**COMSATS University Islamabad, Attock Campus**

# [Online 3D Jewelry Shop with Recommender]

**A project presented to**

**COMSATS University Islamabad, Attock Campus**

**In partial fulfillment**

**Of the requirement for the degree of**

***Bachelor of Science in Computer Science (2017-2021)***

**By**


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# Certificate of Approval

It is to certify that the final year project of BS (CS) "**Online 3D Jewelry Shop with Recommender**" was developed by **[Aqsa Amanat] [CIIT/SP17-Bcs-004/ATK]** and **[Fizza Qaseeem] [CIIT/SP17-Bcs-010/ATK]** under the supervision of **[Ma'am Sadia Ijaz]** ; it is fully adequate, in scope and quality for the degree of Bachelors of Science in Computer Sciences.

**Supervisor**

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# Executive Summary

Now a days online shopping is became popular. Different website are available that serve people. Our website is for online jewelry shopping. It contains different jewelry items. Pervious jewelry website contains 2d images of jewelry items. Our website contains 3d models of jewelry. Through 3D models depth and heights of jewelry items are represented. Customer can easily understand the design of jewelry by rotating the jewelry items which help them to see it from all directions and angels.

Our website contains a recommender. It will provide the recommendation to user according to their interest. A recommender's system is helpful for customer and service provider. Recommender will reduce transaction costs of searching and selecting items in an online shopping environment. The recommendations and suggestions are provided to user by recommender system to reduce time and effort at the side of user for choosing different jewelry items.

# Acknowledgement

In the name of ALLAH, the most kind and the most merciful.

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We are grateful to the ALLAH Almighty who provides all the resources of every kind to us so that we make their proper use for the benefit of mankind. May He keep providing us with all the resources, and the guidance to keep helping humanity.

**[Aqsa Amanat]** **[Fizza Qaseem]**

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# Chapter 1
# Introduction

# 1 Introduction

Giving user's a comfort of buying with different way of shopping that is easily used by the users. AQZA Jewelers is an online website for all type of users. Building a system in which user can view jewelry as well as signup for buying anything from aqza jewelers user have to logged in to our system, After logged in they can access our fully functional website , they can see the Jewelry items in 3D with 360 degree view, view the top viewed product, add item into the Favorite list, get email when sales is on, give ratings and reviews and also see the reviews of other users. Website maintains the activity (user's ratting) log of every users in database which is then used for the prediction process to recommend jewelry items to every user.

## 1.1 Brief

This website application is for online jeweler shopping is easy for customer to buy their jewelry online.[1] In this web application the Jewelry design have 3d models. This web application changes the vision of the user to a completely new tradition of 3D modelling. In these days, a lot of shopping website like Daraz are 2D visualizations-based websites. Now 2d images are shifted to 3dmodels.Today there is a lot of scope of 3D modeling we can use it in augmented reality as well as for 3D printing and motion graphics.

Recommender system is the automate form of a "Shop counter guy", it has the ability to predict whether a particular user would prefer an item or not basically it recommend the relevant items to particular users for example movies to watch, text to read, products to buy or anything else depending on industries. Recommendation system basically are data filtering tools that make use of algorithms and data to recommend the most relevant items to the use. It is beneficial to both service providers and users. It reduces the transaction cost of searching and selecting item in an online shopping environment. There are Six types of recommender that works primarily in media and entertainment industries.

In collaboration with 3D modeling and recommendation system, I am going to develop a website named as "AQZA Jewelers". Through this website, people can see the Jewelry items in 3D shapes. First, the user will see the index page after registration it will access the full functionality so user have to register first. After registration and confirmation of code user will be able to select and view jewellery of their own choice and buy it, then user view product image and also see the 3D model. View the shopping cart and then make checkout. User also remove the product after adding into the cart and also see the top selling and view products list. Recommendation also shown to user according to their interest.

## 1.2 Relevance to course modules

In this section, we discuss some of our courses in program that helps us making this project.

### 1.2.1 Report Writing Skills

We studied subject named report writing skills. Through this subject we learn that how to format document like formal format for documentation as 12 size for text and 14 for headings, through which format we can write the legal document, how to format tables graphs and diagrams.

### 1.2.2 Software Engineering

We studied software engineering that help how we start to make our final year project by 5 phases of se that is planning implementation testing coding. Through this subject we able to make use case diagrams, data flow diagram, activity, sequence diagram.

### 1.2.3 Web Engineering

Web engineering has a huge role in our project. By studying this subject, we can make our final year project web based. We understand how to make web pages, make database, and connect web pages with database.

### 1.2.4 HCI

In this subject we studied the interaction between human and computer that is middle thing between computer and which is interface. We studied how to make interface of any application. We learn how to human interact with computer using graphic user interface.

## 1.3 Project background

3D modelling is the new technology to display Jewelry in 3D shapes including all the angels and shapes. Using 3d modelling we easily analysis all design of Jewelry. It is web-based platform in which we use 3D object for representing our Jewelry products. Now days things are converting from 2D to 3D modelling, it is better approach for customers.

## 1.4 Literature Review

The old shopping websites containing 2D based images which does not give a proper look. But now technology shifts to 3D which gives more details of object and gives more satisfaction to users. Now mostly images are shifts from 2D models to 3D models. On website sketchfab.com 3D models are available peoples upload their 3D models for selling on this website and buy from this site and see the 3D images in all the directions and angles to make it more attractive.

### 1.4.1 Analysis from Literature Review

In our website a user wants to buy a Jewelry set, he clicks on set then a model of 3D Jewelry is shown. 3D viewer on their websites in a manner that customers can see from 360 degree all attributes of the Jewelry clearly including textures, sizes, colors and many more. Through 3d model of Jewelry user can easily understand the design of Jewelry. By seeing Jewellery in 3D shape customer will easily select the Jewellery and buy it.

We use recommender system in our website that is most important part in any website. Because we can filter the target audience of specific type and we can also recognize same kind of items that people want to buy frequently. With help of recommender we can filter people about their interest. In our website if someone wants one kind of jewellery, next time when he/she login same kind of jewellery items are shown according to their interest.

## 1.5 Methodology

Methodology is an essential for managing project. In any project methodology plays an important role. In this project we have a lot of methods that we can apply on our website. Now we can use incremental model that is suitable for our project according to our needs, requirements technology that we want to develop.

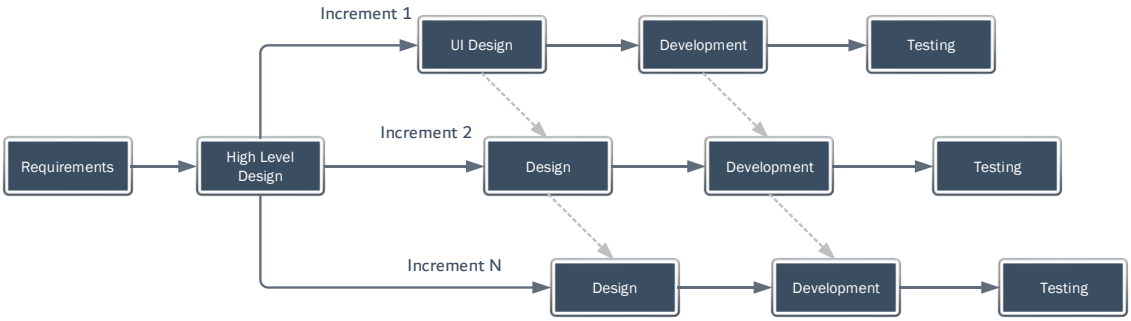



**Figure 1-1 Incremental SDLC**

### 1.5.1 Rationale behind Selected Methodology

Our project contains many modules, so we implement each module in a single increment. Characteristics of Incremental SDLC are

1. Project is divided into smaller portion.
2. First of all, we make prototype than final system
3. Firstly, we handle highest priority requirements.

# Chapter 2
# Problem Definition

# 2 Problem Definition

## 2.1 Problem Statement

Old jeweler website contains 2d models of jewllery.2d models provide overview but these models cannot give proper look.2d models height dimension can never evaluate. These models reduced cell to cell interaction.

Now images are shift from 2d modeling to 3d. 3D modelling is the new technology to display Jewelry in 3D shapes including all the angels and shapes. Our website contains 3d models of jewelry.

## 2.2 Features of 3D Modeling

- Through 3d modeling expenses are decreased by 3d models replaces prototype.
- 3D object obtained complete replication of real object.3d models can show to customer consulted on usage of output production.
- 3d modeling increased visual perception.3d models visualize to customer in such a way that attracts the customers

Due to the features of 3d modeling we prefer to make our jewelry models in 3d. 3d jewelry models represent depth and height of jewelry items. Customer can easily understand the design of jewelry. Customer can rotate the jewelry items see it from all directions and angels. Our website contains a recommender. It will provide the recommendation to user according to their websites. A recommender's system is helpful for customer and service provider. It will reduce transaction cost of finding different items and selecting them. It will deliver relevant content. Recommender will reduce workload. Recommender will provide report of personalization system. Giving customer accurate reporting allow him to make solid decision about the website. In our website if user buys a jewelry item when again visit the website related jewelry items to his previous selection must show to him as recommendations. Most of jewelry website contain recommender system but these websites contain 2d $^{\text{models}}$ of jewelry.

## 2.3 Deliverables and Development Requirements

When we launch our website. Users visit our website they must have a strong internet connection. Through the internet they can easily visit the website and know about the features of website. The user must know about the 3d modeling then they easily understand the jewelry design. While developing the website. We use sublime and brackets for developing our webpages attractive and clear. We used the Maya and blender to make our 3d models that looked clear.

### 2.3.1 Sketchfab.com

It is website where different verity of 3d models are available. People made their 3d models and upload on this website.

In the Pakistan there is no specific website that for 3d jewelry. We are making a website that contain 3d models of jewelry.

## 2.4 Development Requirements

The requirements for our project are Ram 8GB (4k) as well as SSD 256 GB (5k) also 64-bit Intel or AMD multi-core processor (20k). Nvidia GeForce GTX 1660 0C 6GBgraphic card (45k) and three button moue (2000) is required.

### 2.4.1 Tools and technologies

#### *2.4.1.1 Tools*

- Blender
- Bracket
- Xampp.

#### *2.4.1.2 Technology*

- HTML
- CSS
- Php
- JavaScript

# Chapter 3
# Requirement Analysis

# 3 Requirement Analysis

In this chapter we discuss the use case diagrams and functional and nonfunctional requirements. In Use case diagram we can make graphically representation and interaction with our environment of our system and also, we make detailed use case diagram with every part of diagram we can write the detail of every part. In functional requirement we write what our system is basically do. So according to our website it is shopping website for jewelry and we also visualize our products in 3D.In non-functional requirements we can write requirements that are not compulsory but it can enhance our website productivity and effective.

## 3.1 Functional requirements

As the name suggests, function means those requirements that a system perform operation on a specific situation. An operation and function are performed as a specific set of behavior between outputs and inputs. Functional requirements involve technical details, calculations, logic, processing, and data manipulation of a system.

### 3.1.1 FR-01 Administrator

**Table 3-1 FR-01 Administrator**

| **Name** | **FR-01 Administrator** |
|---|---|
| **Summary** | Administrator must provide the information of jewelry items. |
| **Rationale** | To keep records consistence. |
| **Requirements** | a) Administrator can update the system to meet the requirements.<br>b) Administrator can access and handle customers account and product description like quantity, price etc. |

### 3.1.2 FR-02 Registration

**Table 3-2 FR-02 Registration**

| **Name** | **FR-02 Registration** |
|---|---|
| **Summary** | User must register him/herself to see the functionalities of 3D jewelry shop. |
| **Rationale** | To keep the data of each user separately. |
| **Requirements** | a) User will enter your information that are required like first name, last name, email address and password to register him/her in this app.<br>b) Click Register button |

### 3.1.3 FR-03 Login

**Table 3-3 FR-03 Login**

| | |
|---|---|
| **Name** | **FR-03 Login** |
| **Summary** | User must login to enter the 3D jewelry shop. |
| **Rationale** | To keep a trace of individual user activities and to store them for future use. |
| **Requirements** | a) User will enter his/her email address and password in the field.<br>b) Click Login button |

### 3.1.4 FR-4 Web Admin Panel (POS System)

**Table 3-4 FR-04 Web Admin Panel (POS System)**

| | |
|---|---|
| **Name** | **FR-04 Web Admin Panel (POS System)** |
| **Summary** | Admin can access the webpage. |
| **Rationale** | To keep the admin informed of the orders placed and some setting for the website. |
| **Requirements** | a) Web portal only for Admin.<br>b) Admin can handle the orders of users/clients. |

### 3.1.5 FR-05 New Arrival

**Table 3-5 FR-05 New Arrival**

| | |
|---|---|
| **Name** | **FR-05 New Arrival** |
| **Summary** | Jewelry items must be placed on a website. |
| **Rationale** | To keep the data of each user will secure and separate by others. |
| **Requirements** | a) Admin places jewelry products in pages.<br>b) User will interact by clicking on product.<br>c) User will be facilitated by a 360-degree view of product along with information for selected product. |

### 3.1.6 FR-06 Product Recommendations

**Table 3-6 FR-06 Product Recommendations**

| | |
|---|---|
| **Name** | **FR-06 Product Recommendations** |
| **Summary** | Recommendations must generate of any user. |
| **Rationale** | To keep the data of each user's favorite products separately. |
| **Requirements** | a) User will be facilitated to select an item as his/her favorite products.<br>b) User can select the products in favorite list. |

### 3.1.7 Cart

**Table 3-7 FR-07 Cart**

| | |
|---|---|
| **Name** | **FR-07 Cart** |
| **Summary** | Multiple users can add items on its cart. |
| **Rationale** | To keep the record of each user selected items in each session. |
| **Requirements** | a) User will be facilitated to view the products selected in cart.<br>b) User can then manage these products quantity or can delete a product from cart. |

### 3.1.8 FR-08 Delivery Confirmation

**Table 3-8 FR-08 Delivery Confirmation**

| | |
|---|---|
| **Name** | **FR-08 Delivery Confirmation** |
| **Summary** | Deliver the products to the location. |
| **Rationale** | To deliver the products to the location given by user. |
| **Requirements** | a) User will confirm the order.<br>b) Admin will verify the order details (Address etc.)<br>c) User will pay on delivery. |

## 3.2 Non-Functional Requirements

Non-functional requirements are those requirements that take part with functional requirements to help and define the system quality with respect to the following parameter from NFR-01 to NFR-04.[3]

### 3.2.1 NFR-01 Reliability

- The proposed system which the developer designs is reliable as it efferently with users. Secure access of confidential data.

### 3.2.2 NFR-02 Security

Security constraints are as follows

- User must enter valid email address.
- User must enter Address that is valid.
- User data cannot be shared with any third party.
- After login, user states are maintained.
- Session will expire for user after logout.

### 3.2.3 NFR-03 Availability

Server is available of any time. Availability will be provided if there is an internet connection.

### 3.2.4 NFR-04 Robustness

- System cannot lose users information like favorite items and purchasing summary etc.

## 3.3 Use Case Diagram

### 3.3.1 Admin Use Case Diagram

**Figure 3- 1 Admin Use Case Diagram**

### *3.3.1.1 Detail Admin Use Case Diagram*

**Table 3-9 Login Use Case**

| **Use case name** | **Login** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can login to the system. |
| **Pre-condition** | Admin should be in the login page.<br>Admin must have valid email address.<br>Admin record must be in the database. |
| **Post-condition** | Admin will redirect to the dashboard page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Write Web URL.<br>2. Click on login.<br>3. Enter Credentials<br>4. Click on login button to proceed. |

**Table 3-10 Dashboard Use Case**

| **Use case name** | **Dashboard** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can see the dashboard of the system. |
| **Pre-condition** | Admin should be in the dashboard page<br>Admin can view all the pages from dashboard page. |
| **Post-condition** | Product added/Product updated |
| **Extend** | Nil |
| **Normal course of events** | 1. After login can see the dashboard.<br>2. Click on product, orders, users page. |

**Table 3-11 Jewelry Management Use Case**

| **Use case name** | **Product Management** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can manage product in system. |
| **Pre-condition** | Admin should be in the products page<br>Admins navigate through the functionalities like add, update product. |
| **Post-condition** | Product added/Product updated |
| **Extend** | Add, Update, View, Delete |
| **Normal course of events** | 1. Go to the Products page.<br>2. Click on Add/Update product.<br>3. Enter credentials.<br>4. Click on Add/Update to proceed. |

**Table 3-12 Add Product**

| **Use case name** | **Add** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admins add product to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the Add Product page. |
| **Post-condition** | Admin will be redirected to the products add page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Admins go to the Add products page.<br>2. Enter product specification.<br>3. Click on Add Product button. |

**Table 3-11 View Product Use Case**

| **Use case name** | **View Product** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin view product in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin should be in the products page. |
| **Post-condition** | Admin will be redirected to the view page of product. |
| **Extend** | Nil |
| **Normal course of events** | 1. Click on product view button.<br>2. Product will be displayed in the page. |

**Table 3-12 Update Use Case**

| **Use case name** | **Update** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can update product information in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin should be in the product update page. |
| **Post-condition** | Admin will be redirected back to products updated page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Product Update.<br>2. Enter all the fields that Admin want to update.<br>3. Click update button. |

**Table 3-14 Delete Product Use Case**

| | |
|---|---|
| **Use case name** | **View Product** |
| **Actor** | Admin |
| **Summary** | Admin view product in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin should be in the products page. |
| **Post-condition** | Admin will be redirected to the delete page of product. |
| **Extend** | Nil |
| **Normal course of events** | 1. Click on product delete button.<br>2. Product will be deleted from the page. |

**Table 3-11 Sales Management Use Case**

| | |
|---|---|
| **Use case name** | **Sales Management** |
| **Actor** | Admin |
| **Summary** | Admin can manage sales in system. |
| **Pre-condition** | Admin should be in the products page<br>Admins navigate through the functionalities like add and view sale. |
| **Post-condition** | Sale added |
| **Extend** | Add sale, View Sale |
| **Normal course of events** | 1. Go to the dashboard page.<br>2. Click on Sale products.<br>3. Go to product page<br>4. Click on Add sale to proceed. |

**Table 3-12 Add Sale Use Case**

| | |
|---|---|
| **Use case name** | **Add sale** |
| **Actor** | Admin |
| **Summary** | Admins add sale to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the add sale Product page. |
| **Post-condition** | Admin will be redirected to the products sale page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Admins go to the Add sale products page.<br>2. Enter sale specification.<br>3. Click on Add sale button. |

**Table 3-13 View Sale Use Case**

| | |
|---|---|
| **Use case name** | **View Sale** |
| **Actor** | Admin |
| **Summary** | Admin view product in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin should be in the Sale Product page. |
| **Post-condition** | Admin will be redirected to the sale product page of dashboard |
| **Extend** | Nil |
| **Normal course of events** | 1. Click on sale product page.<br>2. Sale product will be displayed in the page. |

**Table 3-11 Order Management Use Case**

| **Use case name** | **Product Management** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can manage order in system. |
| **Pre-condition** | Admin should be in the order page<br>Admins navigate through the functionalities like complete send and view order. |
| **Post-condition** | Order placed |
| **Extend** | View, complete and send order. |
| **Normal course of events** | 1. Go to the orders page.<br>2. View the orders in order page<br>3. Go to send order page<br>4. Click on send to send the order.<br>5. Go to complete order page.<br>6. View all completed order |

**Table 3-11 View Order Use Case**

| **Use case name** | **View Order** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can view order in system. |
| **Pre-condition** | Admin should be in the order page<br>Admins view the placed order |
| **Post-condition** | Order placed |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to the order page.<br>2. View placed order in the order page. |

**Table 3-11 Complete Order Use Case**

| **Use case name** | **Complete Order** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can see completed order in system. |
| **Pre-condition** | Admin should be in the complete orders page<br>Admins view the completed order. |
| **Post-condition** | Order complete |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to the complete order page.<br>2. View completed orders in the orders page. |

**Table 3-11 Complete Order Use Case**

| **Use case name** | **Complete Order** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can see completed order in system. |
| **Pre-condition** | Admin should be in the complete orders page<br>Admins view the completed order. |
| **Post-condition** | Order complete |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to the complete order page.<br>2. View completed orders in the orders page. |

**Table 3-11 Send Order Use Case**

| **Use case name** | **Send Order** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can send order in system. |
| **Pre-condition** | Admin should be in the send orders page<br>Admin can send order. |
| **Post-condition** | Order placed. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to the send order page.<br>2. Click on order send button. |

**Table 3-11 Categories Management Use Case**

| **Use case name** | **Categories Management** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can manage categories in system. |
| **Pre-condition** | Admin should be in the categories page<br>Admins navigate through the functionalities like add and update categories and add subcategories. |
| **Post-condition** | Nil |
| **Extend** | Add categories and subcategories. |
| **Normal course of events** | 1. Go to the categories page.<br>2. Click on add category.<br>3. Click on update category.<br>4. Go to subcategories page<br>5. Click on Add subcategories. |

**Table 3-12 Add Category Use case**

| **Use case name** | **Add Category** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admins add category to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the add category page. |
| **Post-condition** | Admin will be redirected to the category page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Admin go to the category page.<br>2. Click on add category button.<br>3. Add category in it.<br>4. Click on Add button. |

**Table 3-12 Update Category Use case**

| **Use case name** | **Update Category** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin update category to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the add category page. |
| **Post-condition** | Admin will be redirected to the category page.<br>Category must be in the category page. |
| **Extend** | Nil. |
| **Normal course of events** | 1. Admins go to the category page.<br>2. Click on update category button.<br>3. Add category in it.<br>4. Click on update button. |

**Table 3-12 Add Subcategory Use case**

| **Use case name** | **Add Subcategory** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admins add subcategory to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the add subcategory page.<br>Categories must exist. |
| **Post-condition** | Admin will be redirected to the subcategory page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Admin go to the subcategory page.<br>2. Click on add subcategory button.<br>3. Add subcategory in it.<br>4. Click on Add button. |

**Table 3-11 Employees Management Use Case**

| **Use case name** | **Employees Management** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin can manage employees in system. |
| **Pre-condition** | Admin should be in the employees' page<br>Admins navigate through the functionalities like add, update, active or deactivate employees. |
| **Post-condition** | Admin will be redirected to the subcategory page. |
| **Extend** | Add, Update, View, Delete |
| **Normal course of events** | 1. Go to the Employees page.<br>2. Click on Add/Update/ active or deactivate employee.<br>3. Enter credentials.<br>4. Click on Add/Update/ active or deactivate to proceed. |

**Table 3-12 Add employee Use Case**

| **Use case name** | **Add employee** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admins add employee to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the employee page. |
| **Post-condition** | Admin will be redirected to the employee page.<br>Employee Added. |
| **Extend** | Admin will be redirected to the employee page. |
| **Normal course of events** | 1. Admins go to the employee page.<br>2. Click on add employee button<br>3. Enter employee specification.<br>4. Click on Add button. |

**Table 3-12 Update Employee Use Case**

| **Use case name** | **Update Employee** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin update employee to the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the add employee page.<br>Employee must be added. |
| **Post-condition** | Admin will be redirected to the employee page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Admins go to the employee page.<br>2. Click on Edit button.<br>3. Make changes.<br>4. Click on Update button. |

**Table 3-12 Active or Deactivate Employee Use Case**

| | |
|---|---|
| **Use case name** | Active or Deactivate employee |
| **Actor** | Admin |
| **Summary** | Admin active or deactivate the employee in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admin is in the employee page.<br>Employee must be added. |
| **Post-condition** | Admin will be redirected to the employee page.<br>Employee must be converted into active to de-active and vice versa |
| **Extend** | Nil |
| **Normal course of events** | 1. Admins go to the employee page.<br>2. Click on active or de-active button. |

**Table 3-15 User Details Use Case**

| | |
|---|---|
| **Use case name** | **Manage Users** |
| **Actor** | Admin |
| **Summary** | Admin view and search user, that is placed by user in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admins are in the user page. |
| **Post-condition** | Admin are redirected to the user page. |
| **Extend** | Delete Users, Edit User, Update User, View User |
| **Normal course of events** | 1. Go to user page..<br>2. View users at user page.<br>3. Enter user first name to search the user |

**Table 3-15 View Messages Use Case**

| **Use case name** | **View Messages** |
|---|---|
| **Actor** | Admin |
| **Summary** | Admin view users' messages that is placed by user in the system. |
| **Pre-condition** | Admin must be login to the system.<br>Admins are in the view messages page. |
| **Post-condition** | Admin are redirected to the view messages page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to user messages page.<br>2. View users messages on user messages page. |

### 3.3.2 User Use Case Diagram

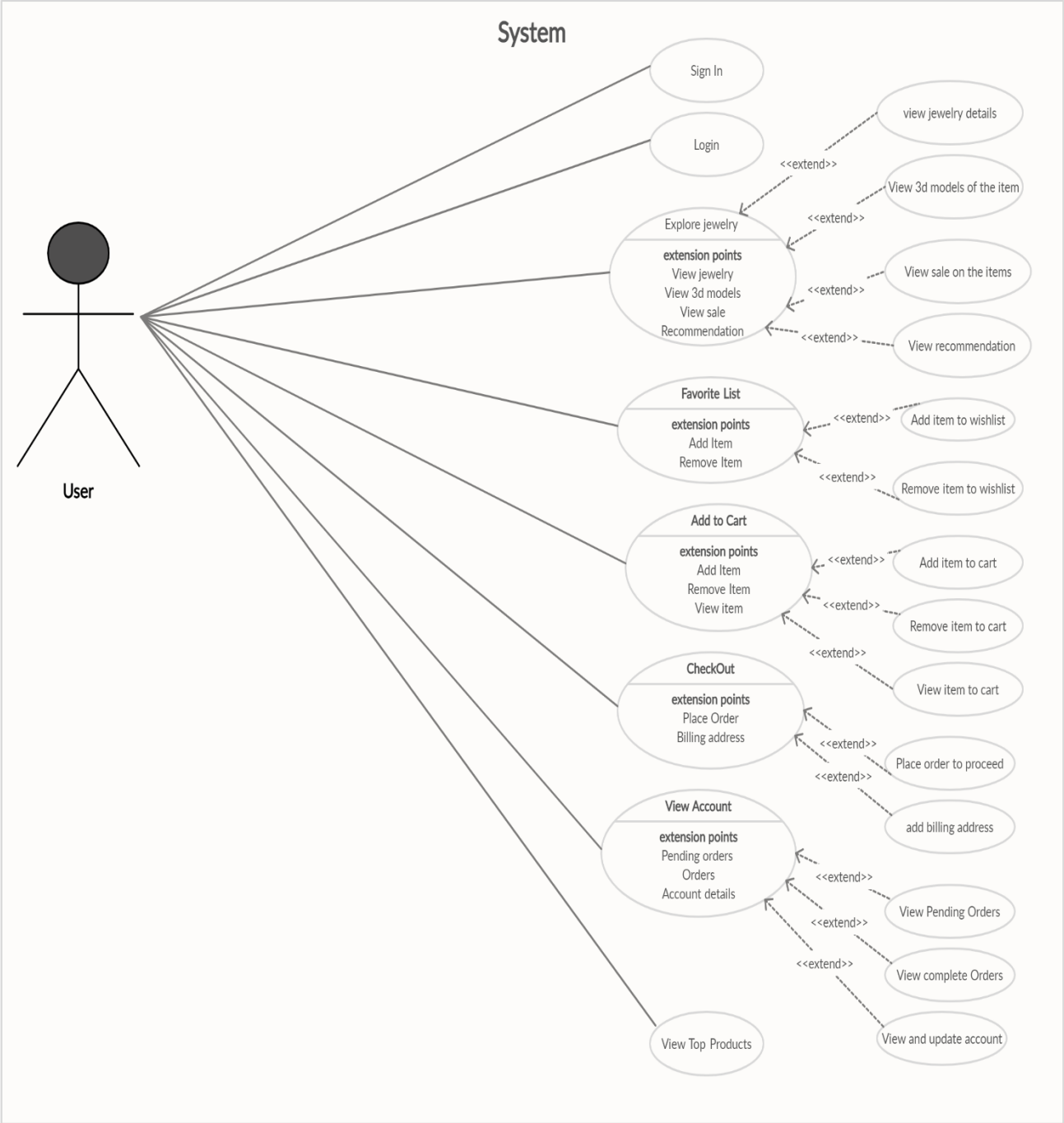



**Figure 3- 2 User Use Case Diagram**

### *3.3.2.1 Detail User Use Case Diagram*

**Table 3-14 Sign Up Use Case**

| | |
|---|---|
| **Use case name** | **Sign Up** |
| **Actor** | User |
| **Summary** | User can Sign up to the system. |
| **Pre-condition** | User should be in the sign-up page.<br>User must have valid email address.<br>User record must not be in the database. |
| **Post-condition** | User will redirect to the home page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to sign up UI.<br>2. Enter credentials.<br>3. Click Sign Up button. |

**Table 3-15 User Login Use Case**

| | |
|---|---|
| **Use case name** | **Login** |
| **Actor** | User |
| **Summary** | User can login to the portal. |
| **Pre-condition** | User should be in the Login page.<br>User must have valid email address.<br>User record already in the database. |
| **Post-condition** | User will redirect to the home page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Login UI.<br>2. Enter credentials.<br>3. Click on login button. |

**Table 3-16 Explore Jewelry Use Case**

| | |
|---|---|
| **Use case name** | **Explore Jewelry** |
| **Actor** | User |
| **Summary** | User can explore jewelry shops. |
| **Pre-condition** | User must be login to the system. |
| **Post-condition** | User will be in the jewelry UI. |
| **Extend** | View jewelry Details, View Items in 3D, View sale, View recommendations. |
| **Normal course of events** | 1. Go to Explore Jewelry UI and details.<br>2. See the jewelry in 3D.<br>3. See items in 3d.<br>4. View sale and recommendation. |

**Table 3-17 View Jewelry Details Use Case**

| | |
|---|---|
| **Use case name** | View Jewelry Details |
| **Actor** | User |
| **Summary** | User can view jewelry details. |
| **Pre-condition** | User must be in jewelry page. |
| **Post-condition** | User will be in the jewelry page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Jewelry page.<br>2. View all jewelry details |

**Table 3-18 View 3d model Use Case**

| | |
|---|---|
| **Use case name** | View 3d model |
| **Actor** | User |
| **Summary** | User can view jewelry 3d models. |
| **Pre-condition** | User must be login into the system.<br>User must be in the jewelry page. |
| **Post-condition** | User will be in the 3d model page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Jewelry page.<br>2. Click on 3d model button<br>3. View 3d model.<br>4. View 360-degree view. |

**Table 3-19 View Sale Use Case**

| | |
|---|---|
| **Use case name** | View Sale |
| **Actor** | User |
| **Summary** | User can view sale on the jewelry. |
| **Pre-condition** | User must be in the jewelry page. |
| **Post-condition** | User will be in the jewelry page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Jewelry page.<br>2. View Sale on jewelry. |

**Table 3-20 Recommendation Use Case**

| | |
|---|---|
| **Use case name** | View Recommendation |
| **Actor** | User |
| **Summary** | User can view recommendation on the Home page. |
| **Pre-condition** | User must be in the Login into the system.<br>User must be in the recommendation page. |
| **Post-condition** | User will in the recommendation page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Home page.<br>2. View recommendations of jewelry. |

**Table 3-21 Favorite List Use Case**

| | |
|---|---|
| **Use case name** | **Favorite List** |
| **Actor** | User |
| **Summary** | User can Add or update item in the favorite list. |
| **Pre-condition** | User must be login to the system.<br>User will be in the Favorite list page. |
| **Post-condition** | When click like button, Items added or<br>When unlike the item, item will be updated. |
| **Extend** | Remove, Add, View |
| **Normal course of events** | 1. Go to jewelry page.<br>2. Click on like button to add item to the favorite list.<br>3. Click on like button, to render update page for favorite list item. |

**Table 3-22 Add favorite Use Case**

| | |
|---|---|
| **Use case name** | **Add Favorite** |
| **Actor** | User |
| **Summary** | User can Add item in the favorite list. |
| **Pre-condition** | User must be login to the system.<br>User will be in the jewelry page. |
| **Post-condition** | When click like button, Items added into favorite list. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to jewelry page.<br>2. Click on like button to add item to the favorite list. |

**Table 3-23 Remove favorite Use Case**

| | |
|---|---|
| **Use case name** | **Remove Favorite** |
| **Actor** | User |
| **Summary** | User can Remove item in the favorite list. |
| **Pre-condition** | User must be login to the system.<br>User will be in the jewelry page. |
| **Post-condition** | When unlike the item, item will be updated |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to jewelry page.<br>2. Click on unlike button to remove item from favorite list. |

**Table 3-24 Cart Use Case**

| | |
|---|---|
| **Use case name** | **Cart** |
| **Actor** | User |
| **Summary** | User can View/Add/Update cart in the system. |
| **Pre-condition** | User must be login to the system. |
| **Post-condition** | User will be redirected to cart UI. |
| **Extend** | Add, Update Cart, View Cart |
| **Normal course of events** | 1. Go to Cart UI.<br>2. Click on Add item to cart to add it in to the cart.<br>3. Click on Update to render update UI.<br>4. Click on view to view item in cart. |

**Table 3-25 Checkout Use Case**

| | |
|---|---|
| **Use case name** | **Checkout** |
| **Actor** | User |
| **Summary** | User can check out the item that is already in the cart. |
| **Pre-condition** | User must be login to the system.<br>User must be in the checkout page |
| **Post-condition** | System shows “Checkout Successful”. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Cart page.<br>2. Click on checkout.<br>3. Enter credentials.<br>4. Click on confirm. |

**Table 3-26 My-Account Use Case**

| **Use case name** | **My-Account** |
|---|---|
| **Actor** | User |
| **Summary** | User can view their orders, pending orders and update their profile |
| **Pre-condition** | User must be login to the system.<br>User must be in the my-account page |
| **Post-condition** | System will be in my-account page. |
| **Extend** | View My orders, View pending orders, Update profile |
| **Normal course of events** | 1. Go to my-account page.<br>2. Click on my-orders to see the orders.<br>3. Click on the pending orders to see pending orders and to mark them complete.<br>4. Click on the update profile to change the information. |

**Table 3-27 Top Product Use Case**

| **Use case name** | **Top product** |
|---|---|
| **Actor** | User |
| **Summary** | User can view the top products that have more views. |
| **Pre-condition** | User must be login to the system.<br>User must be in the top product page |
| **Post-condition** | User will be in the top product page. |
| **Extend** | Nil |
| **Normal course of events** | 1. Go to Top product page.<br>2. View Top products |

# Chapter 4
# Design and Architecture

# 4 Design and Architecture

## 4.1 Architecture Overview

Here are some diagrams that will describe basic architecture of our system, that how components and activities in our system works and collaborate with each other at regular and specified intervals.

## 4.2 Data Modeling (Diagram)

In the sub section, we will make a project design of our web application. Data modeling is a type of software modeling techniques in which we design our project in terms of data passing. Diagrams in the subsection are[4]

- Data Flow Diagram
- Activity Diagram
- Sequence Diagram

### 4.2.1 Data Flow Diagram

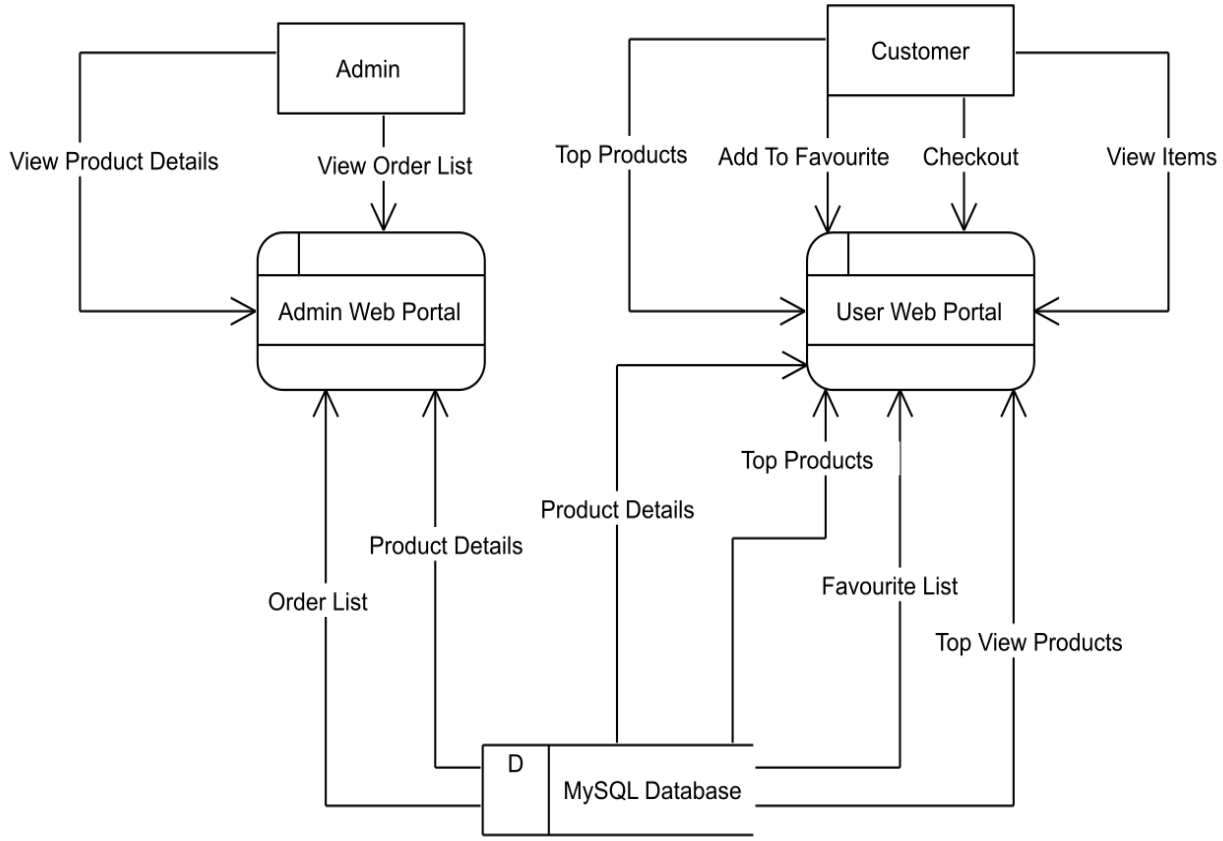



**Figure 4-1 Data Flow Diagram (Level 0)**

### 4.2.2 Activity Diagram

Activity diagram is a type of behavioral diagram. We have two actors in our system that perform different actions in the system.

#### *4.2.2.1 Admin Activity Diagram:*

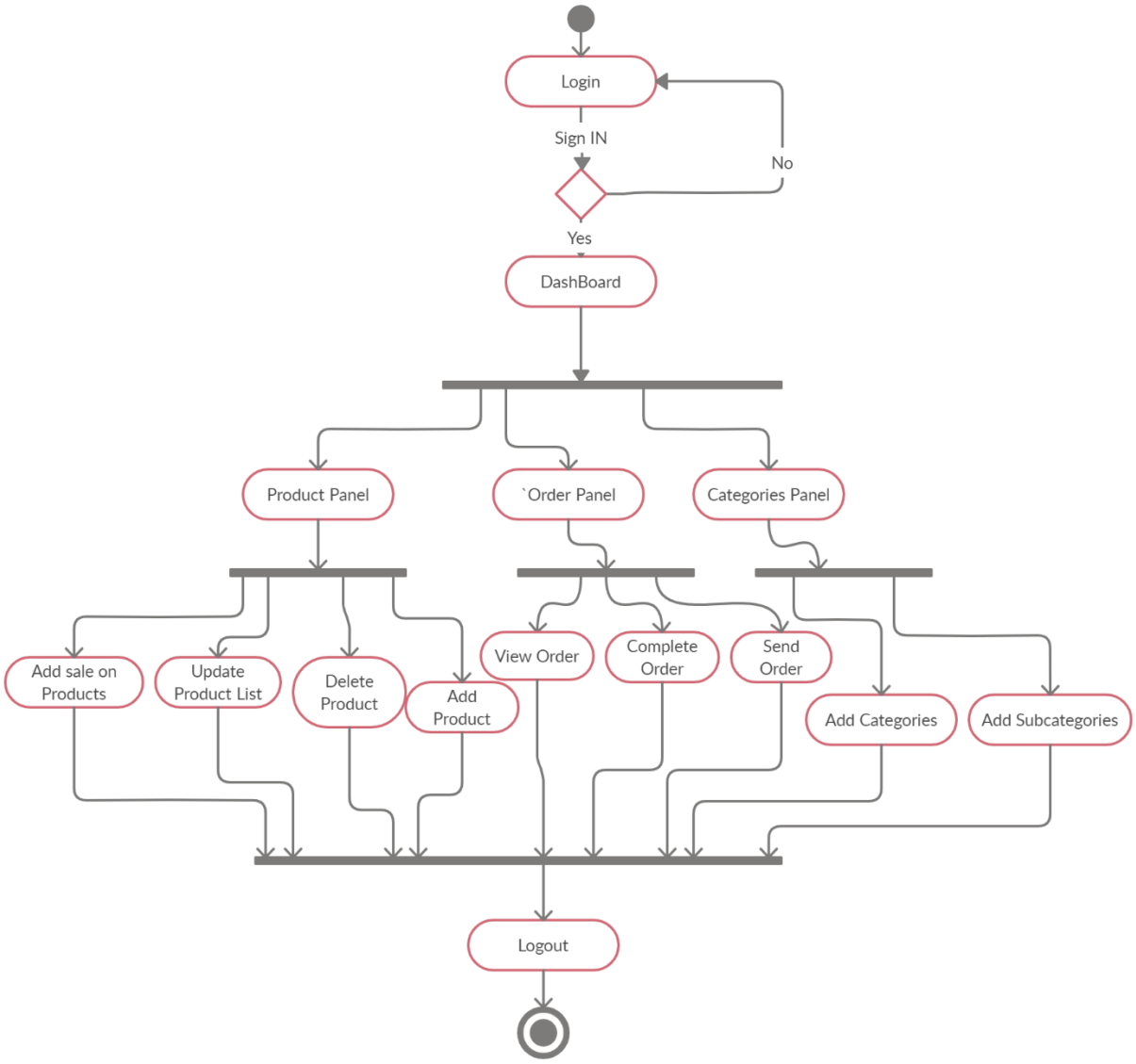



**Figure 4-2 Admin Activity Diagram**

There are activities that are perform by admin while login to the system. In the dashboard Admin perform all these above operations.

#### *4.2.2.2 User Activity Diagram:*

<<paste user activity diagram here>>

There are activities that are perform by user while login to the system. In the home page perform all these above operations.

### 4.2.3 Class Diagram

This is a type of structural modeling diagram in which classes are populated with each other in terms or relationship.

- Association
- Aggregation
- Composition

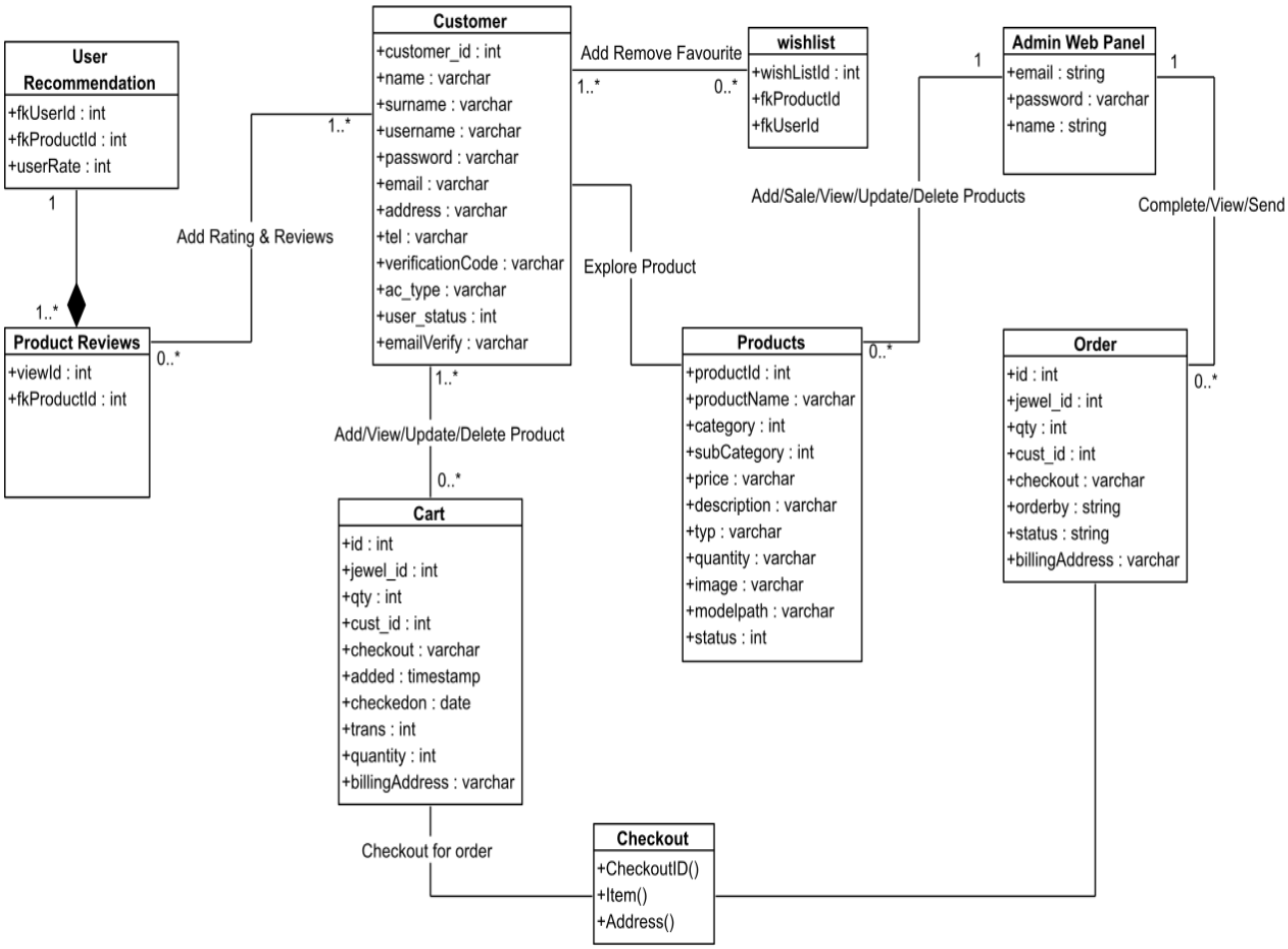



**Figure 4-3 Class Diagram**

### 4.2.4 Sequence Diagram

It is a type of behavioral UML diagram. It shows the realization in the logical view of the system under development. It also shows the message that is passed between the system and the lifelines while performing specific operation. Messages are arranged in ascending to maintain the flow of system. It shows the dynamic behavior of system according to the messages that are being passed.

### *4.2.4.1 Customer Sequence Diagram*

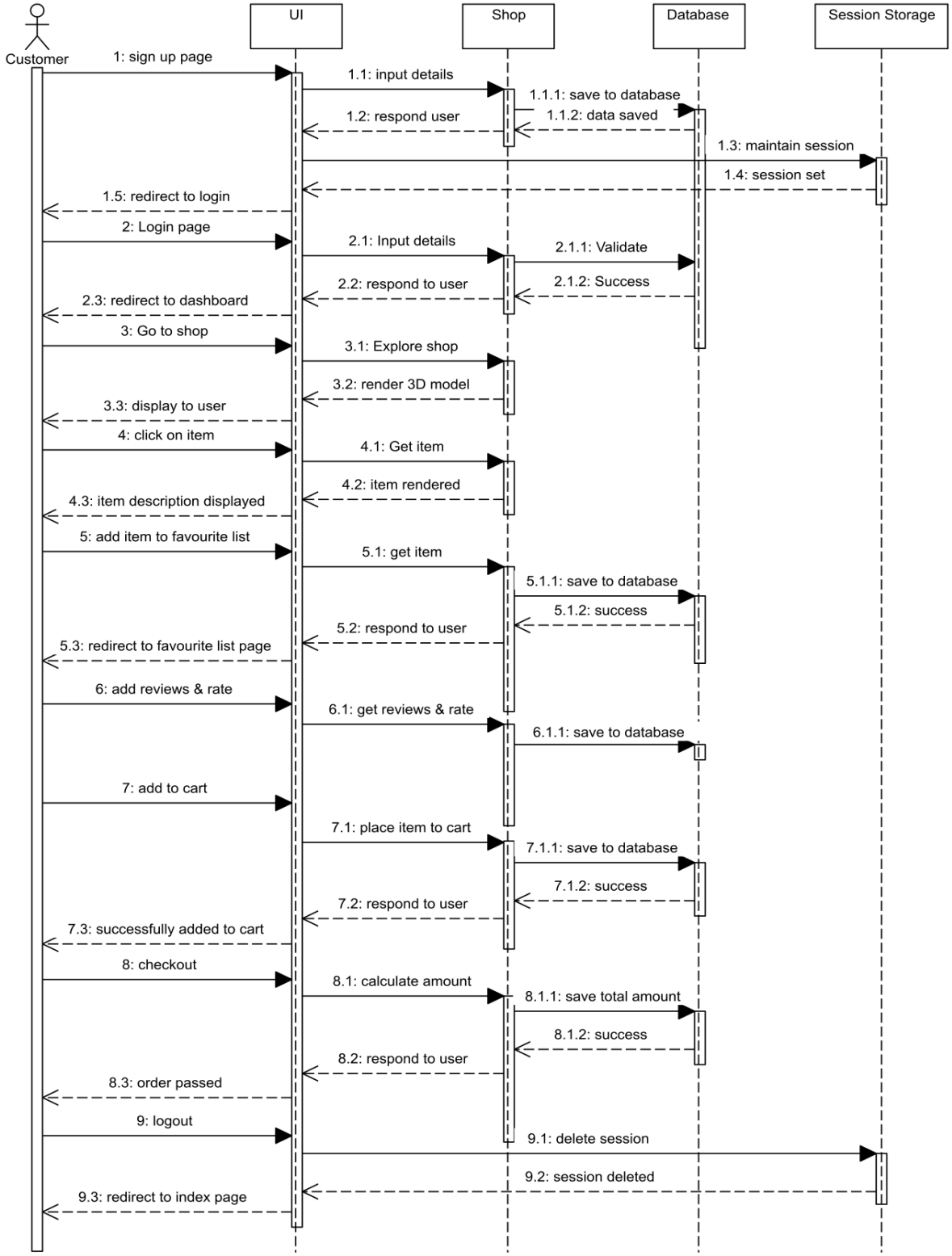



**Figure 4-4 Customer Sequence Diagram**

In the sequence diagram above. Customer first sign up. Enter the details in the user interface, and its data will be saved to the database. After signup customer login to the database by providing their credentials. In the dashboard. User can add item into the favorite list, add items to the cart and checkout.

### *4.2.4.2 Admin Sequence Diagram*

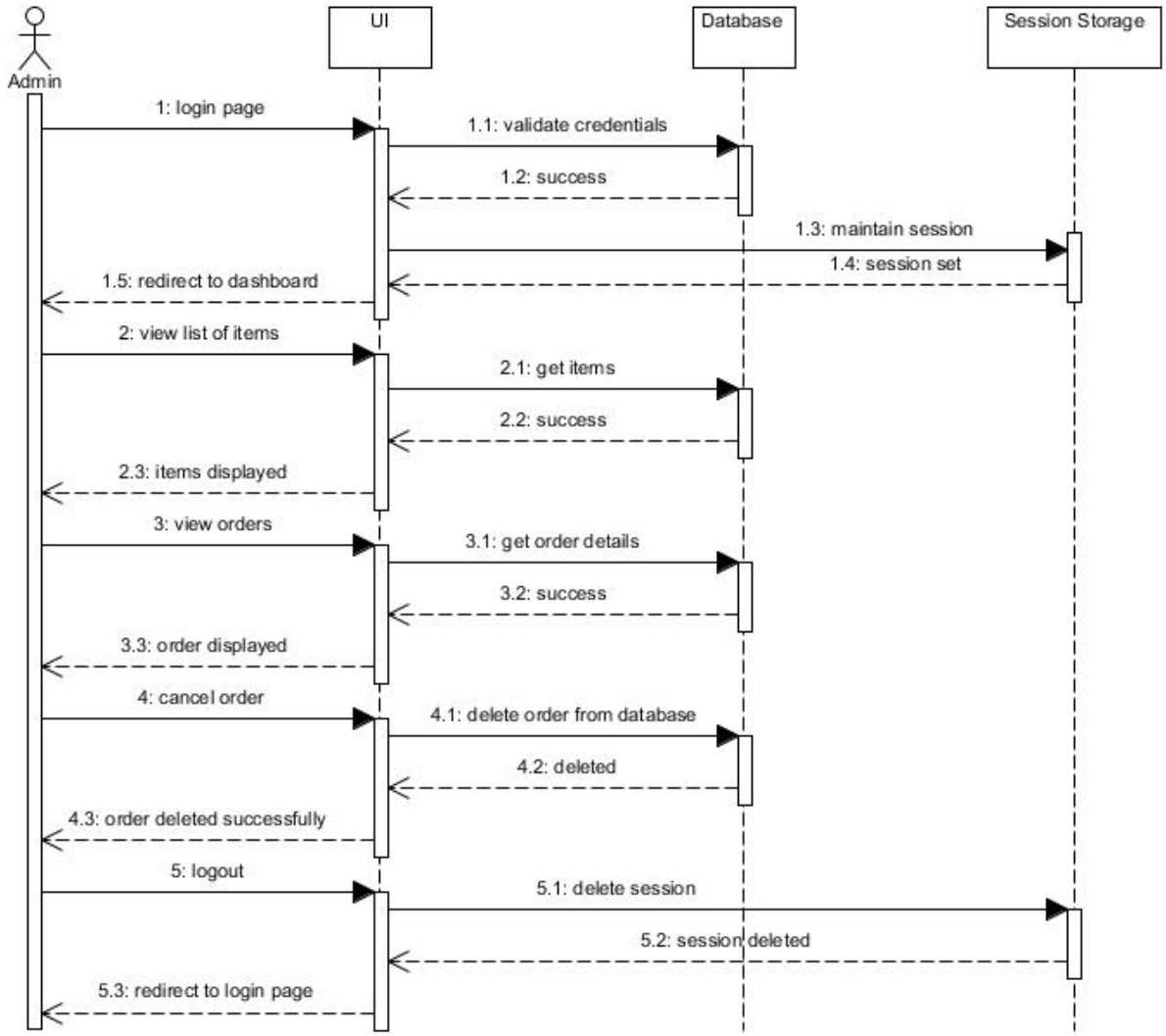



**Figure 4-5 Admin Sequence Diagram**

### 4.2.5 ERD Diagram:

ERD abbreviated as the entity relationship diagram which shows the relation between different tables in database management system, it also show the interaction between entity .

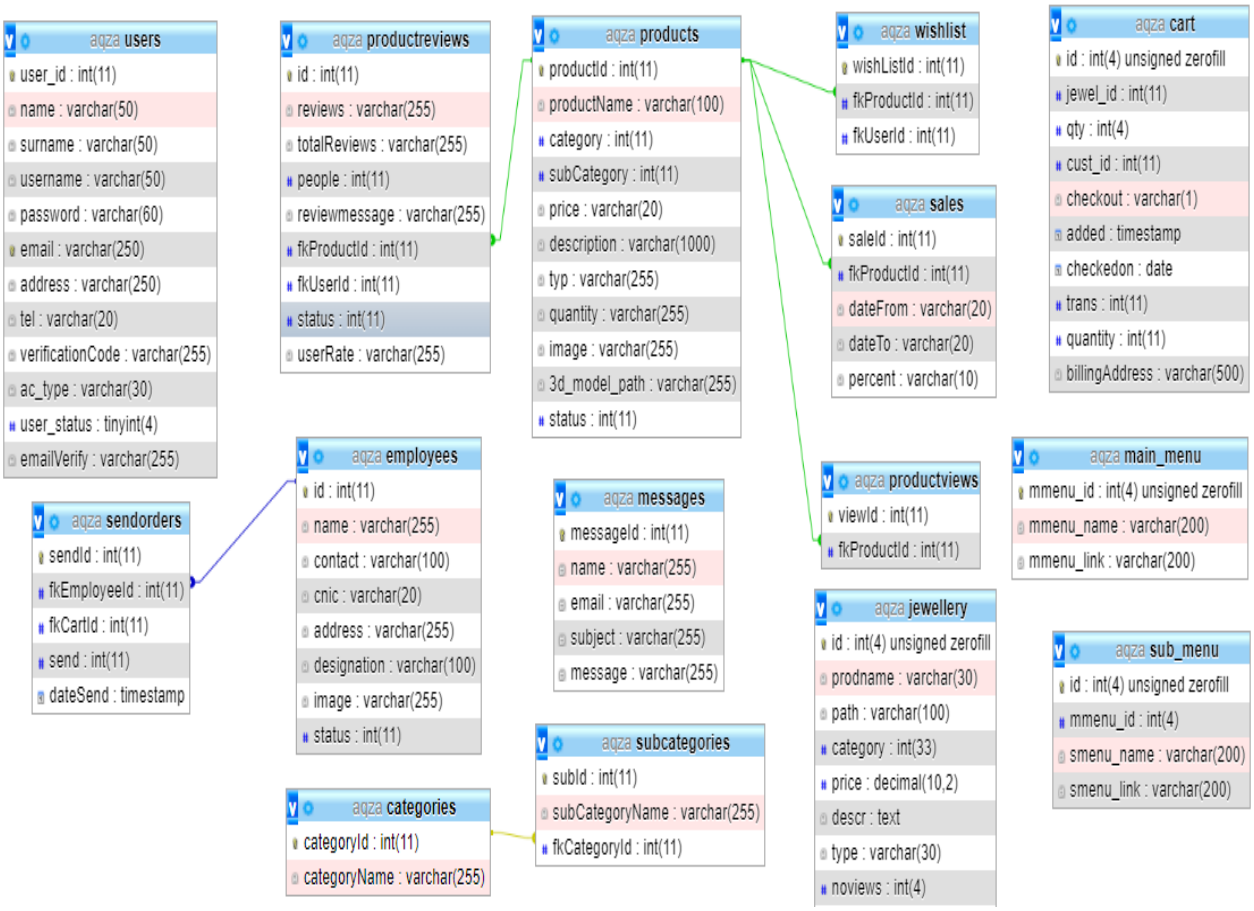



**Figure 4-6 ER Diagram**

# Chapter 5
# Implementation

# 5 Implementation

This chapter is the overview of the different tools used in the development of application and the important stages through the development process. For the development of the project "Online 3D Jewelry Shop with Recommender" some of the important implemented stages mention in this chapter and the different tool that are used and that are listed below.

## 5.1 Tools

- XAMPP
- MYSQL
- Brackets

### 5.1.1 XAMPP

XAMPP is a free and open source cross-platform web server solution and it consist of Apache HTTP Server, Maria DB database and interpreter for scripts. Such as we are developing a project, for the website developing we are using XAMPP.

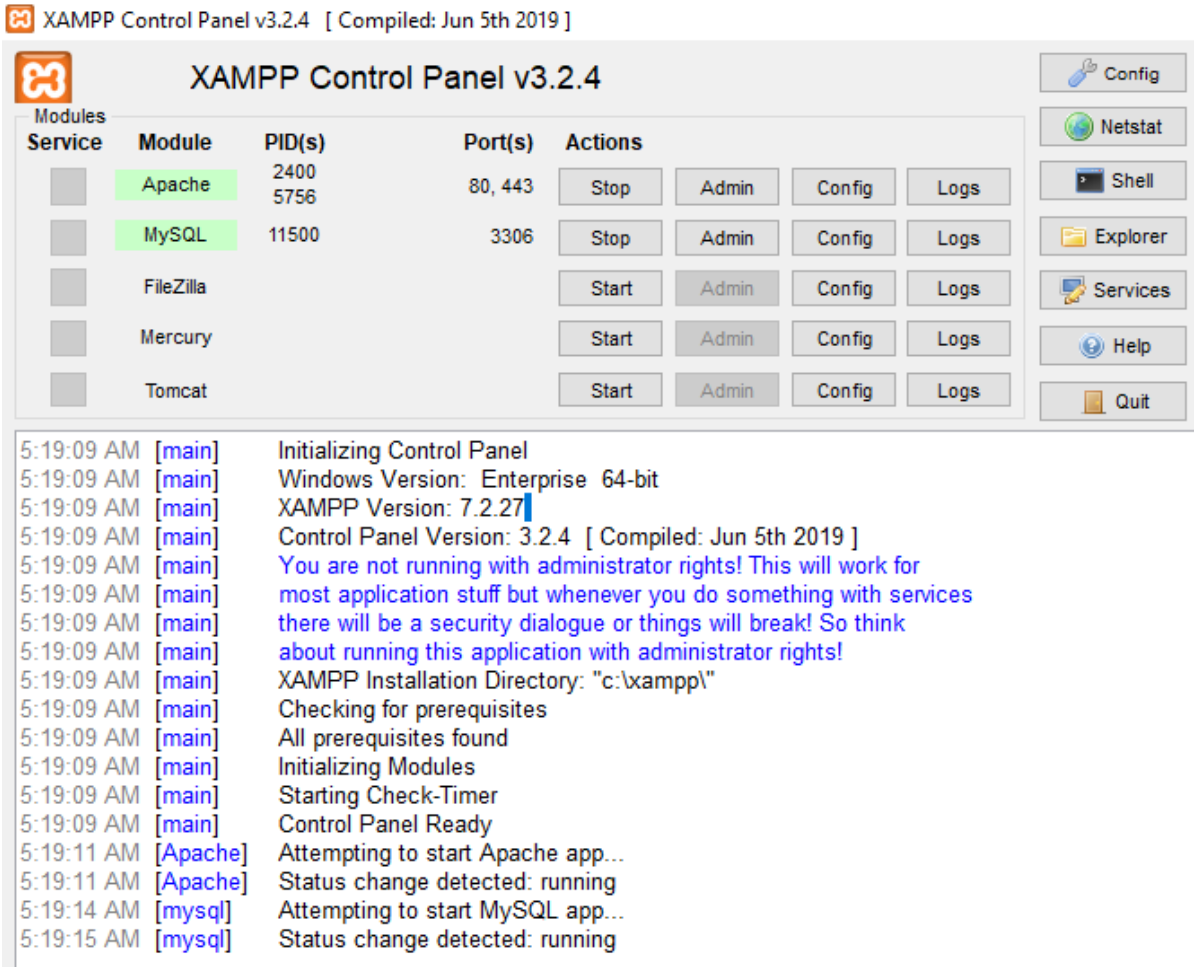



**Figure 5-1 XAMPP Control Panel**

### 5.1.2 MYSQL

We are using MYSQL database for our project and this will work when XAMP server will be open just like show in above picture. MYSQL is an open source relational database management system, because we are developing android and web-based project so that is why we are using relational database.

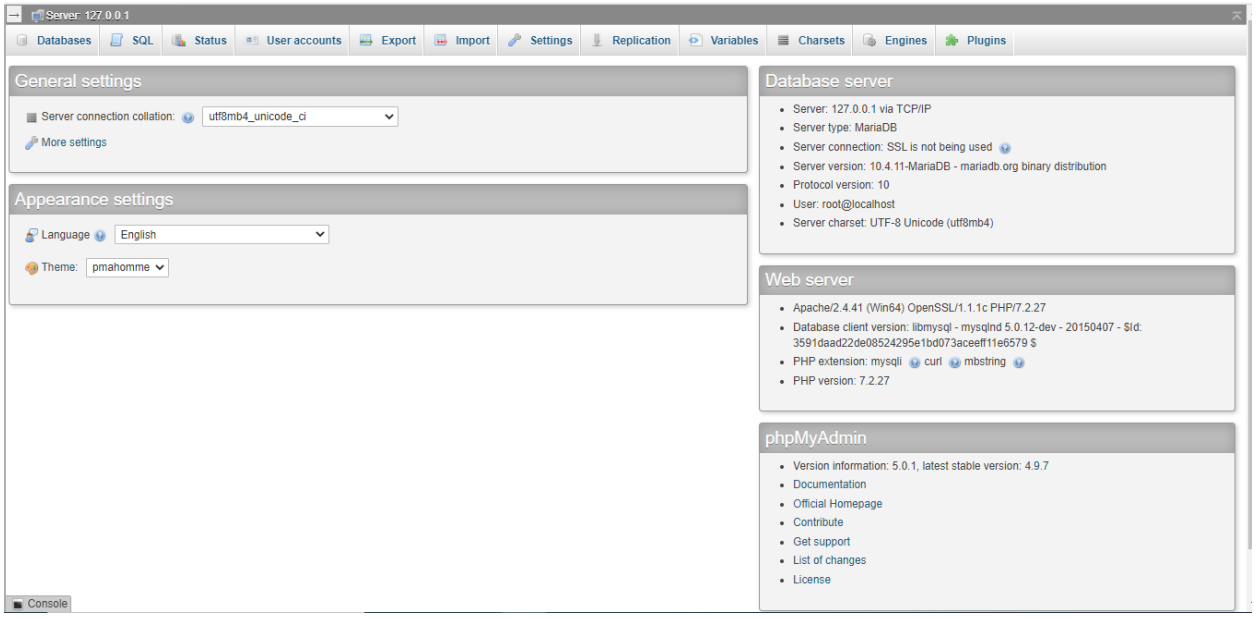



**Figure 5-2 MySQL Database**

### 5.1.3 Brackets

Brackets is a source code editor with a primary focus on web development. Created by Adobe Systems, it is free and open-source software licensed under the MIT License, and is currently maintained on GitHub by Adobe and other open-source developers. It is written in JavaScript, HTML and CSS.

### 5.1.4 Blender

Blender is a free and open-source 3D computer graphics software toolset **used** for creating animated films, visual effects, art, 3D printed models, motion graphics, interactive 3D applications, virtual reality, and computer games.

## 5.2 Development Stages for web portal

The project "Online 3d jeweler shop with recommender "is develop in no of development stages but some are described below. As our project is web based so firstly we discuss about Web design. Following were the discrete phases we have experienced incrementally to realize our product in the given time.

### 5.2.1 Sign up

If the user is new and can't have his account then he clicked on signed up button , the page will appear and user have to fill all the options and then they will be able to signed in as customer. In this form all information of user is taken. Validation is apply on email. When user enter his email verification code is send to him. An email is used for one user. Email and user are name must unique.

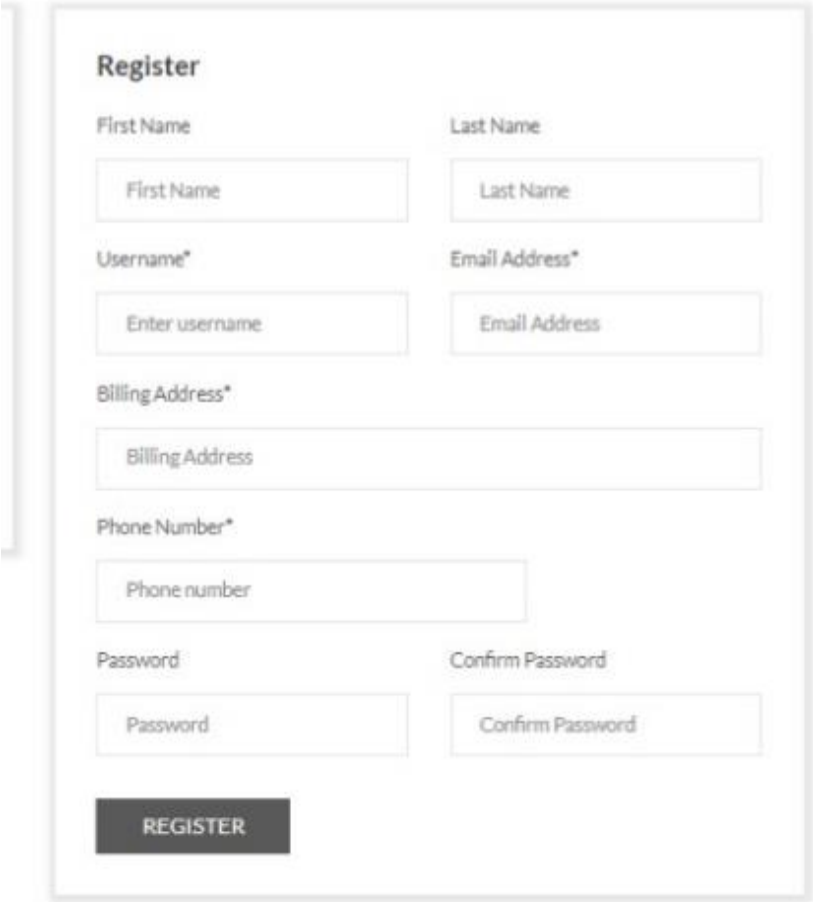



**Figure 5-3 Sign Up Page**

### 5.2.2 Login Page

We started the project by creating a web page that is our login page. Firstly, the user has to be signed up and if he already has an account, he enter his email and password and click on Log in button he will allowed to Log in. Login page is same as for admin.

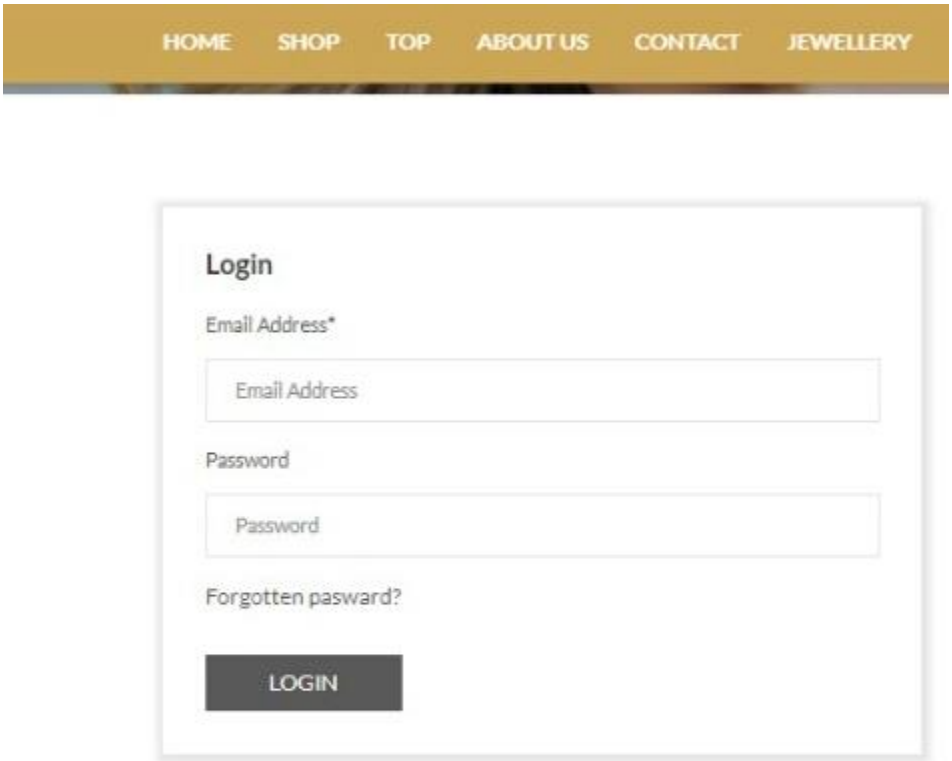



**Figure 5-4 Login Page**

### 5.2.3 Forgot Password

If user forgot the password, he will click on forgot password then he will redirect to the page where user add there email and submit it after that user get a email on their website where it get the password and then login and proceed further.

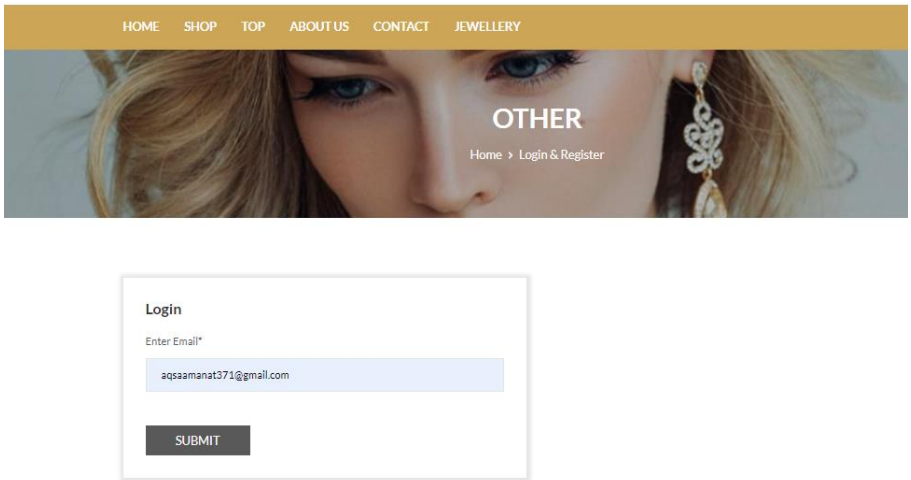



**Figure 5-5 Forget Password**

### 5.2.4 Home page

When user will create their own account and account is verified the user can view home page. On the home page main pages are displayed. All categories of jewllery item are also shown on this page.

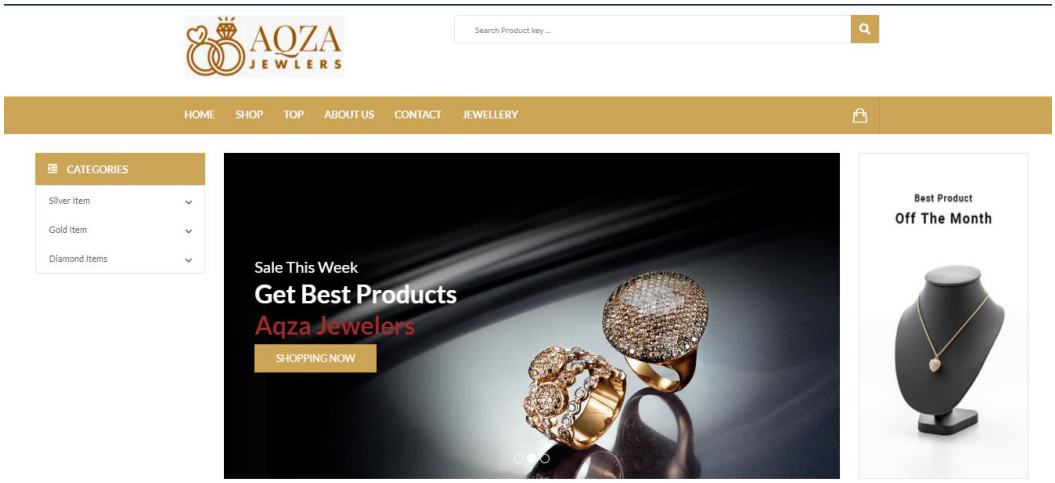



**Figure 5-6 Home Page**

### 5.2.5 About Us

About us page contain information of our website. When user click on Shop Now, he will redirect to homepage.

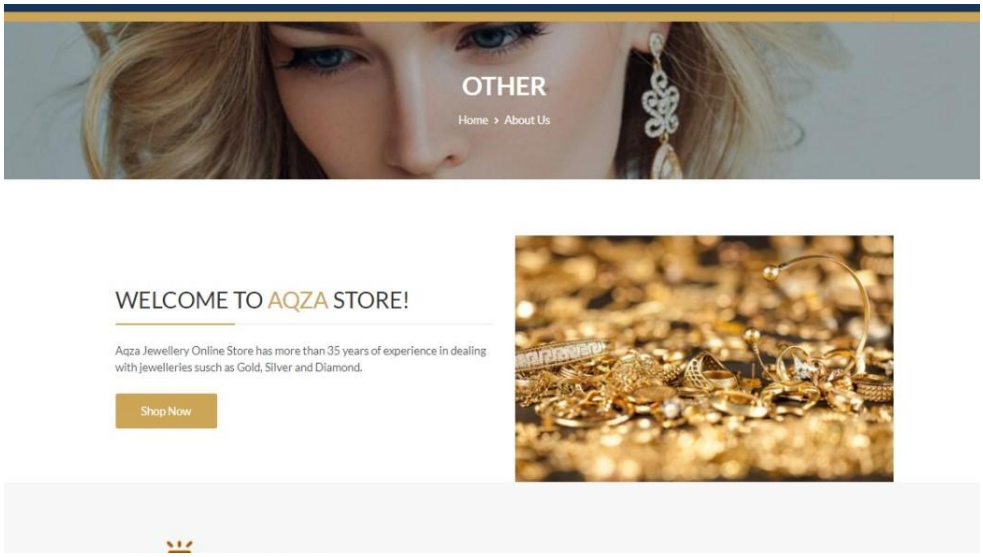



**Figure 5-7 About Us Page**

### 5.2.6 Contact Us

If user wants to give any suggestions or user have any issue he can contact with admin through contact us page. We also add the validation in every inputs.

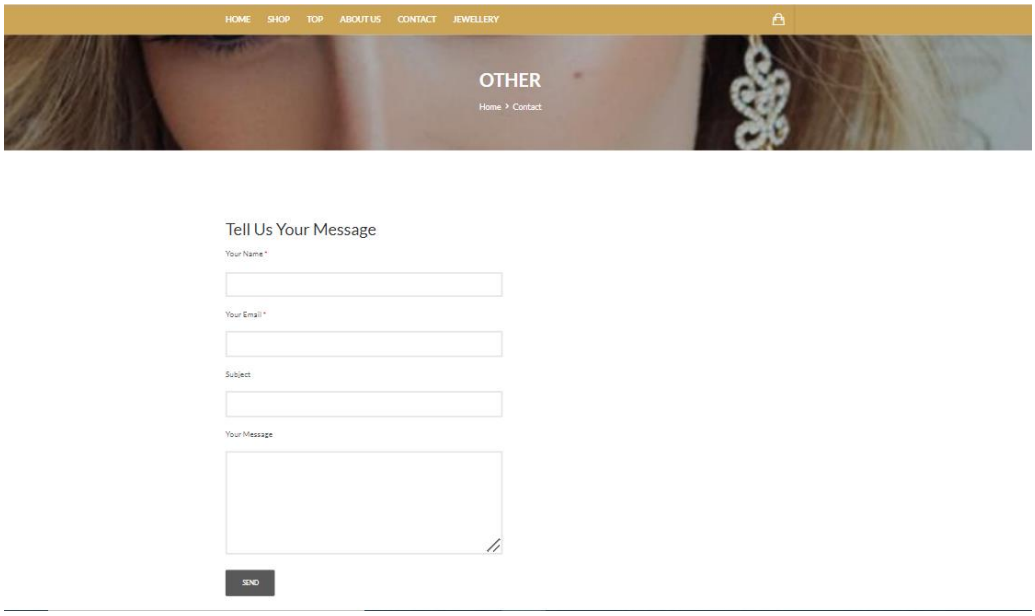



**Figure 5-8 Contact Us Page**

### 5.2.7 Top product page:

The products that are mostly viewed product by the user are in the top page.

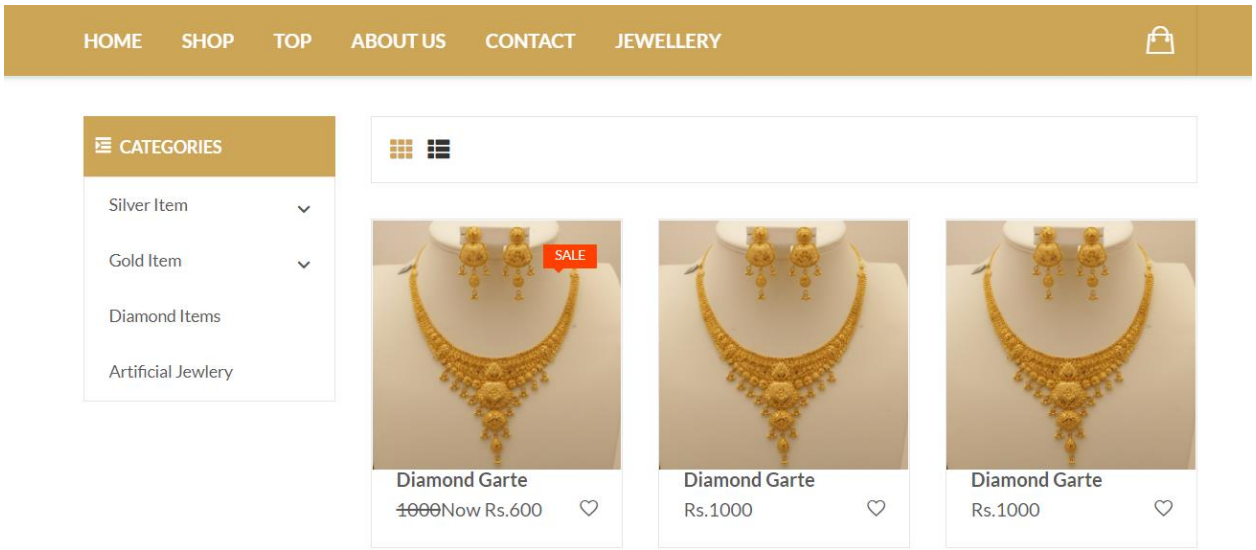



**Figure 5-9 Top Product Page**

### 5.2.8 Favorites

In the favorites page User can see his wish list products and also they will buy these products.

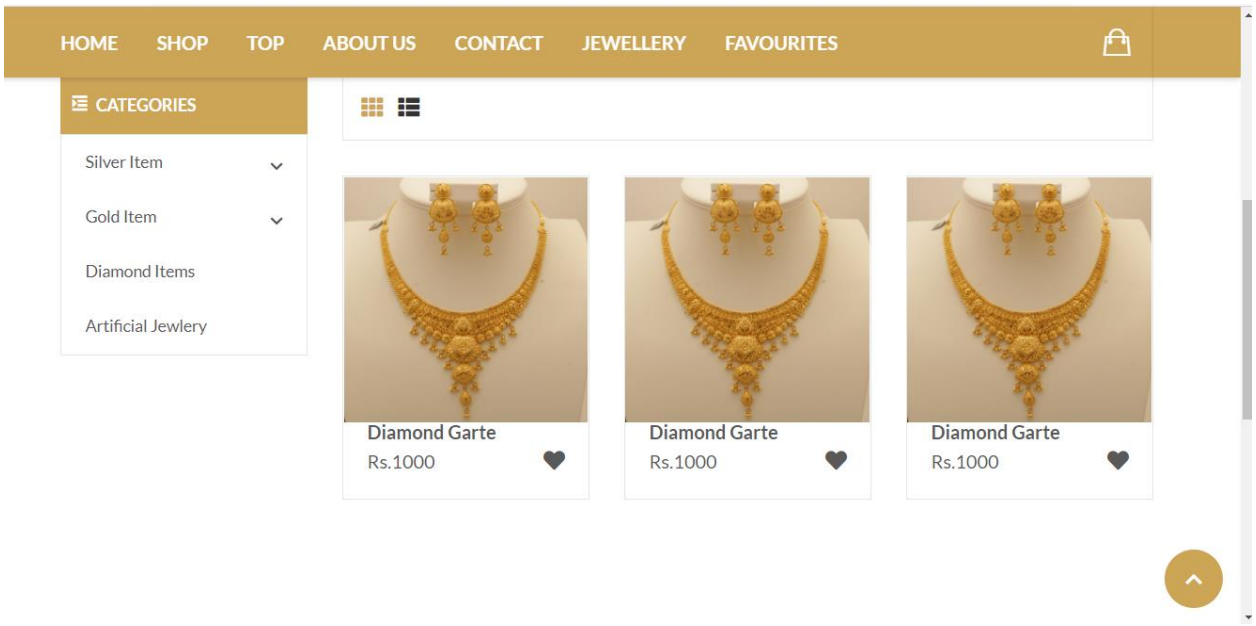



**Figure 5-10 Favorites Page**

### 5.2.9 Shopping Cart

User can see the shopping cart.

**Figure 5-11 Shopping Cart**

### 5.2.10 Mini cart

When user click on minicar button he can see his order in minicar. User can delete and update his order in minicar and then proceed to checkout.

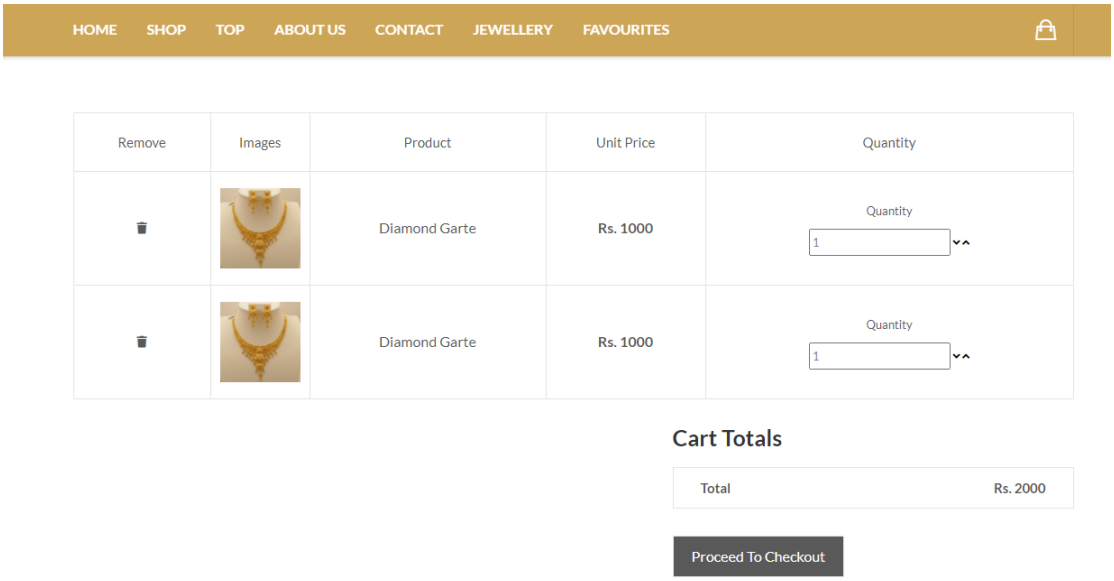



**Figure 5-12 Mini Cart**

### 5.2.11 Checkout

When user click on checkout button. Checkout page will show to him and where he add his billing address and proceed to checkout.

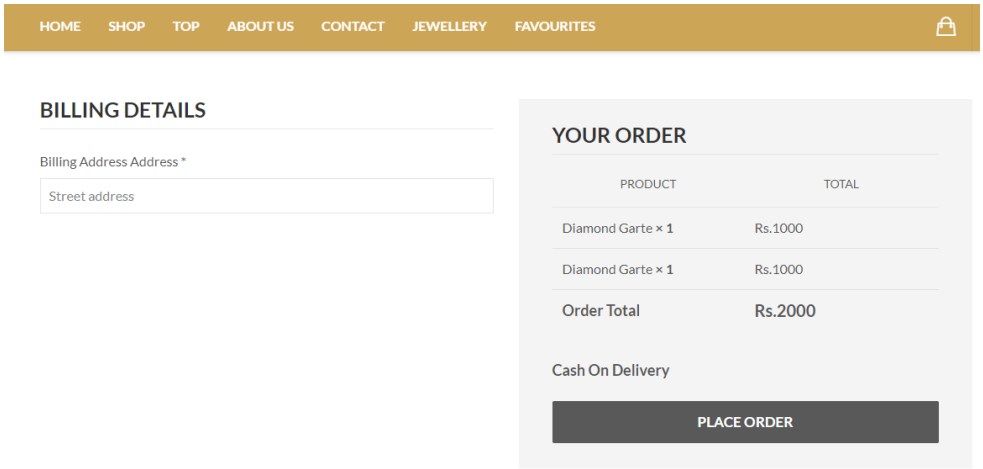



**Figure 5-13 Checkout**

### 5.2.12 My Account

User can view his account detail by clicking on my account. User can view his pending orders that are not proceed to checkout. In order page there is button user will clicked on it when has received

order. Address page show the address of user. Account detail page contain all information of user. User can change his information through this page. User have authority to change password for his security. User also logout from this page.

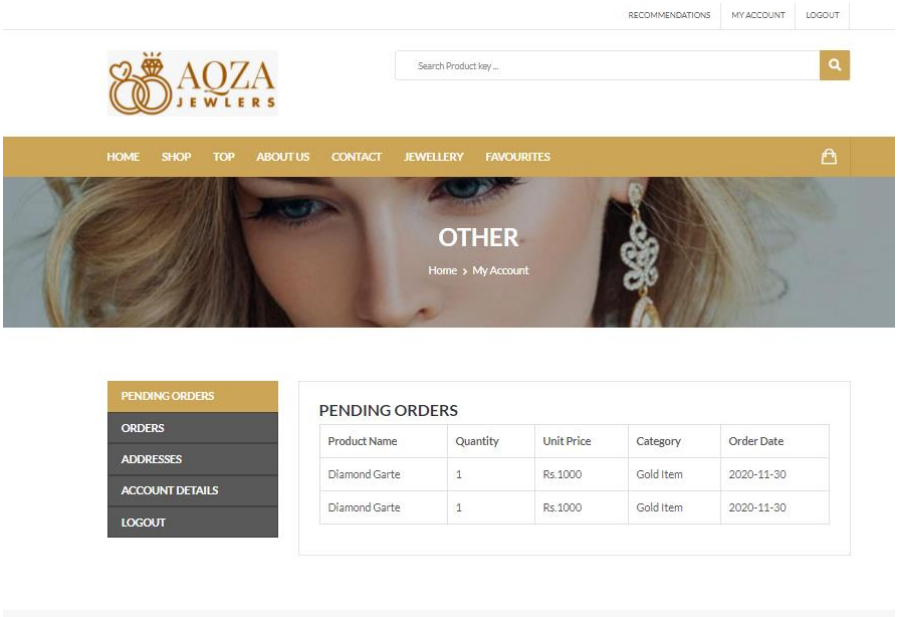



**Figure 5-14 My Account**

## 5.2.13 Admin Login

Admin will enter his email and password to login.

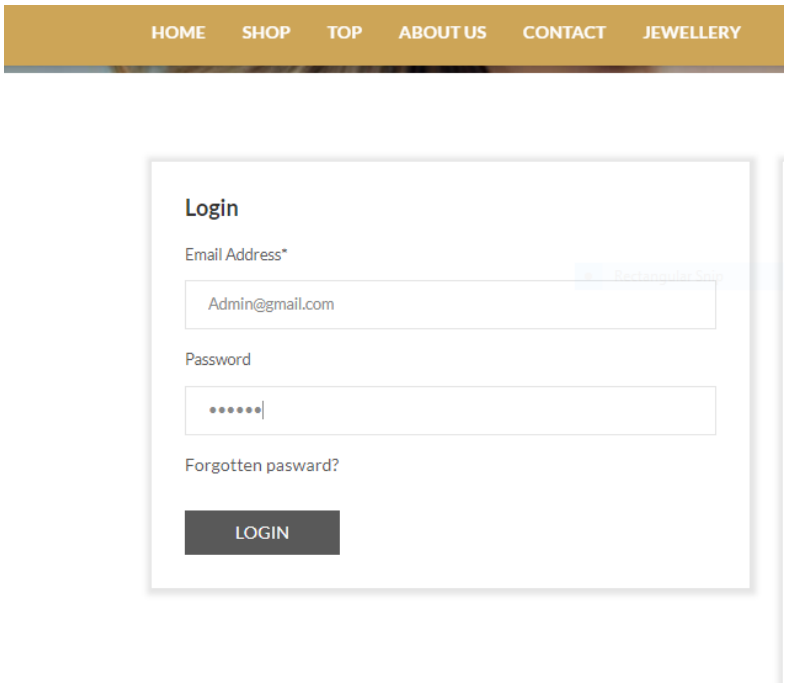



**Figure 5-15 Admin Login Page**

## 5.2.14 Admin Dashboard

After login admin view the dashboard where it can see the overall view of the products, orders, messages, categories, subcategories and employees.

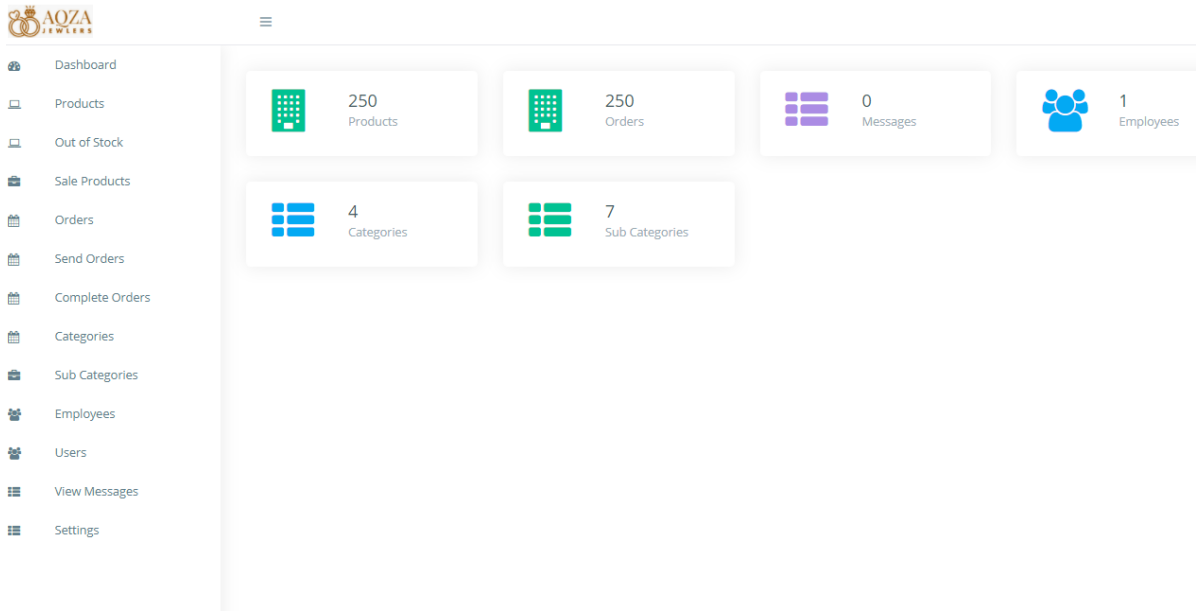
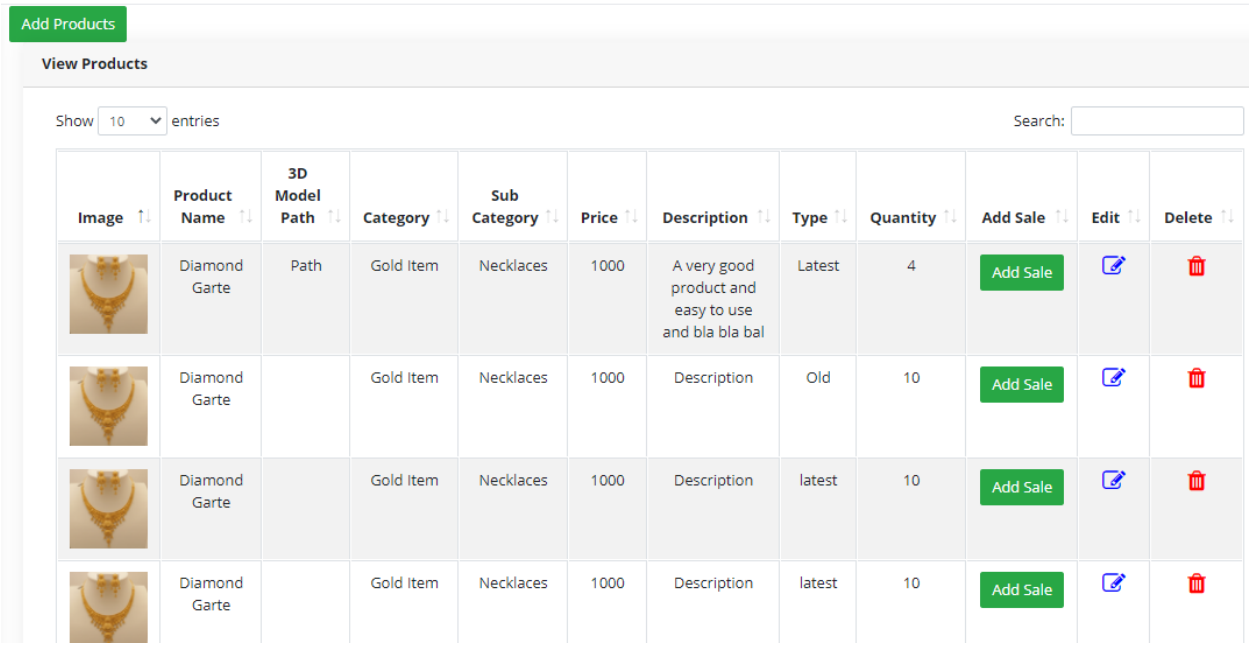



**Figure 5-16 Admin Dashboard**

## 5.2.15 Products Page




| Image | Product Name | 3D Model Path | Category | Sub Category | Price | Description | Type | Quantity | Add Sale | Edit | Delete |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diamond Garte | Path | Gold Item | Necklaces | 1000 | A very good product and easy to use and bla bla bal | Latest | 4 | Add Sale | | |
| | Diamond Garte | | Gold Item | Necklaces | 1000 | Description | Old | 10 | Add Sale | | |
| | Diamond Garte | | Gold Item | Necklaces | 1000 | Description | latest | 10 | Add Sale | | |
| | Diamond Garte | | Gold Item | Necklaces | 1000 | Description | latest | 10 | Add Sale | | |

**Figure 5-17 Products Page**

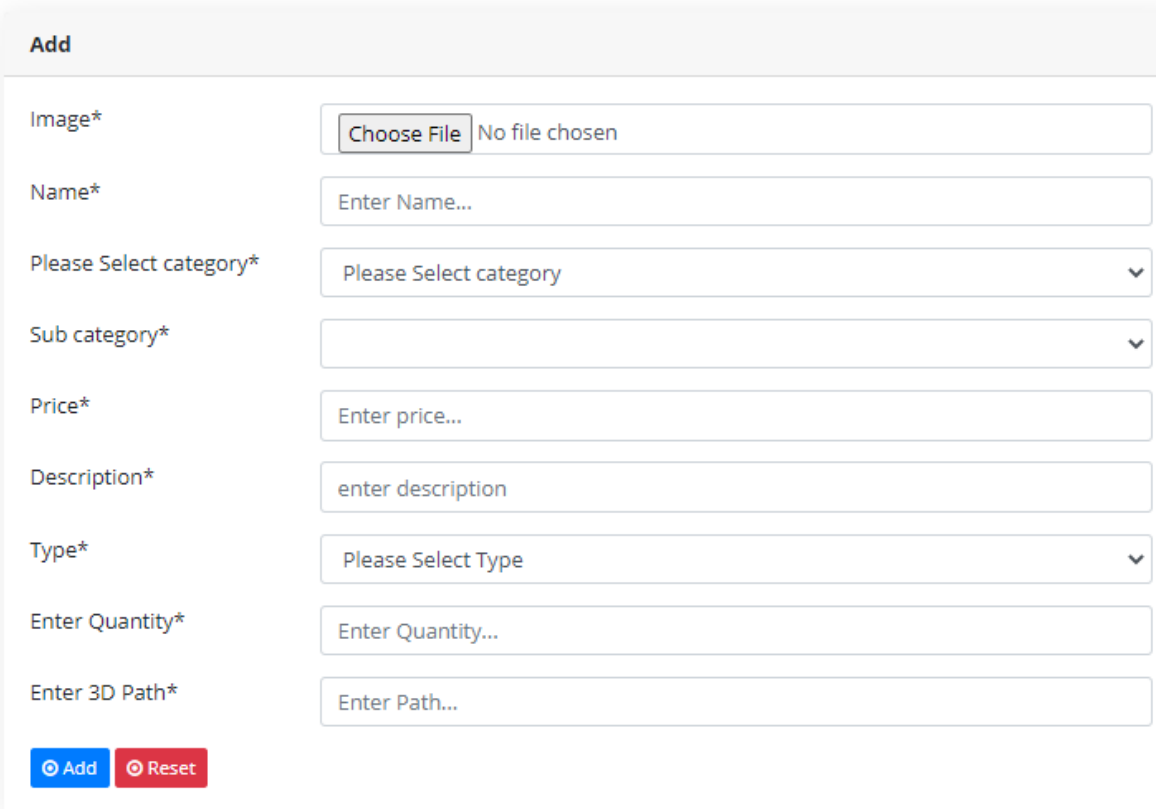



**Figure 5-18 Add Product Page**

Admin can view, update and delete products. Admin can also add the sale in the product page. Admin add the product by putting information in fields as put the image or choose the file which will added and all required information.

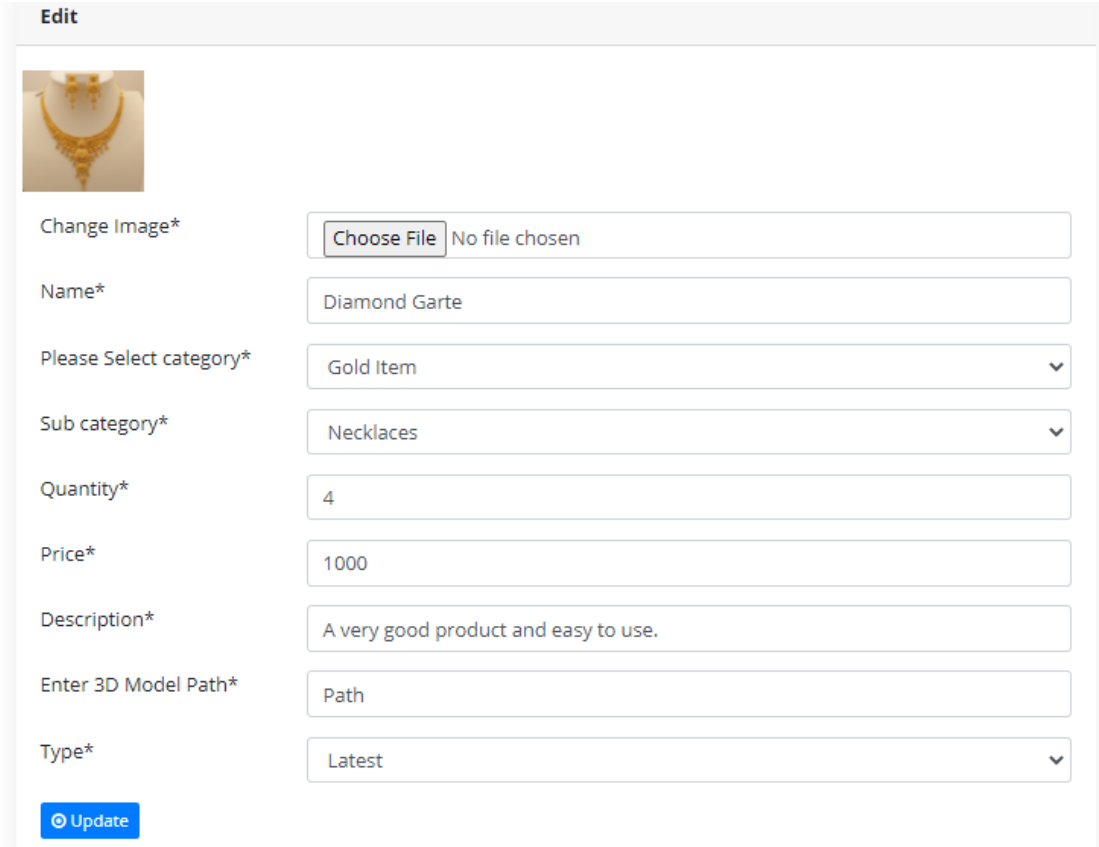



**Figure 5-19 Edit Product Page**

## 5.2.16 Orders

Admins view the orders.

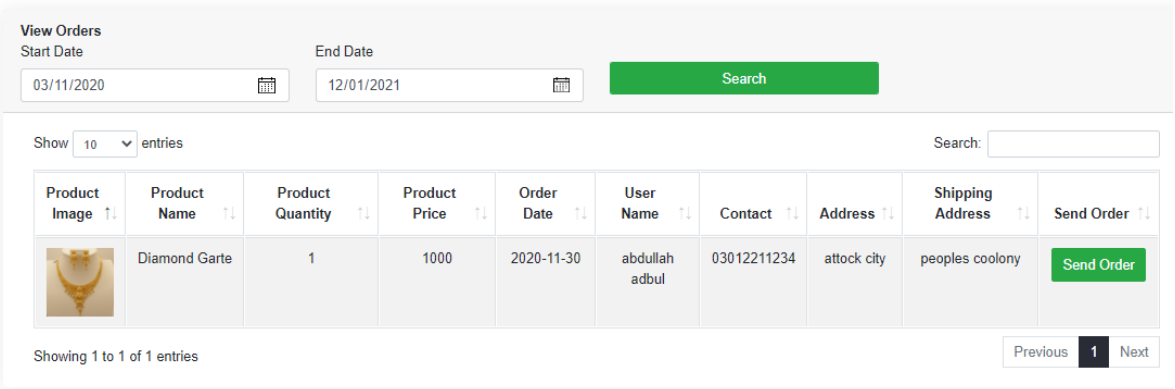



**Figure 5-20 Order View Page**

Admins send orders.

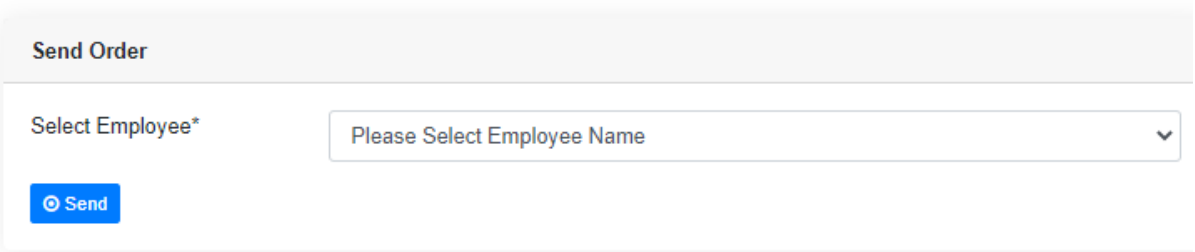



**Figure 5-21 Admin Send Orders**

Admin view sale product

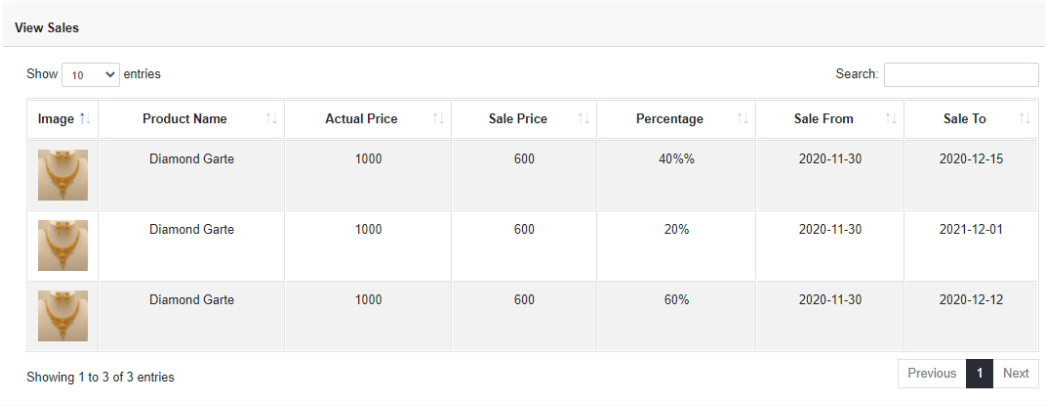



**Figure 5-22 Admin View Sale Product**

Admin view, add and update the categories.

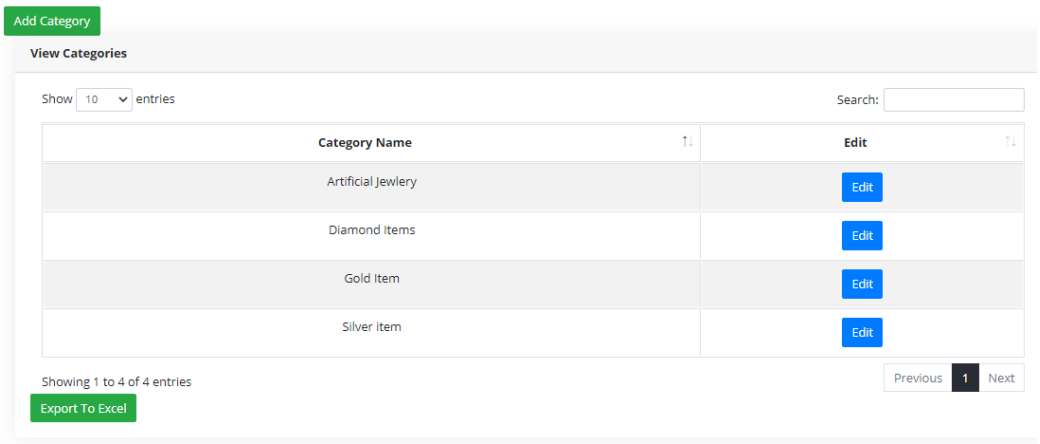



**Figure 5-23 CRUD Categories**

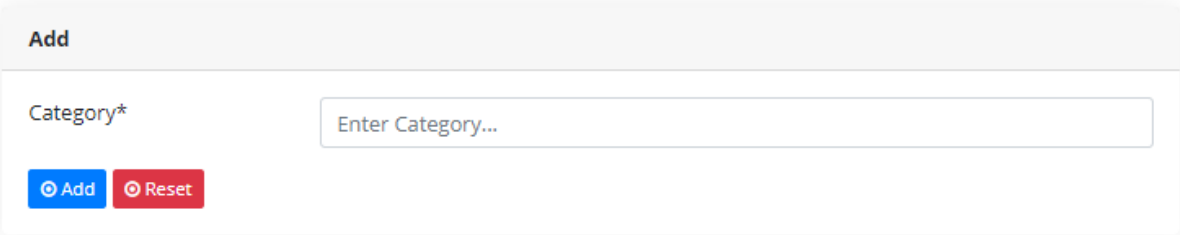



**Figure 5-24 Add Category**

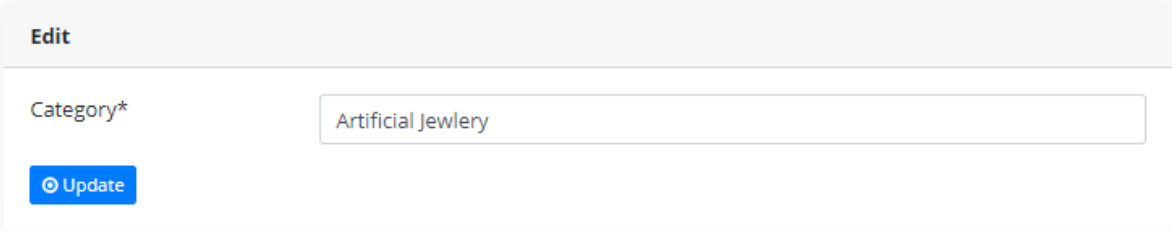



**Figure 5-25 Edit Category**

Admin view, add and update the subcategories.

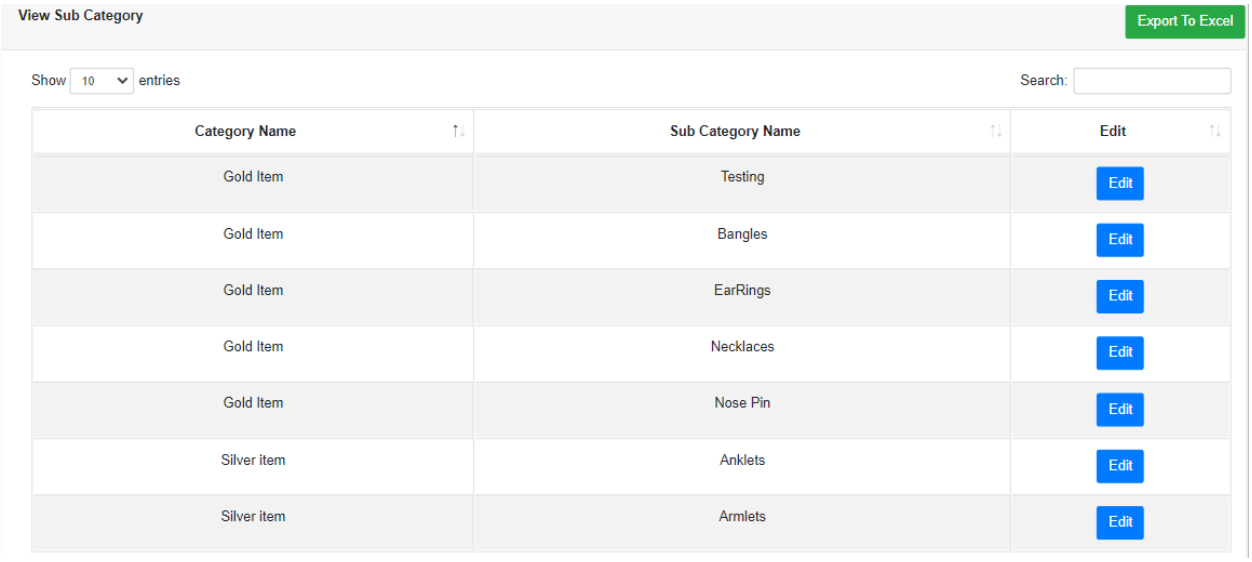



**Figure 5-26 CRUD Sub Categories**

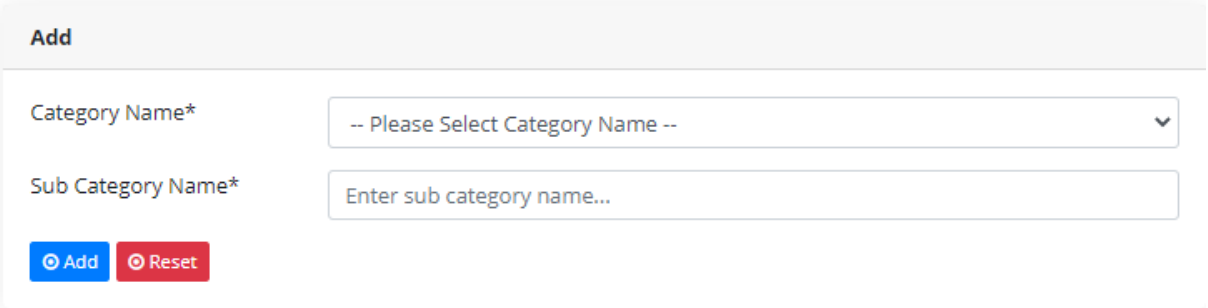



**Figure 5-27 Add Sub Category**

## 5.3 Employee

Admin view, add and update the employees.

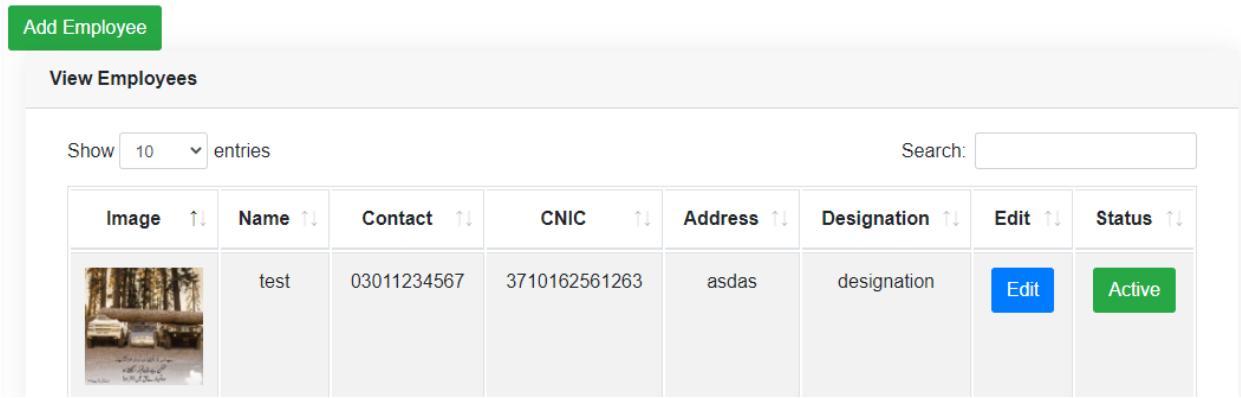



**Figure 5-28 Add Employee**

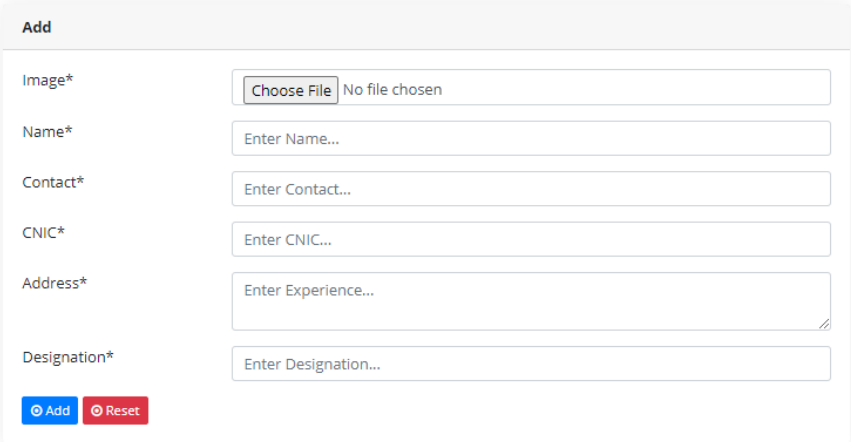
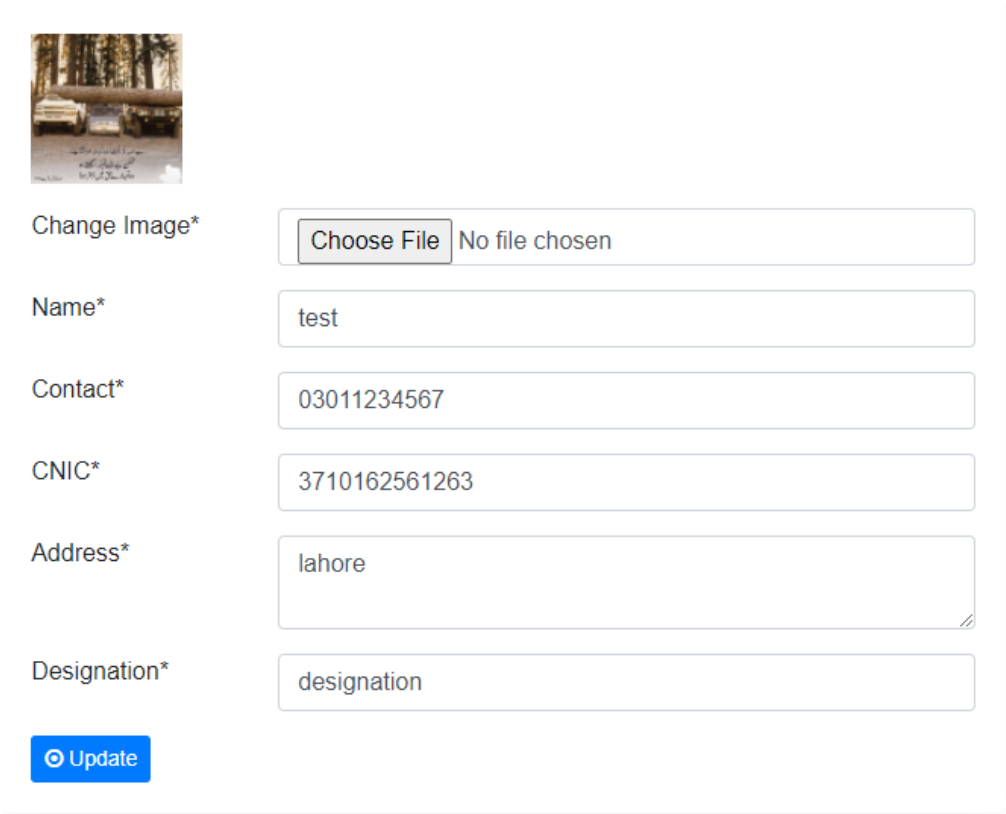
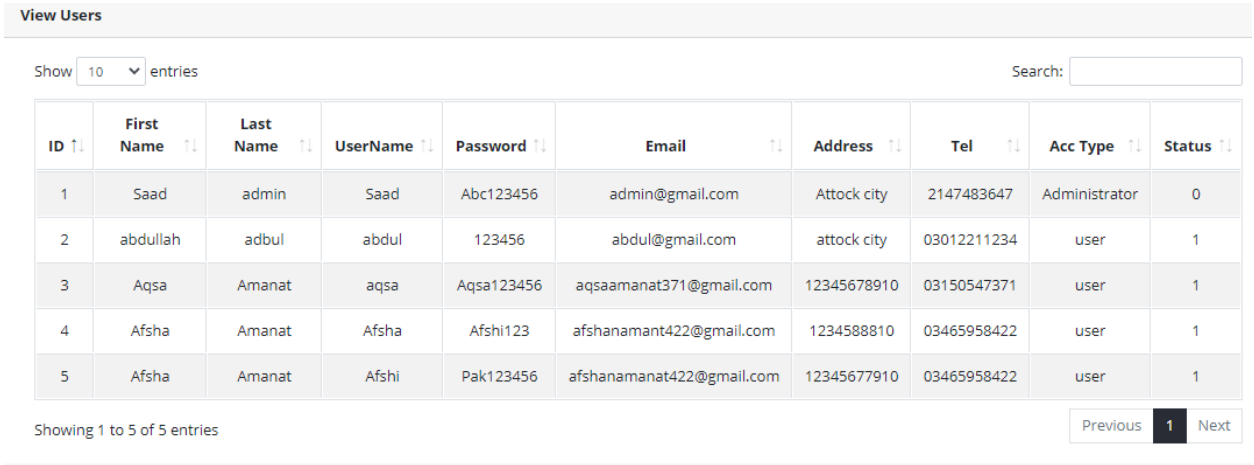



**Figure 5-29 Data for Add Employee**




Admin view users.




| ID | First Name | Last Name | UserName | Password | Email | Address | Tel | Acc Type | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Saad | admin | Saad | Abc123456 | admin@gmail.com | Attock city | 2147483647 | Administrator | 0 |
| 2 | abdullah | adbul | abdul | 123456 | abdul@gmail.com | attock city | 03012211234 | user | 1 |
| 3 | Aqsa | Amanat | aqsa | Aqsa123456 | aqsaamanat371@gmail.com | 12345678910 | 03150547371 | user | 1 |
| 4 | Afsha | Amanat | Afsha | Afshi123 | afshanamant422@gmail.com | 1234588810 | 03465958422 | user | 1 |
| 5 | Afsha | Amanat | Afshi | Pak123456 | afshanamanat422@gmail.com | 12345677910 | 03465958422 | user | 1 |

**Figure 5-30 Admin View Users Page**

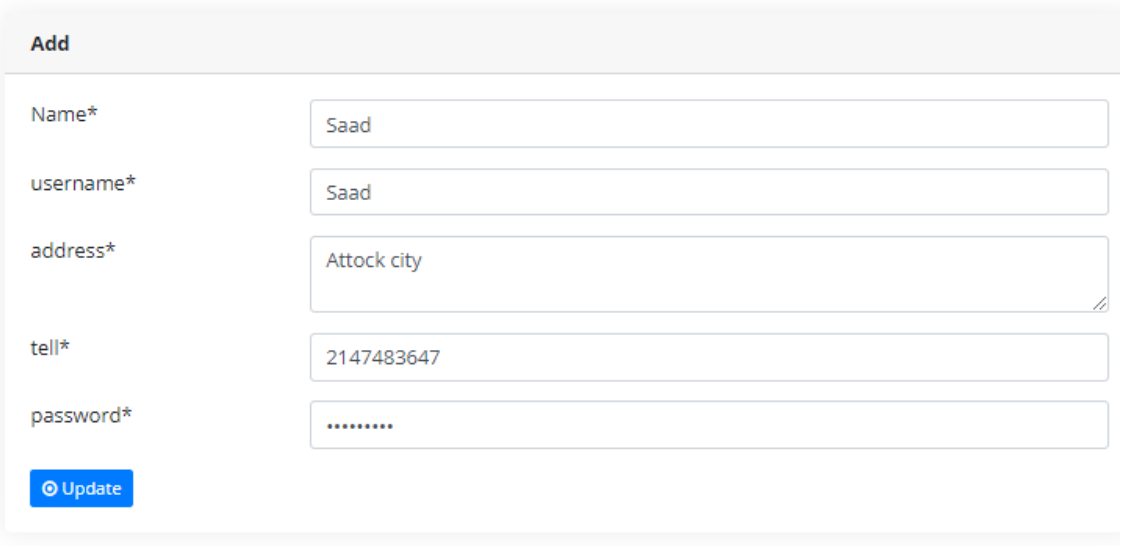



**Figure 5-31 User Details**

Admins view the messages

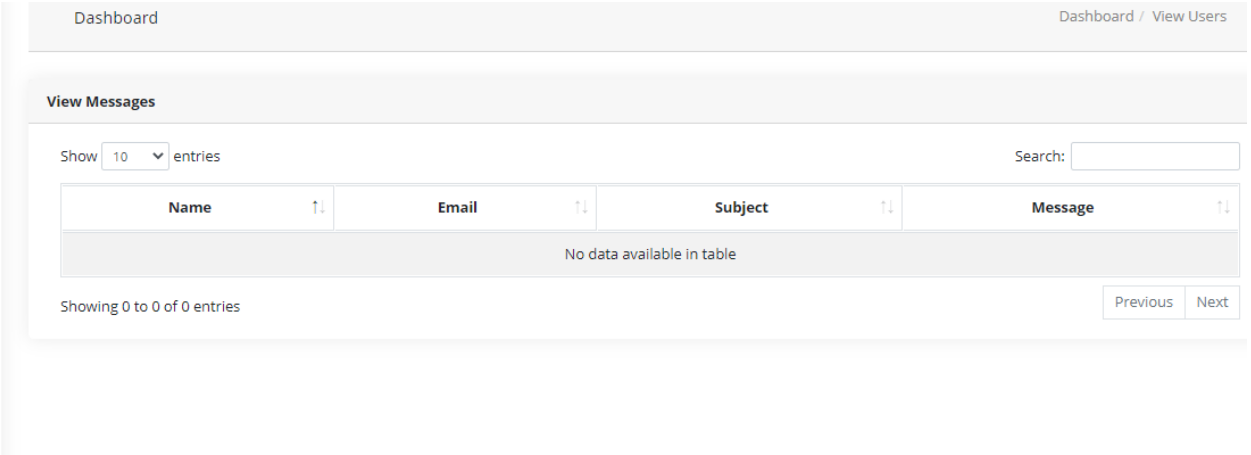



**Figure 5-32 View Message Page**

## 5.4 Recommender Algorithm

Users personalization and profiling plays very important role for the successful web sites. Personalized recommender are getting more popular with the evaluation of technology and internet. Now a days recommender system are most successful application of machine learning in the field of business recommendation is the automate form of a "Shop counter guy", it has the ability to predict whether a particular user would buy, like or view an product, video , post and others, or may not it will recommend the relevant items considering the different parameters like on the history bases, purchased item on view , like or dislike to particular users for example movies to watch, text to read, products to buy or anything else depending on industries. Recommendation system basically are data filtering tools that make use of algorithms and data to recommend the

most relevant items to the use. It is beneficial to both service providers and users. Recommender system also reduce the transaction cost of searching and selecting item in an online shopping environment. There are main Six types of recommender that works primarily in media and entertainment industries.

As from the above evidence recommender system is beneficial to the users it helps users to buy product easily so we are decided to implement the recommender system in the website so we decided to use the recommender system in our AQZA jewelers website so we used the collaborative filtering algorithm.

Collaborative filtering depends on the like or desire of the other users, in this we calculate the similarity index between users and then recommend products to users accordingly, basically it matches the similar user on the bases of similar taste. Using this concept we implement the user based collaborative filtering by using the parameter of user rating on the jewelry item.

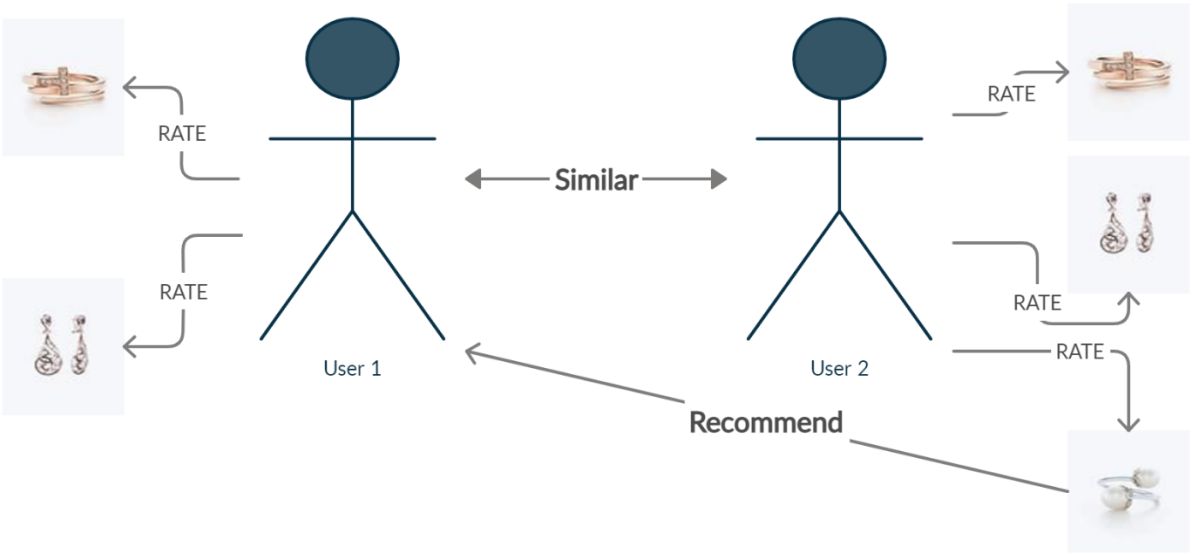



**Figure 5-33 user base collaborative filtering**

## 5.5 Implementation steps to implement recommender:

We follow these steps to implement recommender system is shown below:

### 5.5.1 Getting Ratings from the users:

We get the ratings from the users of every product along with the reviews. We cannot restrict our user to add ratings, user have own choice but for user must be login or register there self in the system to add the rate the any jewelry . We also show the reviews of other users to help the user to buy the product or not if they are new to our website.

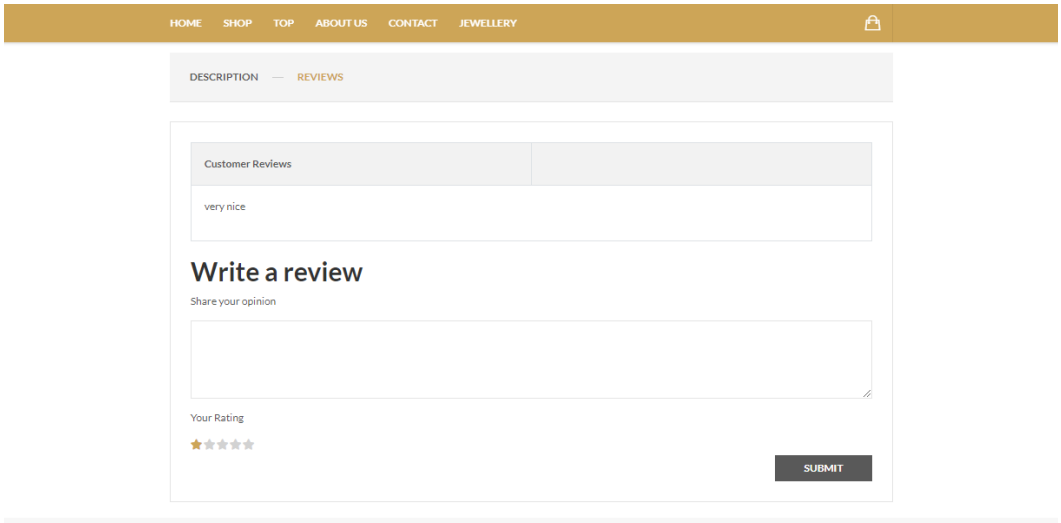



**Figure 5-34 User's review and rating**

### 5.5.2 Store rating in the database tables:

After user add rating in any product that record will be store in the database to used it further for the recommendation. We store the following information of every user in the database: reviews, total reviews, people (how many reviews in total), review message, we fetch user id and product id, status and user Rate.

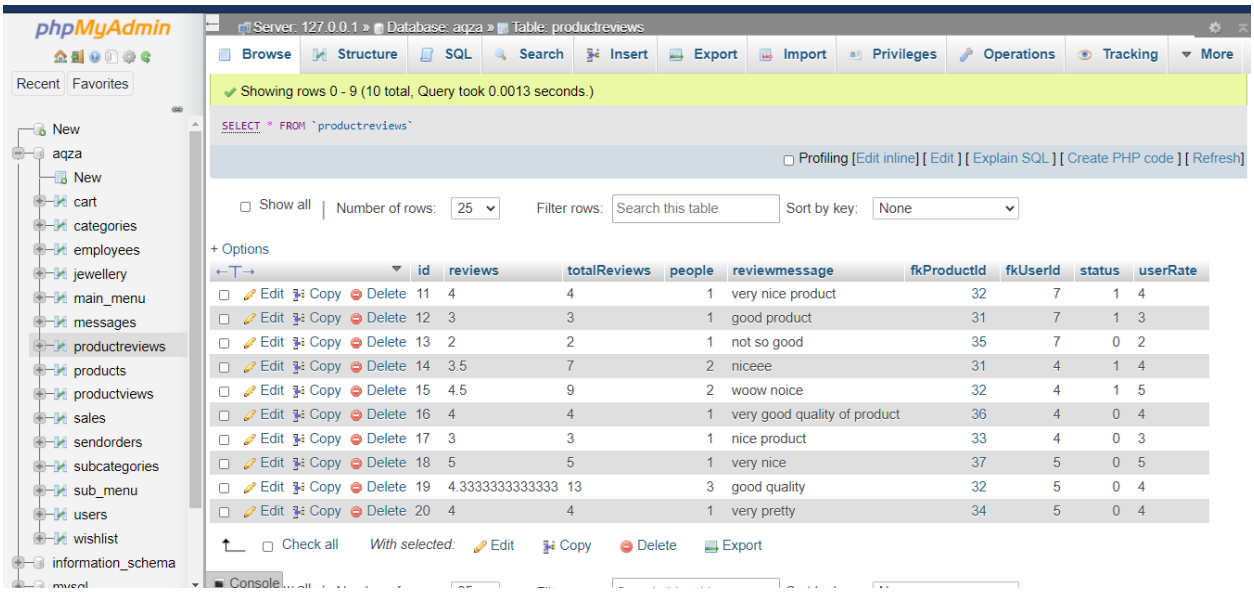



**Figure 5-35 Store rating in the database tables**

### 5.5.3 Create Matrix of every user:

After storing the ratings in the database table we have to make the matrix of every user to we create the matrix because we want to generate the product name and rating for each user so the data can be compare and access later for the calculation of similarity. As shown in the figure we fetch every username and make array in which we fetch the product name along with the ratings that is given by the users on different products.

```
Array
(
    [jamil] => Array
        (
            [Gold EarRings] => 4
            [Diamond Garte] => 3
            [Silver EarRings] => 2
        )

    [humi] => Array
        (
            [Diamond Garte] => 4
            [Gold EarRings] => 5
            [Diamond EarRing] => 4
            [New gold Ear ring] => 3
        )

    [arshii] => Array
        (
            [Diamond Garte] => 1
            [Gold EarRings] => 4
            [Silver Ring] => 4
        )

    [fiz123] => Array
        (
            [Gold EarRings] => 5
            [Silver Ring] => 5
            [Diamond Garte] => 2
        )

    [tahir] => Array
        (
```

**Figure 5-36 Matrix of Every User**

### 5.5.4 Similarity Calculations:

We use the distance formula to calculate the similarity among the users.

$$d(x, y) = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}$$

To calculate the similarity of one user we used this code.

1.php (aqza) - Brackets

Navigate Debug Help

```php
<?php

function  similarity_distance($matrix,$person1,$person2)
{
    $similar=array();
    $sum=0;
  foreach($matrix[$person1] as $key=>$value)
  {
      if(array_key_exists($key,$matrix[$person2]))
         {
          $similar[$key]=1;


         }
  }
      if($similar==0)
      {
          return 0;

      }
     foreach($matrix[$person1] as $key=>$value)
  {
      if(array_key_exists($key,$matrix[$person2]))
         {
          $sum=$sum+pow($value-$matrix[$person2][$key],2);



         }
  }

    return 1/(1+sqrt($sum));

}

function getRecommendation($matrix,$person)
{

  foreach($matrix as  $otherPerson =>$value)
  {
      if($otherPerson != $person)
      {
          $sim = similarity_distance($matrix,$person,$otherPerson);
          var_dump($sim);


      }
  }

```

**Figure 5-37 Code Snippets for Similarity Calculation**

```php
<?php
    include("includes/mysqli_connection.php");
 include("1.php");
   $products=mysqli_query($db_conx,"select * from productreviews");

  $matrix=array();
 while($product=mysqli_fetch_array($products))
    {
      $users= mysqli_query($db_conx,"select username from users where user_id=$product[fkUserId]");
      $user1= mysqli_query($db_conx,"select productName from products where productId=$product[fkProductId]");
      $username1= mysqli_fetch_array($user1);

       $username= mysqli_fetch_array($users);


        $matrix[$username['username']][$username1['productName']]=$product['userRate'];


    }


 var_dump(getRecommendation($matrix,"fiz123"));

 ?>
```

## 5.5.5 OUTPUT:

This output is for the username fiz123 are given below:

```
float(0.5) float(1) float(0.23166247903554) float(0.30901699437495)
```

**Figure 5-38 Output Window**

### 5.5.6 Collaborative Filtering

For this we use the formula of collaborative filtering that is:

$$p_{(U,i)} = \frac{\sum_{N€similarTo(i)}(S_{iN} \times R_{uN})}{\sum_{N€similarTo(i)} (|S_{i\,N}|)}$$

Here u means that user and i is item , here we are going to predict the rating that is given by the user u that will give by the item, $R_{uN}$ is the rating user u against the item I and $S_{uN}$ is the similarity the item I and n.

In this we predict the product along with rating to the one user

Following code is used to implement this formula:

```php
function getRecommendation($matrix,$person)
{
    $total=array();
    $simsums=array();
    $ranks=array();

  foreach($matrix as  $otherperson =>$value)
  {
      if($otherperson!=$person)
      {
          $sim = similarity_distance($matrix,$person,$otherperson);

            foreach($matrix[$otherperson] as $key=>$value)
          {
            if(!array_key_exists($key,$matrix[$person]))
            {
                if(!array_key_exists($key,$total))
                {
                    $total[$key]=0;

                }

                    $total[$key]+=$matrix[$otherperson][$key]*$sim;

                    if(!array_key_exists($key,$simsums))
                    {
                        $simsums[$key]=0;
                    }
                    $simsums[$key]+=$sim;

            }

          }


      }
  }

     foreach($total as $key=>$value)
     {
         $ranks[$key]=$value/$simsums[$key];

     }
     array_multisort($ranks,SORT_DESC);
         return $ranks;
```

**Figure 5-39 Collaborative Filtering Implementation**

```php

<?php
   include("includes/mysqli_connection.php");
 include("1.php");
  $products=mysqli_query($db_conx,"select * from productreviews");

 $matrix=array();
 while($product=mysqli_fetch_array($products))
   {
     $users= mysqli_query($db_conx,"select username from users where user_id=$product[fkUserId]");
     $user1= mysqli_query($db_conx,"select productName from products where productId=$product[fkProductId]");
     $username1= mysqli_fetch_array($user1);

      $username= mysqli_fetch_array($users);


       $matrix[$username['username']][$username1['productName']]=$product['userRate'];


   }


 var_dump(getRecommendation($matrix,"fiz123"));

 ?>
```

## 5.5.7 Output

This is output for the username fiz123.

```
?> array(3) { ["Diamond EarRing"]=> float(4.4810723697728) ["New gold Ear ring"]=> float(3) ["Silver EarRings"]=> float(2) }
```

**Figure 5-40 Output of Collaborative Filtering Code**

Now we calculate the prediction about every user, following code is used to calculate the prediction about the user that is login into the our system.

```
        $username= mysqli_fetch_array($users);


         $matrix[$username['username']][$username1['productName']]=$product['userRate'];


     }



  $userId = $_SESSION['userId'];
 $users=mysqli_query($db_conx,"select username from users where user_id=$userId");
 $username=mysqli_fetch_array($users);



 ?>



         <div class="container-fluid">
             <h2 class="head" >Porducts you may like</h2>
         <table class="table">
             <th> Product Name</th>
             <th> Product Rating</th>


             <?php
             $recommendation=array();
             $recommendation=getRecommendation($matrix, $username['username']);

             foreach($recommendation as $product=>$rating)
             {
             ?>
             <tr>

                 <td><?php echo $product; ?> </td>
                 <td><?php echo $rating; ?> </td>


             </tr>
             <?php } ?>
         </table>
         </div>
```

Line 116, Column 10 — 313 Lines  INS  UTF-8  PHP  Spaces: 4

**Figure 5-41 Code snippets for prediction about the user**

### 5.5.8 Final Output:

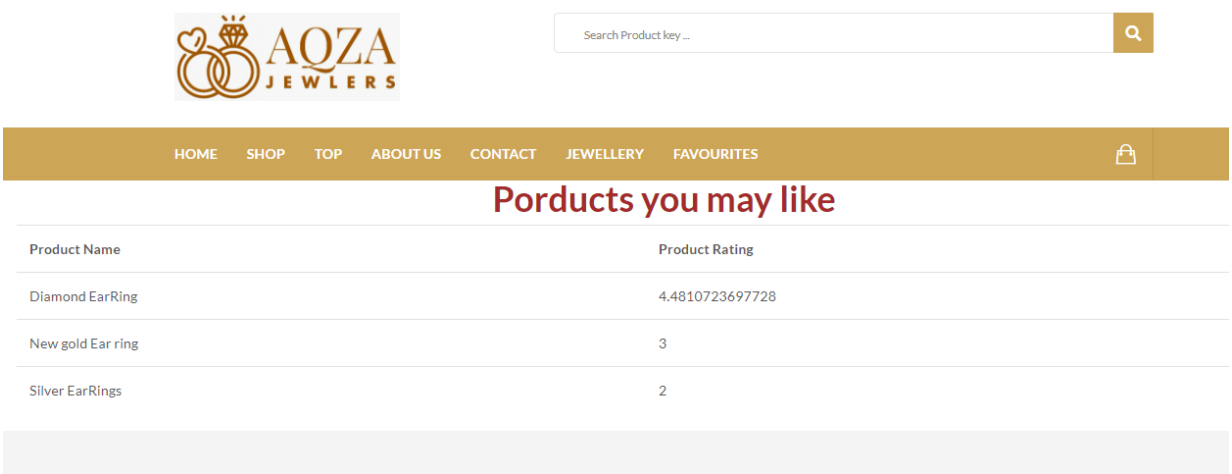



**Figure 5-42 Output screen after performing recommender algorithm**

## 5.6 3d model Implementation

3D modeling is the use of software to create a virtual three dimensional model of some physical object, we used this in many different industries, virtual reality, video games,3D printing .3D designs allows the designer to see what they would not see in 2D and these object obtained complete replication of real object. We used the different functions of the blender to make these models. Firstly we used extrude function that duplicate vertices, keeping the new geometry connected with the original vertices, then loop Cut and Slide tool creates a cut through the whole loop you select, the subdivision Surface modifier used to split faces of a mesh into smaller faces, to give smooth appearance, we also used the join function selection based that provide the attachment of multiple objects together first they must be selected and named then we apply join function to it to make them one object. We also add the planes for lightning scene to make brighten the image. To view the final output of the model we Render the model in blender, blender will render the model and then window displays output as its being processed basically Rendering is the process of turning a 3D scene into a 2D image and larger we set the value is better the 2d image but the larger the value of model is longer time take to render.

Models that we develop using the above functions and many others

**Figure 5-43 3D model of ring**

**Figure 5-44 3D Model of ring**

**Figure 5-45 3D Model of Bracelet**

**Figure 5-46 3D Model of Ring**

### 5.6.1 Embedding the 3d model into our website

To add the models in our website we first add the polymer JavaScript library in it is an open-source JavaScript library for building web applications using Web Components, after adding the polymer library we can easily use the web component in it, we component is basically it is a custom HTML element built from standard web platform features, it behaves for all intents and purposes. It has a unique tag in it, so we use the model-viewer tag of the web component to add the 3d model in it. Using the model-viewer tag it will give the better rendering quality than the other methods, this tag only used the extension of .glob which is export from any 3d software, we also add the auto-rotate and 360 degree view property by using this tag.

After adding this we also must add the model in the database by using the inserting query and to show in the browser fetch query is used.

Following are the main code:

```php
<?php require("partials/header.php");
   if(isset($_GET['productId']))
   {
       $idProd  = $_GET['productId'];
       $_SESSION['productId'] = $idProd;
   }
   else
   {
   $idProd  = $_SESSION['productId'];
   }
   $queryProd = "SELECT *from products where productId='$idProd'";
   $runQueryProduct = mysqli_query($conn,$queryProd);
   $rowQueryProduct = mysqli_fetch_array($runQueryProduct);
?>


    <div align:center>
                <model-viewer id="reveal" loading="eager" camera-controls auto-rotate src="3D_Models/<?php echo $rowQueryProduct['3d_model_path']?>"
                alt="A 3D model of jewelry></model-viewer>

            </div>
```

**Figure 5-47 Code for embedding 3D model into the website**

## 5.6.2 Output

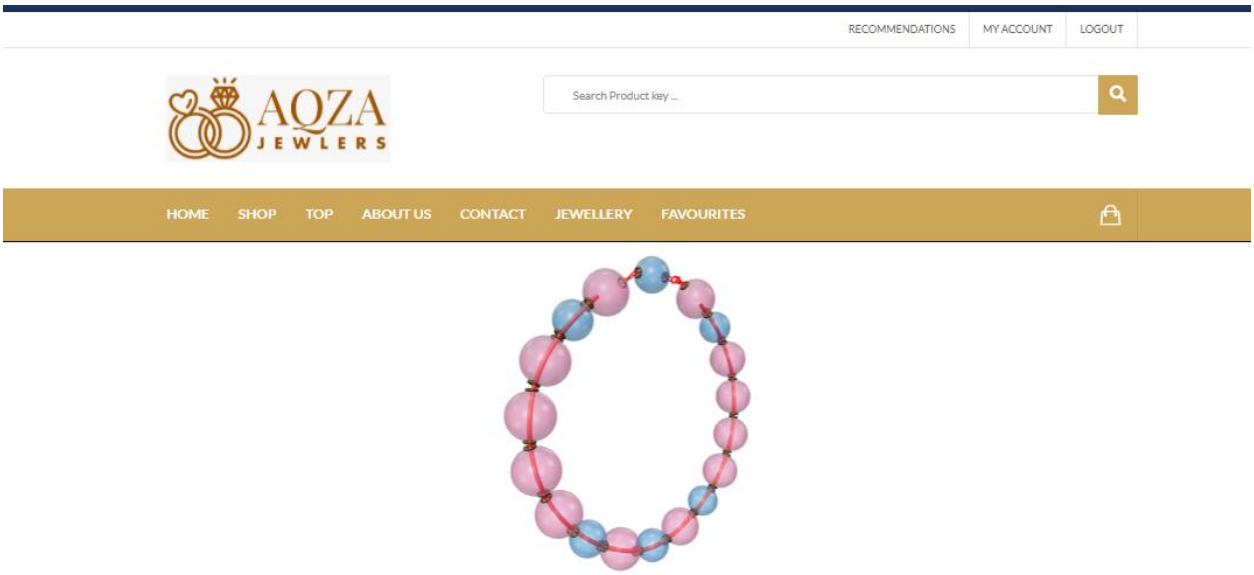



**Figure 5-48 Output after Adding 3D model**

# CHAPTER 6
# SYSTEM TESTING

# 6 System Testing

In system testing a complete and integrated system is tested. Our focal point throughout the designing and implementation was to test each unit. User activities regarding with user's registration properly tested and stored in database. Validation and verification are very important process where we will validate each module in case if user enter any wrong entry in desired field.

## 6.1 Unit Testing

IT'S a level where we test each individual component while being developed for the conformance to desired requirement. This testing was applied to both feedback and registration portions in case if our user enters some incorrect value then a message will be shown to put correct entry. We applied validation process on our input field. we also check the conformance of correct value to be entered in database.

## 6.2 System Testing

We have focused on thorough testing through-out the design and implementation phase while testing the user and admin all the other activity that they perform should be stored in database. Evaluation contains the testing of each and every module of the system and checking the errors which occur into the database while putting some entries into it or the interface problem.

| | |
|---|---|
| **Test Case:** 1.0 | **Test Case Name:** User Login (Valid) |
| **System:** 3D Jewelery Shop with Recommender | **Subsystem:** Register user,admin |
| **Designed by:** Aqsa Amanat,Fizza Qaseem | **Design Date:** 10/03/2020 |
| **Executed by:** Aqsa Amanat | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing user Login with valid data. | |

**Pre-Conditions:**

- User have valid Email.
- User have a correct password.
- User have an already created account.

| Steps | Actions | Expected System Response | Pass/Fail |
|---|---|---|---|
| 1 | Users enter Invalid email | Show error message "Please enter valid email. | Fail |
| 2 | User enter invalid password. | Show error message "Please enter valid password | Fail |
| 3 | Enter valid password. | | |
| 4 | Users click on login button | System displays the home page of profile setting. | Pass |

**Post-Conditions:**

- System must not be logged in with invalid data. System stays on login page.

| | |
|---|---|
| **Test Case:** 2.0 | **Test Case Name:** User Register Invalid |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Register user,admin |
| **Designed by:** Aqsa Amanat,Fizza Qaseem | **Design Date:** 10/03/2020 |
| **Executed by:** Aqsa Amanat | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing user registration with invalid data. | |

**Pre-Conditions:**

- User have invalid mobile number.
- User have an invalid email address.
- User have a registered email address.
- User have invalid name.
- Password should be match with confirm password.
- User should be at sign up page of the website.

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on sign up button. | System displays a registration form | Pass |
| 2 | Users enter the existing Email. | System shows error message "Email already exist". | Pass |
| 3 | User enters the 9 character password. | System shows error" Password must be at least 9 character" | Pass |
| 4 | User Enter invalid Email format/ same email. | System shows "Email already exist" | Pass |
| 5 | Users enter number in name field. | System shows error "Please Enter correct name" | Pass |
| 6 | User Click on Sign up button | System shows error "One or more field is missing or incorrect" | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information and user detail will not store into database.

| | |
|---|---|
| **Test Case:** 3.0 | **Test Case Name:** Login |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Admin |
| **Designed by:** Aqsa Amanat | **Design Date:** 13/03/2020 |
| **Executed by:** Aqsa Amanat | **Execution Date:** 14/03/2020 |
| **Short Description:** testing user login with valid data. | |

**Pre-Conditions:**

- Admin must be Login.
- Internet must be connected.

| Steps | Actions | Expected System Response | Pass/Fail |
|---|---|---|---|
| 1 | Admins enter Invaild email | Show error message "Please enter valid email. | Fail |
| 2 | Admin enter invalid password. | Show error message "Please enter valid password | Fail |
| 3 | Enter valid password. | | |
| 4 | Admin click on login button. | System displays the home page of profile setting. | Pass |

**Post-Conditions:**

- System must not be logged in with invalid data. System stays on login page.

| | |
|---|---|
| **Test Case:** 3.1 | **Test Case Name:** Admin Sign Up invalid |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Admin |
| **Designed by:** Aqsa Amanat | **Design Date:** 11/03/2020 |
| **Executed by:** Fizza Qasem | **Execution Date:** 11/03/2020 |
| **Short Description:** testing user sign up with invalid data. | |

**Pre-Conditions:**

- Admin have invalid mobile number.
- Admin have an invalid email address.
- Admin have a registered email address.
- Admin have invalid name.
- Password should be match with confirm password.
- Admin should be at sign up page of the website.

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on sign up button. | System displays a registration form | Pass |
| 2 | Admin enter the existing Email. | System shows error message “Email already exist”. | Pass |
| 3 | Admin enters the 9 character password. | System shows error” Password must be at least 9 character” | Pass |
| 4 | Admin enter invalid Email format/ same email. | System shows “Email already exist” | Pass |
| 5 | Admins enter number in name field. | System shows error “Please Enter correct name” | Pass |
| 6 | Admin Click on Sign up Button. | System shows error “One or more field is missing or incorrect”. | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information and user detail will not store into database.

| | |
|---|---|
| **Test Case:** 4.0 | **Test Case Name:** Dashboard Employee |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Add Employee |
| **Designed by:** Aqsa Amanat | **Design Date:** 11/03/2020 |
| **Executed by:** Fizza Qasem | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing adding employees. | |

**Pre-Conditions:**

- Admin enter employee invalid name.
- Admin have invalid address.
- Employee must fill all fields.

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on add employee button. | System displays a registration form | Pass |
| 2 | Admin enters the 10 character address. | System shows error" Address must be at 9 character". | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information.

| | |
|---|---|
| **Test Case:** 4.0 | **Test Case Name:** Dashboard Product |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Add Product |
| **Designed by:** Aqsa Amanat | **Design Date:** 11/03/2020 |
| **Executed by:** Fizza Qasem | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing adding product. | |

**Pre-Conditions:**

- Admin have choose incorrect file.
- Admin have an invalid product name .
- Admin have select correct file. .
- Admin have select subcatgory.
- Password should be match with confirm password.
- Admin should be at add product page of the website.

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on add products button. | System displays a form. | Pass |
| 2 | Admin enter alphabets in product price. | System shows “Enter only digits” | Pass |
| 3 | Admins enter number in Product name field. | System shows error “Please Enter correct name” | Pass |
| 4 | Admin Click on add Button. | System shows error “One or more field is missing or incorrect”. | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information.

| | |
|---|---|
| **Test Case:** 4.0 invalid | **Test Case Name:** Forget Password |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Forget Password |
| **Designed by:** Aqsa Amanat | **Design Date:** 11/03/2020 |
| **Executed by:** Fizza Qasem | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing forget password. | |

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on forgot password button. | System displays a form. | Pass |
| 2 | Admin enter the email that registered is address. | System shows error "Enter correct email address. | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information.

| | |
|---|---|
| **Test Case:** 4.0 | **Test Case Name:** 3D Models |
| **System:** 3D Jewelery Shop with Recommender | **SubSystem:** Add 3D Model |
| **Designed by:** Aqsa Amanat | **Design Date:** 11/03/2020 |
| **Executed by:** Fizza Qasem | **Execution Date:** 11/03/2020 |
| **Short Description:** Testing 3D Models in our system. | |

| Steps | Actions | Expected System Response | Pass/fail |
|---|---|---|---|
| 1 | Click on add models | System display form . | Pass |
| 2 | Admin enter must files with extension of glob. | System shows error “File not showed”. | Pass |

**Post-Conditions:**

- System shows the error message against missing or incorrect information.

# Chapter 7
# Conclusion and Future Work

# 7 Conclusion and Future Work

## 7.1 Conclusion

Online shopping We are facing visual problems and issues in finding the best jewelry item which may I like the most while buying the products because there are no such system that provide 3d models of jewelry along with the recommendation in the website.

In this project we developed a web based system "AQZA Jewelers" .It is very useful application as online shopping is become more popular day by day to provide ease and convenience to the users but user cannot understand the design of jeweler items. Overcome the users problem related to online shopping like visual problems , problem in searching of that jewelry that it may like the most. We provide the solution in the form of online website and by adding the 3d models of jewelry and display in our website. Through 3d models of jeweler user can easily understand the design of each product. We also provide recommendation with the use of user base collaborative filtering algorithm on the basis of users ratting**.** As mostly user like rings so such mostly liked products are shown to users as recommendations.

## 7.2 Future Work

There could be some improvement possible in this website. Some of the improvements for future development are mentioned below:

### 7.2.1 Website

We will add other products as dresses and shoes in our website and view them in 3dimension. products. We aim to add multiple seller and add more functionality in our website to make big website to increase the business

### 7.2.2 Jewelry Virtual Trial Room

Create virtual trial room in which users will add his images and jewelry will place on user added image, users will try different jewelry products on their image to check the jewelry to select them with ease. We will also give options to the user to customize the jewelry and purchase that customized jewelry.

### 7.2.3 Recommendations

We can used different algorithms for the recommendations using the different parameters like we use user buying products parameter to predict the products with different technique.

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