on real-world scenes in real-time allowing increased engagement and interaction that could eventually be even better than reality since it allows users to preview items more easily than real life. This will allow users to take body scans helping clothing companies get the exact body dimensions/measurements of the customers allowing them to send the exact size of clothes the customer has asked for. This will reduce the number of returns made therefore decreasing the loss of time and money.

Why this project should be developed?

Sales for online shopping companies have increased as a result of Covid-19, but a major downside currently is the absence of connection with the products which buyers wish to buy online, such as garments. The customer may order certain clothes and not be able to acquire the proper length required since they were physically unable to wear the clothes. As a result, the product got returned due to dissatisfaction of the buyer, leading the brand or company to lose resources, time, and budget. We decided to develop a program that includes cloud architecture including Augmented Reality which allows consumers to get precise measurements for the exact fit they need, which then aids our targeted clients, clothing companies, in their search for a solution to this issue. Another issue faced with online shopping is lack of direct personal service. Obtaining accurate measurements through a phone reduces the need for measurements to be taken physically therefore decreasing the need for personal service itself.

Objective of the project:

- To develop a Software that uses augmented reality to enables shoppers pick clothes in the virtual way.
- To design Interactive user manuals to shoppers better understand how the product works.
- To provide conversion rates and reduces returns. Shoppers are less likely to return clothes, saving company time and money on shipping, restocking, and repackaging.

Expectations:

- Improves customer satisfaction.
- Reduces returns.
- Personalizes the shopping experience.
- Increase Brand & Product Exposure.

Limitations:

- There are government policies that need to be followed in order to handle data.
- Security risk, the security risk cannot be completely avoided.
- Managing resources as in more load, more expertise needed to manage multiple clouds.

Project Clients

Nowadays many people order clothes online instead of going to stores themselves. A big cause of this is the current pandemic due to covid 19. In general shopping online is less time consuming than going to a store physically. Consequently, the usage of online resources and clothing companies has increased. Therefore, this Project is directed towards one general main audience, Clothing companies/brands and indirectly towards their customers. A few examples of potential clients would be:

- PRADA.
- GUCCI.
- LOUIS VUITTON.
- THE GARMENT.
- RARE CLOTHING.
- ATTACK APPAREL.
- LAZADA.
- SHOPPEE.

The project will benefit both the companies and their customers. Customers will have less interaction with other people and save a trip to the store itself leading to saved time and effort yet still being able to check accurate measurements without trying the clothes themselves on. Receiving the exact fit will not only make the customers happy but also allow the companies to become popular, increasing sales and decreasing the number of returned orders which waste the company's money and assets. It also reduces the need for a lot of personal service which is harder to provide with online clients.

Cloud Computing Architecture

Cloud architecture is the way technology components combine to build a cloud, in which resources are pooled through virtualization technology and shared across a network.

It consists of two parts

- Front-end:
  Front end is where the end-user interacts with the cloud infrastructure. It consists of the client-side applications such as web browsers and here, it provides with the applications and interfaces for the cloud service by providing GUI to the end-user to interact with.
  The only component of front-end is Cloud infrastructure which is hardware and software components such as server and storage.
- Back-end:
  Backend is a platform that automates backend side development and takes care of the cloud infrastructure by monitoring the programs that run the application on front-end.
  There are several components of Back-end cloud infrastructure.
  - Application:
    Resources used in the back end to provide end-user with a software or platform.
  - Service:

The prime function of service is to provide utility in the cloud architecture.

- Storage:
  Stores and maintains data over the internet.
- Management:
  Establishes harmony among the cloud resources.
- Security:
  Secures cloud resources, systems, files to build secure environment to end-user

It has numerous benefits and consequently, helps a firm become more efficient and cost effective. It offers efficient way of allocating resources and scaling them which allows the required amount of resources being used and none being wasted which helps with the cost of operations. It provides high security, reducing IT operation costs. It allows for better data recover incase of disaster because the data is more accessible and stored virtually in cloud server storage. All these advantages allow for greater competitive advantage for the firm over others in the similar domain.

There are various other cloud computing architecture components

- Hypervisor.
- Management software.
- Deployment software.
- Network.
- Cloud server.
- Cloud storage.

We will be focusing on deployment software to integrate the concept in our idea.

Deployment software consists of all the configurations installed that are required to run a cloud service. Deployment of cloud service is done using deployment software. The deployment models are SaaS (Software as a service), IaaS (Infrastructure as a service), PaaS (Platform as a service).

Our project would use the deployment model of SaaS (Software as a service). SaaS is a web-hosted software which is centrally hosted and manages application of the end-user. The client would have access to the software using web browser as it is hosted by the service provider and hence it is not installed on the device of the end-user. SaaS is deployed instantly and since it's not distributed physically where trade partners are needed, the initial cost of setup is significantly lower. Our software would be deployed hosted on AWS infrastructure in this case scenario. Similarly, as mentioned before, this would allow the firm to have scalability of resources, in simple words, the end-users would just access the site using their web browser to access the application and all the additional features specifically integrated in it.

To summarize the general advantages of using SaaS:

- Accessibility: Only requirement to access is internet.
- Scaling.
- Data Safety.

Methodology

The process started with the idea that 4th IR technologies should be used to tackle modern world problems regarding e-commerce. As the world went into the state of multiple lockdowns, the e-commerce sector developed rapidly, because companies started selling goods and services online. This recent flow of things allowed for an opportunity to include modern technology to tackle additional issues related to it. The idea of using augmented reality which would allow users to take body scans for them to come up with correct dimensions for their clothes, which would additionally allow the company to have smoother transactions. The cloud technology would be used to set up the operation for the application to be developed as it's the most efficient use of resources. A prototype was created for efficient design so it could be tested before its application in real world environment. It personalizes and improves customer satisfaction and help the brand with its exposure. The limitations that would need to be tackled are related to government policies as different countries around the globe have different laws, and another issue to be tackled is security concerns regarding it and expertise to manage clouds. Interviews were conducted of the targeted audience so information could be gathered regarding the use of technology and limitations.

User Requirement Analysis. Requirement analysis is the process of defining the expectations of users for an application that is to be built or modified.
Information gathering helped us understand how the already existing system worked.

Our target user demographic was regular online shoppers (ages 18-40 years).

To identify user needs and expectations we made surveys with our target users that included open and closed ended questions such as

1. How do you usually buy clothes?
2. Which factors do you prioritize the most when buying clothes online?
3. What are some of the challenges you have experienced when shopping online?
4. Have you ever used AR apps/features to shop?

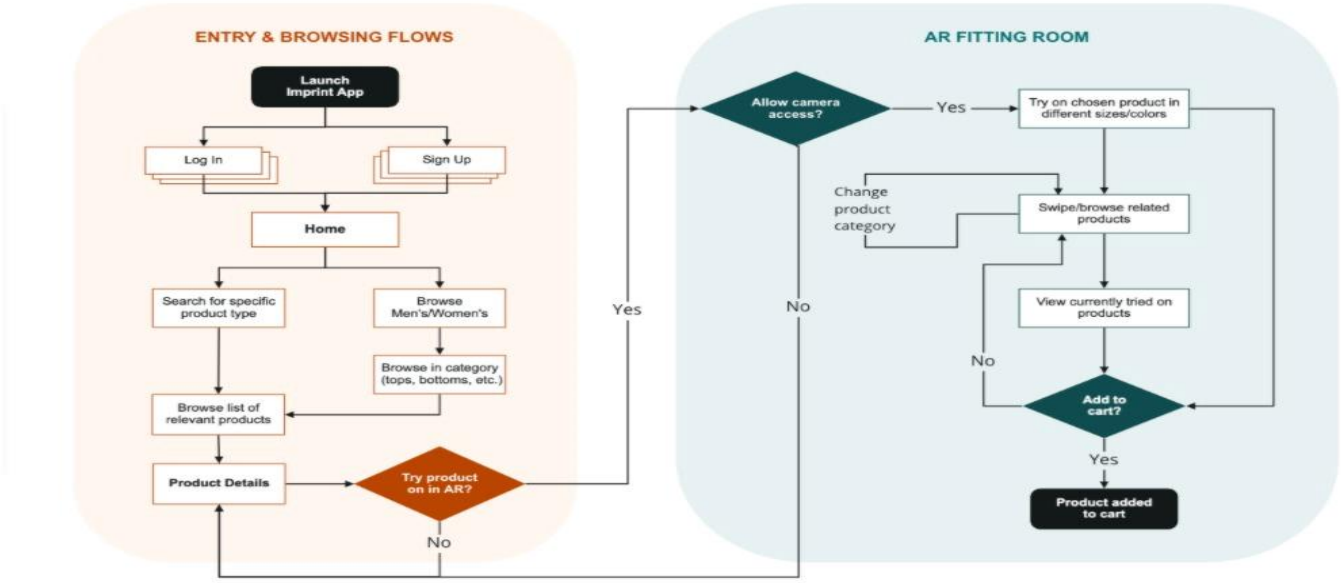
The surveys helped us understand what the current system lacked and how we could make improvements to it. In our case the problem was identified to be the lack of accuracy while measuring size resulting in the wrong fitting of the order being sent.

To further conclude our research, we interviewed a few survey respondents and asked the following questions:

What factors do you consider when shopping online and why?

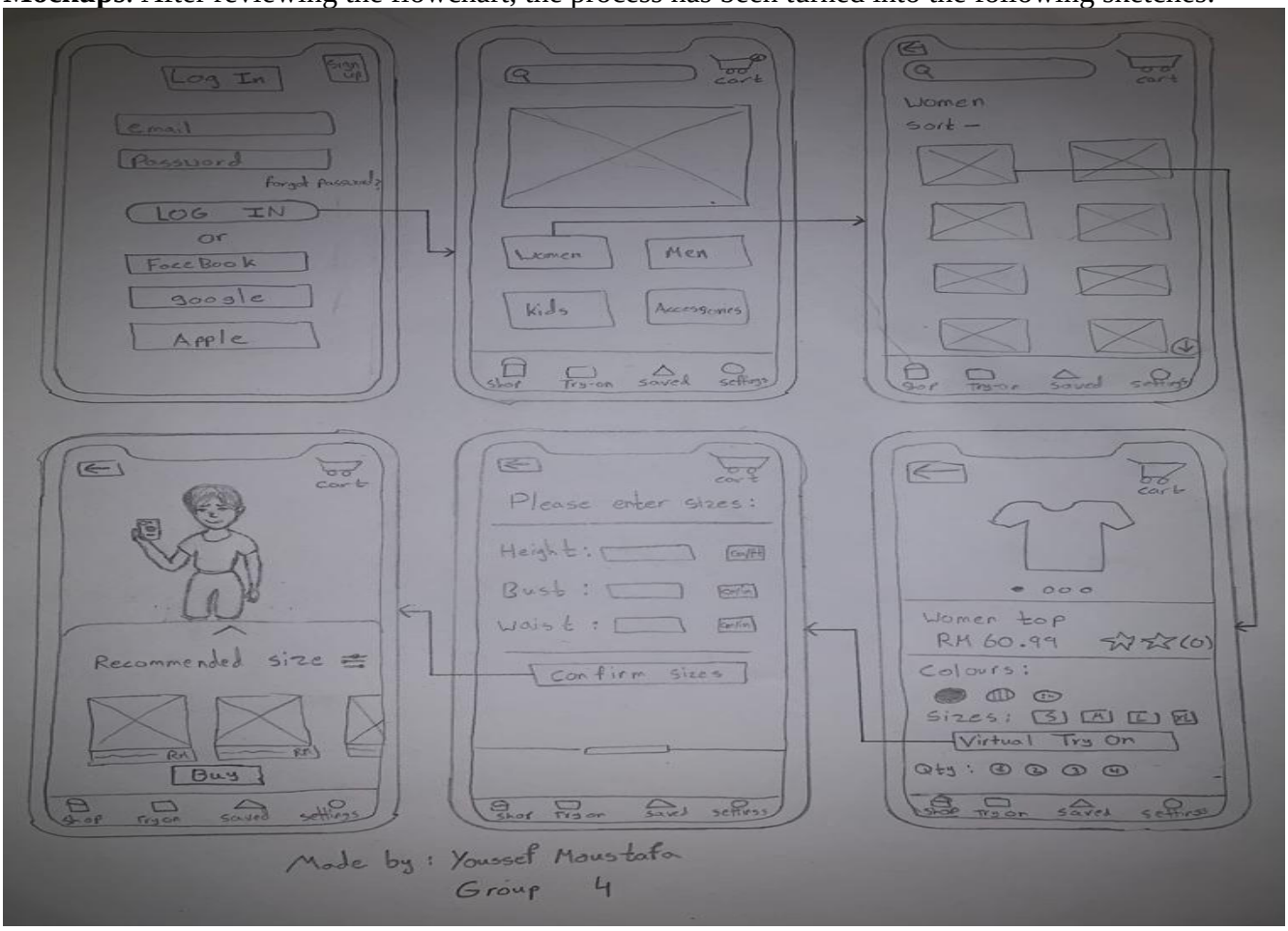
1. Have you used any augmented reality-based apps/features before?
2. What did you like/dislike about them?
3. What would you like to see in an AR fitting room?

The results of the interviews helped us realize that most users would prefer to see products projected on real-time video feeds of their actual bodies.



Results

Mockups. After reviewing the flowchart, the process has been turned into the following sketches:



The low fidelity prototype has been created and will be attached with this report inside the “Prototype” folder. Please refer to the link **index.html** to try out the prototype of how the project operates. The prototype works by navigating from the main log in screen to the clothing section page where the user will pick the type of clothes, he/she desires (in the prototype provided certain buttons were functional that are labeled by an arrow). After that, the user navigates to the options list where they choose what they would like to try on which then navigates them to the size input page where the user enters their body measurements the virtual try on page that allows the user to experience the latest AR technology provided by our project to try out the clothes on themselves and decide whether it is a good match or not.

Conclusion

From the data received through surveys and interviews we learned that online shopping is used a lot these days especially due to the pandemic and 5 out of 10 times the order is not what the client desired which has created our motivation for this project. AR implementation and the cloud architecture were chosen for this project. The project will help people all over the world easily purchase their required clothes without having to worry about receiving the wrong size and wasting money therefore it won’t just be beneficial to us but companies and their clients as well. Overall, we wanted to help people shop online with ease. While online shopping is great for users' convenience, it does not address one key aspect of the in-store shopping experience: trying on products before buying. This creates a problem when shopping online for clothes. When the order arrives, it may not be the exact fit since the size measured online was not accurate enough. We came up with a solution for this after gathering information through surveys and performing interviews to first understand what was already available and what needed to be changed. To make sure the problem being faced would be fixed we then then used AR and cloud architecture allowing the client to scan their figure and get the exact size they want.

The team’s ambitions do not stop at this current project. Digitalizing the whole shopping industry making it easier and more user friendly for the average customer is the future goal. Providing efficient, secure, and reliable systems would create a more convenient shopping experience for a vast number of users. This goal could be fulfilled by implementing on demand and custom clothing as well as repair, redesign and upcycle fashion, clean and green fashion, and secondhand shopping.

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