Flipkart GRID 4.0

2022 Campus Challenge

MetaCommerce - The Future of Shopping with Metaverse

Team Name: AKANE

Institute Name: Indian Institute of Technology Ropar

Team members details

Team Name	AKANE		
Institute Name	Indian Institute of Technology Ropar		
Team Members >	**1 (Leader)**	**2**	**3**
Name	Aditya Aggarwal	Ankit Sharma	Arshdeep Singh
Batch	2024	2024	2024

Deliverables/Expectations for Level 2 (Idea + Code Submission)

The solution should focus on:

- Building a web-based metaverse using out-of-the-box Avatar generation tools for users to enter and experience. **HInt - Existing open source solutions can be used.**
- Building a shared 3D space on the web that is shared concurrently by many users. **Hint-** Any existing 3D spaces can be used.
- We are listing a few feature suggestions below - Feel free to use a part or all of them in your experience Or additional features can be added too. The idea is to build a next-gen futuristic Metaverse Shopping experience.
- Ability to view products in 3D in the shared spaces and AR as well (You may allow users to scan a QR code to view products in AR on their phone)
- Ability to try-on apparels etc on the Avataar.
- **Bonus**- Add-to-cart/checkout of the product
- **Bonus- Voice chat with fellow shoppers, enablement of camera**
- **Bonus- Use your imagination and create innovative experiences.**

Glossary

- glTF:- GL Transmission Format is a 3D file format that stores 3D model information in JSON format
- MVP:- Minimum Viable Product
- A-Frames:- A web framework for building virtual reality experiences
- Network A Frames:- A web framework for building multi-user virtual reality experiences
- Mind AR:- Mind AR is an opensource web augmented reality library

Use-cases

No/Negligible Set Up Cost for vendors

Setting up a shop in multiverse involves no upfront infrastructure cost for the brand, which in turn makes it easier for smaller brands to reach wide audience in market traditionally dominated by marquee brands.

Ease & Peace in Shopping

Online Shopping has already established a well defined target group in young generation but the elder among us reason that online shopping doesn’t provide the feel of how an article looks on them. With metaverse shopping complex, we can attract all the segments of people, both young and old. With traffic to skip and not having to wait in long queues outside fitting room, metaverse shopping will be the trend of tomorrow.

Use-cases

Influencer Marketing

Brands often rope in celebrities for their marketing, in metaverse influencer marketing can be elevated to next level. Brands can collaborate with multiple influencers at once and even let them interact with shoppers at their store in metaverse which isn’t feasible in physical shop.

Strengthen crisis management

COVID-19 has been the perfect example of how revenues can plummet in crisis and lead to bankruptcy. With metaverse, brands will strengthen their core and eventually metaverse will become their primary revenue stream thus virtually protecting them from any such future situations.

Essentially the main idea is that metaverse shopping is beneficial for shoppers but its benefits for vendors/brands are even more.

Dissecting the Problem

Base Problem Statement-I

- Create a 3D virtual browser based metaverse for the new age shoppers

Sub Problem Statement - 1

Allow shoppers to create a unique id for themselves & select an avatar according to their choice.

Analysis & Solution Proposed

When the user logs in for the first time, he is requested to select a username(id) for him/her self. We have leveraged *Ready Player Me* to generate customizable avatars for users. The user can also select from a plethora of already created avatars.

Sub Problem Statement - 2

Create an interactive 3D space which can be concurrently used by many users.

Analysis & Solution Proposed

A Frames is popular open source tool that is used to create shared Virtual Reality Spaces. We have utilised the same to develop an interactive 3D space. The components of the 3D space are open source GLTF models.

Sub Problem Statement - 3

Ability to view products available for sale in the virtual shop & try them on virtually.

Analysis & Solution Proposed

We have built the 3D space in a way that user can roam around freely and browse through the products. User experience is enhanced by utilisation of *MIND AR* which provides users the ability to virtually try on the products available in shop.

Dissecting the Problem

Base Problem Statement-II

- Commercialise the 3D space for market use & generate revenue streams

New-Age Feature - 1

Allow Shoppers to add product to their carts and display the items selected and the total cost.

Analysis & Solution Proposed

"My Cart" feature allows users to add products to their carts for checkout. The users can see the items added and the total cost associated with them.

New-Age Feature - 2

Advertisement billboards where brands can advertise themselves by paying the space owner.

Analysis & Solution Proposed

The metaverse advertisement is the next big thing in advertisement industry. We have added billboards with a bidding system to allow brands to place their advertisements.

New-Age Feature - 3

Voice & Video chat with fellow shoppers along with privacy options to turn of the mic and camera.

Analysis & Solution Proposed

We have resorted to Network A-Frames, another open source project to allow users interact with fellow people in the 3D space. The possible interaction methods are voice chat and video chat.

Limitations & Analysis of Possible Solutions

The current solution only allows the admin/web master to manage the inventory for products.

Solution

We will add support to allow different vendors, manage their inventories themselves using a web interface making calls to APIs

To display the products in virtual shopping complex and allow for virtual try-on feature, we need 3D models of the product, which currently are available only for limited items and hence try on is not possible for every product at the moment.

Solution

We will create automatic 3D model generator, which can be done using the existing open source tools. Whenever a new product will be added to inventory, its 3D model will be generated automatically if required.

Future Scope- Low Level Design

Scalability

- We will use *horizontal scaling* to allow parallelly allow millions of users to be a part of 3D space.
- Horizontal scaling is adding of additional computing resources to the infrastructure to cope up with the required demands. The additional resources can be scaled up or down based on the requirements.
- The current MVP is hosted on free servers provided by generous people and it isn't feasible to do scaling on free servers.

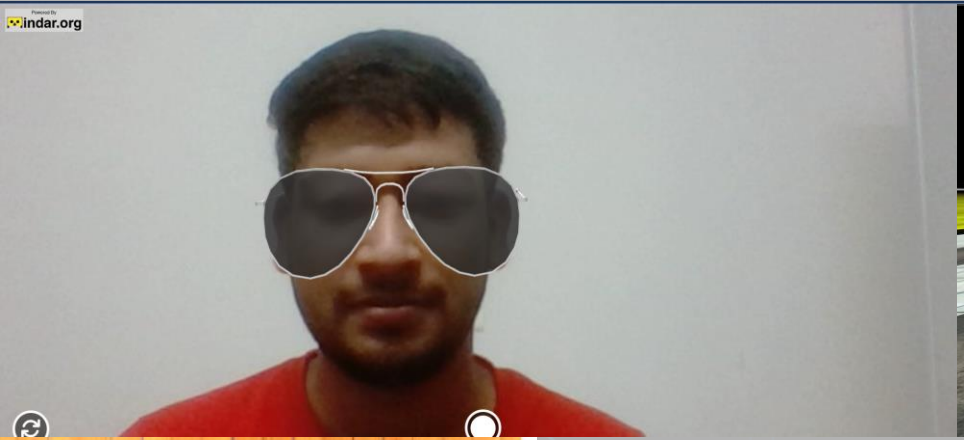
Future Scope- High Level Design

Real Time Mimic Avatar

- The avatar in MVP is controlled by keyboard and mouse keys and is essentially only a computer representation of the person.
- As a part of future scope we plan to develop a real time tracking avatar which will move exactly like the person does, show emotions that the person has, and replicate all the movements of that person. To put in perspective, an avatar which is a clone of a person in metaverse.
- This can be done using integration with VR based devices like Oculus which are very popular in gaming & creative industry.

Recommender System

- Machine Learning Algorithms can be used to further enhance the user shopping experience.
- We can track several data points for each user like, time spent in particular shop, types of clothes bought, brands visited and using all these data points build a recommender system which isn’t possible in a physical shop.



V-Shop In Action