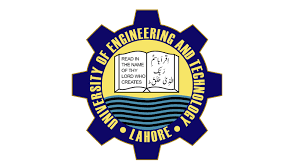
**Virtual Reality-Based E-commerce Web Application**

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**Project Title:**

Virtual Reality-Based E-commerce Web Application

**Description:**

We are making a **Virtual Reality based e-commerce** web application. Our FYP is inspired by the **metaverse** concept. We will be catering to two types of customers, the ones having VR headsets will be able to visit the virtual store while wearing a VR headset where the customer can touch, and hold different products and can move in the virtual store and try different outfits. If the customer wants to try different outwear like jackets so they can try the outwears on their **Animated Avatar** in a virtual store and the customer can experience how the to outwear will look on them. The customer can also see the animated avatar in different poses while moving. The other customer without VR headsets can visit the website and avail themselves of the virtual tour of the store where they don’t need any VR headsets and can experience a virtual tour of the store. So basically, we are working on four modules that are:

1)E-commerce website

2)Virtual tour environment

3)Virtual Reality Environment

4) based on customer inputs system will recommend which size (small/medium/large/Extra Large) suits best to the user.

Besides this, the customer can see the **3D models, 3D images, and 3D animated avatars** in the web application. The core technology will be virtual reality.

**What is Virtual Reality?**

Virtual Reality is the future and it's a **3D complete environment** in which everything provides a real-time feeling. Virtual reality is a buzzword today and it is popular nowadays in the future the students can take lessons and classes in the virtual environment and companies like Amazon is also working on e-commerce virtual reality-based application. People can just wear a VR headset and in their home, they can go to virtual e-commerce stores, and explore mental health treatment. There are lots of applications of virtual reality like VR in fashion designing, mental health treatment, education, sports, military, medical training, etc.

**Difference between Virtual Reality and Augmented Reality**

No external AR headset is required for experiencing augmented reality while a VR headset is required for experiencing a virtual environment. In virtual reality, everything is virtual like objects in a virtual environment while Augmented reality augments the real-world scene. Snapchat uses augmented reality as when we open a Snapchat camera then Snapchat provides different filters in which we can different objects The filters in which Snapchat lens scans our face and the apply different cartoon shapes or filters or face changers etc. all is possible because of augmented reality.

**Use Cases Section (Web Application)**

**Actors**

Following are the actors in our virtual Reality-based eCommerce web application:

1. Admin
2. Customer

**Use Cases of Actors:**

**Use Case UC-1: Admin Login**

**Description:** This use case is about successful administrator login after providing valid login details.

**Pre-Conditions:**

1. Admin should have already been registered.
2. All must-required information about the admin should be available in the database.
3. Databases should be available in online mode.

**Normal Flow:**

1. The administrator enters valid login details.

2. Administrator clicks on the login button.

3. System confirms and validates the data.

4. Admin successfully logins the account.

**Post-Conditions:**

1. Admin successfully logins the account.

**Authority: Administrator**

**Use Case UC-2: Add Products**

**Description:**

This use case is about managing adding products in the existing system.

**Pre-Conditions:**

1. All must-required information about the product should be available.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options to add a new product.

2. System asks for necessary information.

3. Administrator provides all the required information and options to complete the operation.

4. System after confirmation adds the new product.

**Post-Conditions:**

1. A new user account is successfully created.

**Authority:** Administrator

**Use Case UC-3: Edit Product Details**

**Description:**

This use case is about managing editing/modifying

Product details in the existing system.

**Pre-Conditions:**

1. All must-required information about the product should be available.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options to edit the product details(title, description, images, etc).

2. Administrator changes the desired details of the product options to complete the operation.

4. System after confirmation updates the details of the product in the database and the website as well.

**Post-Conditions:**

The product will be live on the website with updated new details successfully.

**Authority:** Administrator

**Use Case UC-4: Delete Products**

**Description:**

This use case is about managing to delete

products in the existing system.

**Pre-Conditions:**

1. All must-required information about the product should be available.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options to delete a product.
2. The administrator will click on the delete product option and then the system will ask for confirmation before deleting the product from the database.

4. System after confirmation deletes the product from the database.

**Post-Conditions:**

1. The desired product is successfully deleted from the database.

**Authority:** Administrator

**Use Case UC-5: View Products**

**Description:**

This use case is about viewing

products in the existing system.

**Pre-Conditions:**

1. Admin must be logged in to the system.
2. All must-required information about the product should be available.
3. The database should be available in online mode.

**Normal Flow:**

1. Administrator options to view a new product.

2. Administrator can see all the products.

**Post-Conditions:**

1. All the products will be displayed to the administrator.

**Authority:** Administrator

**Use Case UC-6: Search Products**

**Description:**

This use case is about searching

products in the existing system.

**Pre-Conditions:**

1. All must-required information about the product should be available.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options to search a product.

2. System asks for necessary information.

3. Administrator provides the name of the product or sets the price range

4. System after taking administrator shows the results.

**Post-Conditions:**

The desired products will be displayed to the admin

**Authority:** Administrator

**Use Case UC-7: View Orders and purchase history of Products**

**Description:**

This use case is about viewing orders and the purchase history of products in the existing system.

**Pre-Conditions:**

1. All must-required information about the product should be available and customers bought some products so that the details of payment etc of that will be in the existing system.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options to about viewing orders and purchase history of products in the existing system.
2. The system will display the orders and purchase history.

**Post-Conditions:**

The orders and purchase history of products will be displayed to the admin

**Authority:** Administrator

**Use Case UC-8: View Customer Details except for Personal information (account password, credit card password, etc)**

**Description:**

This use case is about viewing customers in the existing system.

**Pre-Conditions:**

1. Information about the signed-up customers should be available in the existing system.

2. Database should be available in online mode.

**Normal Flow:**

1. Administrator options about viewing customer details in the existing system.
2. The system will display the customer details(name, total purchasing amount, etc).

**Post-Conditions:**

The customer details(name,total purchasing amount etc).

will be displayed to the admin

**Authority:** Administrator

**Use Case UC-9: Set discounts and special offers**

**Description:**

This use case is about setting the discount price on the products.

**Pre-Conditions:**

1. All must-required information about the product should be available.

2. Database should be available in online mode.

**Normal Flow:**

While adding a new product the admin can set the discount on the product or

The option will be provided to the admin from which the admin can set the discount prices on the products based on the price range etc.

**Post-Conditions:**

The product with a discount price will be shown to the customer.

will be displayed to the admin

**Authority:** Administrator

**Use Case UC-10: Administrator Logout**

**Description:**

This use case is about successfully logging out administrators.

Pre-Conditions:

1. Admin must be logged in through valid login details.

2. Admin must be able to perform all the required operations.

3. There must be an option to log out as an administrator.

4. Databases should be available in online mode.

**Normal Flow:**

1. Administrator logins the account.

2. System validates the data.

3. Administrator successfully logs into the account.

4. Administrator performs all the required operations.

5. Administrator clicks on the logout button.

6. System successfully logs out the administrator.

**Alternative flow:**

2a. There is a problem with the Admin login account.

• Admin can recover password using forgot password.

• Admin can again try to login Admin continues from step 1.

**Post-Conditions:**

1. The administrator successfully logs out of the system.

**Authority:** Administrator

**Use Case UC-11: User Sign Up**

**Description**:

This use case is about adding a new user to an existing system. A new user can sign up any time he wants if he hasn’t already made an account.

**Pre-Conditions:**

1. All must-required information about the new admin should be available.

2. Databases should be available in online mode.

**Normal Flow:**

1. New User by clicking on the signup button opts for creating a new account.

2. System asks for necessary information.

3. User provides all the required information and opts to complete the operation.

4. System confirms and validates the data.

5. System creates a new account successfully.

6. System sends the account creation email to the administrator’s email id and user’s email address.

**Alternative flow:**

1a. There is a problem with the User’s login details. Required information is not provided.

* Users can check the login details and correct them.
* The user continues from step 1.

3a. There is a problem in the data provided, some data needs to be corrected.

* The user checks the available information and corrects the error.
* The user continues from step 3.

4a. There is a problem with the data validation. The data provided is not valid.

* The user checks the validation of data and corrects the information.
* The user continues from step 3

**Post-Conditions:**

1. A new User account was successfully created.

2. New Users can log in to the account using /her login details.

**Authority**: User

**Use Case UC-12: User Login**

**Description:**

This use case is about successful User login after providing valid login details.

**Pre-Conditions:**

1. Users should have already been registered.

2. All must-required information about the user should be available in the database.

3. Databases should be available in online mode.

**Normal Flow:**

1. User enters valid login details.

2. User clicks on the login button.

3. System confirms and validates the data. The user successfully logs in to the account.

**Alternative flow:**

1a. There is a problem with the User’s login details.

* The user provides the required login details.
* The User continues from step 1.

3a. There is a problem in the data provided, some data needs to be corrected.

* The user checks the available information and corrects the error.
* The user continues from step 3.

3b. There is a problem with the data validation. The data provided is not valid.

* The user checks the validation of data and corrects the information.
* User recovers password if forgotten using forgot password link.
* The user continues from step 3.

**Post-Conditions:**

1. The user successfully logs in to the account.

**Open Issues:** if the database fails to connect, the user may need to wait for days to connect.

**Authority**: User

**Use Case UC-13: User Profile Creation**

**Description:**

This use case is about the successful creation of a user profile after providing valid profile details.

**Pre-Conditions:**

1. Users should have already been registered.

2. All must-required information about the user should be available in the database.

3. Databases should be available in online mode.

**Normal Flow:**

1. User enters valid required details for creating a profile.

2. User clicks on the create profile button.

3. System confirms and validates the data.

4. User successfully creates a profile.

**Alternative flow:**

1a. There is a problem with the User’s profile details.

* The user provides the required details when creating a profile.
* The user continues from step 1.

3a. There is a problem in the data provided, some data needs to be corrected.

* The user checks the available information and corrects the error.
* The user continues from step 3.

3b. There is a problem with the data validation. The data provided is not valid.

* The user checks the validation of data and corrects the information.
* The user continues from step 3

**Post-Conditions**:

1. The user successfully creates a profile.

**Open Issues:** if the database fails to connect, the user may need to wait for days to connect.

**Authority:** User

**Use Case UC-14: Edit Account**

**Description:**

This use case is about the user changing their account details successfully.

**Pre-Conditions:**

1. Users should be already logged in.

2. All must-required information about the user should be available in the database.

3. Databases should be available in online mode.

**Normal Flow:**

1. User navigates to the account setting page.

2. User edits its details and saves.

3. For confirmation, the user is asked to write the password twice.

3. System confirms and validates the data.

4. User account is successfully updated.

**Alternative flow:**

2a. There is a problem with the User’s profile details.

* The user will be provided with validation in case they enter invalid data such as number in name etc.
* The user continues from step 2.

3a. There is a problem in the data provided, some data needs to be corrected.

* If the user enters the wrong password, then they will be asked to provide the correct password to continue to update details.
* The user continues from step 3.

**Post-Conditions**:

1. The user successfully updates its profile details.

**Authority:** User

**Use Case UC-15: Switching to Virtual tour mode**

**Description:**

This use case is about users switching to virtual tour mode on the website for a better experience of products and a realistic feel.

**Pre-Conditions:**

1. Users should be logged in.

2. Option will be available on the website for virtual tour mode.

3. User will have to select his desired avatar from the available ones.

4. Proper description and measurement of avatar will be provided.

3. Databases should be available in online mode.

**Normal Flow:**

1. User clicks the virtual tour option and switches to virtual tour mode for a better experience.

2. User controls the avatar and roams around the virtual store and views products.

3. After viewing user can also add the item to the cart in the same mode.

**Alternative flow:**

2a. In case the user has not selected his/her avatar previously

* The user will first be provided with the list of avatars and their measurement details.
* The user selects the avatar according to his/her preference.
* The user continues from step 2.

**Post-Conditions**:

1. The user successfully explores the virtual tour mode.
2. The option will be available which can navigate the user back to the website

**Authority:** User

**Use Case UC-16: Switching to VR mode**

**Description:**

This use case is about users switching to VR mode from the website for a better experience of products and a realistic feel.

**Pre-Conditions:**

1. Users should be logged in.
2. Users should have VR headsets compatible with the system.

3. Option will be available on the website for switching to VR mode.

4. User will have to select his desired avatar from the available ones.

5. Proper description and measurement of avatar will be provided.

6. Databases should be available in online mode.

**Normal Flow:**

1. The user clicks the VR mode option on the website.
2. The user configures a VR headset (such as Oculus) with the system
3. After configuration, the user is connected to his/her selected avatar and can roam around the virtual store and view products.
4. After viewing user can also add the item to the cart in the same mode.

**Alternative flow:**

2a. In case the user’s VR headset is not compatible

* Users cannot experience VR mode and have to continue to the website or virtual tour mode

3a. In case the user has not selected his/her avatar previously

* The user will first be provided with the list of avatars and their measurement details.
* The user selects the avatar according to his/her preference.
* The user continues from step 3.

**Post-Conditions**:

1. The user successfully explores the VR mode.
2. The option will be available which can navigate the user back to the website and the VR headset will be disconnected from the system.

**Authority:** User

**Use Case UC-17: Add to Cart (Website)**

**Description:**

This use case is about adding products to the cart so that users could checkout.

**Pre-Conditions:**

1. User may or may not be logged in for an add-to-cart operation.

2. Similar items can be added more than one time.

3. Number will be shown on the cart icon displaying the number of products in the cart.

4. Add to cart button will only be shown on in-stock available products.

5. Databases should be available in online mode.

**Normal Flow:**

1. User picks a product and presses add to cart button.

2. Users can search for more products and add those as well.

3. User clicks on the cart icon to navigate to the cart page.

4. User validates the selected products and proceeds to the checkout page.

5. If the user is not satisfied, products added to the cart can be removed and the user can get navigated back to the products page.

**Alternative flow:**

1a. In case the user picks a product but it is not available in stock.

* Add to cart button won't be clickable.
* User continues from step 1 for different(available) products.

4a. In case the user is not logged in.

* After clicking the checkout button, the user will first be directed to the login page and asked for credentials
* After successful login, the user will be redirected back to the checkout page.
* The user proceeds to checkout.

**Post-Conditions:**

1. The user successfully adds products to the cart.

**Authority:** User

**Use Case UC-18: Add to Cart (Virtual Tour mode)**

**Description:**

This use case is about adding products to the cart in Virtual tour mode so that users could checkout.

**Pre-Conditions:**

1. The user must be logged in for an add-to-cart operation in virtual tour mode.
2. The user will be in virtual tour mode.

2. Similar items can be added more than one time.

3. Number will be shown on the cart icon displaying the number of products in the cart.

4. Add to cart button will only be shown on in-stock available products

5. Databases should be available in online mode.

**Normal Flow:**

1. User picks a product and presses add to cart button.

2. Users can search for more products by roaming around the virtual store.

3. User clicks on the cart icon to navigate to the cart page.

4. User validates the selected products and proceeds to the checkout page.

5. If the user is not satisfied, products added to the cart can be removed and the user can get navigated back to virtual tour mode.

**Alternative flow:**

1a. In case the user picks a product but it is not available in stock.

* Add to cart button won't be clickable.
* User continues from step 1 for different(available) products.

**Post-Conditions:**

User successfully adds products to cart in virtual tour mode.

**Authority:** User

**Use Case UC-19: Add to Cart (VR mode)**

**Description:**

This use case is about adding products to the cart in VR mode so that users could checkout.

**Pre-Conditions:**

1. The user must be logged in for an add-to-cart operation in VR mode.
2. The user will be in VR mode.

2. Similar items can be added more than one time.

3. Number will be shown on the VR headset screen displaying the number of products in the cart.

4. Add to cart option will only be shown on in-stock available products

5. Databases should be available in online mode.

**Normal Flow:**

1. User picks a product and moves the hand to the add-to-cart option for adding it to the cart.

2. Users can search for more products by roaming around the VR mode.

3. User moves the hand on the cart icon on the headset screen to navigate to the cart page.

4. User validates the selected products and proceeds to the checkout page.

5. If the user is not satisfied, products added to the cart can be removed and the user can get back to product view in VR mode.

**Alternative flow:**

1a. In case the user picks a product but it is not available in stock.

* Add to cart option won't be clickable.
* User continues from step 1 for different(available) products.

**Post-Conditions:**

1. User successfully adds products to cart in VR mode.

**Authority:** User

**Use Case UC-20: View Products (Website)**

**Description:**

This use case is about viewing available products on the web page.

**Pre-Conditions:**

1. User may or may not be logged in for viewing products.

2. Search and product filtering options will be provided.

3. Different sorts of options for products will be available.

4. Image and proper description with feedback and ratings will be provided when any particular product is selected.

5. Databases should be available in online mode.

**Normal Flow:**

1. With or Without login, the User views the products page.

2. Users can use the search option and filter for quick desired output.

3. User clicks the particular product and is directed to a page including all of the details of that product.

4. User checks all descriptions, feedback, rating, etc of the product and adds it to the cart if satisfied.

**Alternative flow:**

3a. In case the user doesn’t want to visit the page consisting of that particular product.

* Users can add to the cart the product without having to see its details.
* The user continues from step 1 for more products or visits the cart page.

4a. In case the user is not satisfied fully and wants to test the product (wearable item).

* Users can go to a 3D environment or VR mode.
* There they can test the wearable item with different on its selected custom virtual avatar for fitting issues.
* After satisfaction, the user can add to the cart that product from the 3D environment /VR mode.
* The user either continues in the same environment for viewing more products or goes back to website mode.

**Post-Conditions:**

Users can efficiently view products in website mode.

**Authority:** User

**Use Case UC-21: View Products (Virtual Tour mode)**

**Description:**

This use case is about viewing available products in the virtual tour mode.

**Pre-Conditions:**

1. User must be logged in for viewing products in virtual tour mode.

2. 3D models Products will be placed in the virtual store already.

3. Proper description with feedback and ratings will be provided when any particular 3d model of the product is selected.

4. Databases should be available in online mode.

**Normal Flow:**

1. The user roams around the store using a selected avatar to see 3D models of products.

2. User clicks the particular 3D model of details and the description of the product is shown.

3. For wearable items, the user can virtually try on the item on the avatar and check the fitting of any sizes by rotating the avatar

4. User checks all descriptions, feedback, rating, and virtual try-on of the product and adds it to the cart if satisfied.

**Post-Conditions:**

Users can efficiently view products in virtual tour mode.

**Authority:** User

**Use Case UC-22: View Products (VR mode)**

**Description:**

This use case is about viewing available products in VR mode.

**Pre-Conditions:**

1. User must be logged in for viewing products in VR mode.

2. 3D models Products will be placed in the virtual store already.

3. Proper description with feedback and ratings will be provided when any particular 3d model of the product is selected.

4. Databases should be available in online mode.

**Normal Flow:**

1. The user roams around the store using a VR headset as an avatar to see 3D models of products.
2. Users can grab the particular 3D model virtually.

3. User hovers on the particular 3D model of details and the description of the product is shown.

4. For wearable items, the user can virtually try on the item on the avatar and check the fitting of any sizes by rotating the avatar

5. User checks all descriptions, feedback, rating, and virtual try-on of the product and adds it to the cart if satisfied.

**Post-Conditions:**

Users can efficiently view products in VR mode.

**Authority:** User

**Use Case UC-23: Giving feedback (Website)**

**Description:**

This use case is about giving feedback on the web page.

**Pre-Conditions:**

1. The user must be logged in for giving feedback.
2. Previous feedback given by others should be visible to the user.
3. Databases should be available in online mode.

**Normal Flow:**

1. The user selects any products.

2. The user writes their feedback on the feedback area about that product or can ask any question regarding it.

3. The user clicks the submit button to send feedback.

4. The user waits for a response from the administrator side

**Post-Conditions:**

Users can efficiently give feedback about products, delivery responses, etc.

**Authority:** User

**Use Case UC-24: Giving rating (Website)**

**Description:**

This use case is about giving a rating on the web page.

**Pre-Conditions:**

1. The user must be logged in for giving a rating to the product.
2. The current rating of the product and the number of ratings should be visible to the user.
3. Databases should be available in online mode.

**Normal Flow:**

1. The user selects any products.
2. The user will be shown five empty stars.

3. The user has to give their rating from one to five stars about that product.

4. User selects the rating and their rating will be added to the product.

**Alternative flow:**

2a. If the user already gave a rating to the product

* User will be shown their previous rating
* Users can edit the rating by clicking it and choosing a new rating.

**Post-Conditions:**

Users can efficiently give a rating to a product.

**Authority:** User

**Use Case UC-25: Order History of Products**

**Description:**

This use case is about user viewing their all order history on the web page.

**Pre-Conditions:**

1. The user must be logged in for viewing their order history.
2. Databases should be available in online mode.

**Normal Flow:**

1. The user goes to the order history page.
2. The user sees all details and pricing of all previously completed or uncompleted orders.

**Alternative Flow:**

2a. In case the user has not purchased anything previously.

* An empty message will be displayed stating that No previous completed orders yet

**Post-Conditions:**

Users can efficiently view previous history details.

**Authority:** User

**Use Case UC-26: Pending Orders (Website)**

**Description:**

This use case is about the user viewing all pending (yet to be delivered) order history on the web page.

**Pre-Conditions:**

1. The user must be logged in for viewing pending orders.
2. Databases should be available in online mode.

**Normal Flow:**

1. The user goes to the pending orders.
2. The user sees all details of the upcoming product(s) to be delivered with the delivery date.

**Alternative Flow:**

2a. In case the user has nothing yet to be delivered.

* An empty message will be displayed stating that nothing is to be delivered yet

**Post-Conditions:**

Users can efficiently view previous history details.

**Authority:** User

**Use Case UC-27: User Logout**

**Description:**

This use case is about successfully logging out users.

**Pre-Conditions:**

1. Users must be logged in through valid login details.

2. Users must be able to perform all the required operations.

3. There must be an option to log out for Users.

4. Databases should be available in online mode.

**Normal Flow:**

1. User logs in to the account.

2. System validates the data.

3. Users successfully log in to the account.

4. Users perform all the required operations.

5. Users click on the logout button.

6. System successfully logs out the user.

**Alternative flow:**

2a. There is a problem with the user’s login account.

• Users can recover passwords using the forgotten password option.

• Users can again try to log in.

• User continues from step 1

**Post-Conditions:**

1. The user successfully logs out of the system.

**Authority:** User

**Thank You**