Senior Design Project

Project Specification Report

RecoModa

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Table of Contents

1 Introduction

In today’s world, most people have access to the internet through smart phones, computers and other technological devices and it causes us to have different applications with different purposes. Many applications for both computers and smartphones are produced to make life easier and it changed our perspective to many daily activities. One of the precedents for affected activities is shopping. Compared to 10 years ago, now people can buy clothes, glassware, food and other things through the internet and people can find products of every brand. In that sense, there are many applications for this purpose, however online shopping is still problematic for many people because users can experience difficulties while choosing the best fitting cloth to themselves even though they know their body sizes. It is because every brand may have an exclusive size for their products while they are labeled with standard body sizes. Therefore, people can never be sure about whether clothes fit on their bodies or not. Moreover, on the internet, there are many resembling products from different brands and users spend too much time searching for the correct product. The only way to be sure is ordering the clothes, which is a waste of both money and time because there is a high possibility of returning back the product as a result of dissatisfaction.

In that sense, RecoModa intends to find a solution to the loss of time and waste of money of users while they try to find the best-fitting product for themselves. The goal is to decrease the time of online shopping with the data that is received from the users. With the help of data, the taste of the user will be detected and our application will recommend the combinations according to the user's preferences. Furthermore, our product will act like social media. It will be an alternative platform for influencers and users to share their combinations. People will have the opportunity to reach out the combination of the influencer and it will save time for the user while buying the combination because instead of searching for every piece of the combination separately, the user can find the whole combination through links.

In this report, planned details of our application are listed below regarding different aspects, which are constraints, ethical issues, and functional and non-functional requirements. Before those parts, an elaborative description and desired features are included.

1.1 Description

RecoModa is a mobile shopping application with a strong recommendation system that combines the features of both shopping and social media. Like social media, users will be able to share their products or combinations and be followed by other users. These shared combinations can be registered by the users in parts or completely, as well as they will be able to buy the whole combination or the parts they want with a single click with a fingerprint scan. The appropriate sizes of the user will be determined with information such as body information, weight, height, shoulder width obtained from the users, and then suitable sizes will be suggested. This information will be requested to be updated at regular intervals and new suggestions will be made according to the changes. Suggestions that may be different in different brands will reduce the size problem. The most important feature of RecoModa is that it has a strong personalized recommendation system. For this, every data that can be obtained from the user will be used. This data is the likes of users, shares of users followed, products previously bought etc. and will be used to enlarge and elaborate the recommendation system. The generated suggestions will be all over the system. For example, a suitable jacket proposal will be displayed on a shirt purchased while the basket is displayed, or the most used colors and the clothes that match those colors will be primarily concentrated on the user's homepage. Bots will be scraping data from other clothing companies so RecoModa will not be dependent on other brands and update their database constantly.

1.2 Constraints

1.2.1 Economic Constraints

- The application will be offered to users free of charge.
- Before the application is presented to the users, the expenses that will occur in the subjects such as server and database will be calculated. [1]
- A fee will be paid for the application to be published on the Google Play Store [2].

1.2.2 Implementation Constraints

- Our application will be implemented according to phones with Android operating systems in order to reach wider audiences.

- Engineering branches such as Machine Learning, Data Science, Data analysis will be used.
- Github platform will be used as the platform where codes are shared and code history is watched.
- Jira application will be used in the follow-up of the project.
- Open-source libraries and data models will be used in application development and machine learning.
- The development will be done by adhering to the MERN Stack recommended by MongoDB [https://www.mongodb.com/mern-stack]. MongoDB, Express.js, React Native, and Node.js will be used while implementing the application. Python language will be used in Machine learning and Data Science sections.
- A regular data flow will be provided by using web scraping and API for creating clothing data on the web.

1.2.3 Time Constraints

- According to the Bilkent academic calendar, the demo of the project should be trained before the end of the fall semester. The entire project, together with all its features, should be grown at the end of the spring term.

1.2.4 Ethical Constraints

- The user will be asked for some information about himself. In order to use the application more effectively, parameters to be used in determining the user's body measurements such as height and weight will be requested.
- To increase security, the user will be asked to take a fingerprint.
- The user will be asked to use the camera to determine his or her clothing preferences.

1.2.5 Sustainability Constraints

- It will be updated regularly so that the application can run with better performance with a better user experience.
- Since the data will be variable within the application, the clothing database structure in the application will remain up to date.

1.2.6 Social Constraints

- The sensitivities of the users and the issue of information sharing will be taken into account. Studies will be conducted according to age groups, gender, variables such as height and weight.

1.2.7 Manufacturability Constraints

- The application will use SOLID design principles to support object-oriented programming while designing and coding, and the progress of the project will be supervised through the networking method.

1.3 Professional and Ethical Issues

Our main priority in practice will be to enable users to reach the product they want quickly and safely by spending less time and effort. Users who reach the product they want will reach the last seller quickly and safely by finding the product they want with link forwarding. Since there will be a wide variety of data, many techniques will be used during their processing. Some information will be requested in order to ensure that users can reach the product they want quickly and safely. At this point, personal data such as height and weight will be obtained from the users. Ensuring data security has become very important to us because many ethical issues can arise in the event of a possible data leak.

In the application, there will be a sharing of clothing combinations and some people's information will not be used without their permission. Data received from people will not be processed, used and shared with any third party institution or organization without their consent. Photos that will be requested from users in order to provide them with a better experience or in other words to determine their body size will be encrypted by React Native libraries.

2 Requirements

2.1 Functional Requirements

2.1.1 Unauthenticated Functionalities

- The application displays popular posts of the week rather than personalized recommendations.
- The application lists the trending posts below the categories.
- The application allows searching without requiring any authentication.

2.1.2 Registration Functionalities

- The application displays unique recommended posts to each user according to the recommendation model, which is determined by the likings of the user.

- The application lists the recommended posts according to the recommendation model below the given categories.
- The application mandatorily requires a username, password, and e-mail and optionally requires a full postal address, credit card information, body measurements, and fingerprint id.
- The application activates the register button if and only if the mandatory information is correctly given.
- The application requires a unique username, a valid e-mail address, and a minimum 8-character password which includes an uppercase, lowercase, and special character. Otherwise, the application gives an error message and does not activate the register button.
- The application requires email confirmation for successful registration.

2.1.3 Search Functionalities

- The user can search by typing a string in the text field.
- The user can search by choosing given categories of garments, RGB color values, and sizes.

2.1.4 Post & Profile Functionalities

- The user is able to post outfits into the system, where users can attach the Amazon link to each garment.
- The user gets a share from the acquisition for every sale from a post.
- The user can see the previous post of another user or self by the profile.
- The user is able to “like” or “comment” on a post that is visible to other users.
- The user can “save” the post or linked garments on the post, which is available to the user in the “saves” section.
- The user can “follow” or be “followed” by another user, which alters the recommendation model.

2.1.5 Information & Purchase Functionalities

- The user is able to upload and update the full postal address, credit card information, body measurements, and fingerprint id.
- The information given to the system is used while purchasing the post’s outfit or selected garments with fingerprint confirmation.
- The user needs to measure their own body in a specified given way. The information includes: gender, weight, height, shoulder width, chest circumference, waist circumference, hip circumference, leg length, and foot size.
- The body measurement information is used to recommend the fitting size for any piece of garment.
- The recommendation depends on whether the user likes wearing loose, slim, or standard sizes.

- The full postal address is used to create a shipment to that address.
- The credit information is used to purchase the selected items.
- The body measurements are inserted by the use

2.1.6 Server Functionalities

- The server recommends posts according to user interactions and returns a post list. If there is no authentication, the server returns a trendy post list.
- The server saves and updates posts and user information in the database.
- The server encrypts the user information and then saves them in the database.

2.2 Non-Functional Requirements

2.2.1 Performance

- The processes that need high computing power should be handled on the server side so that the program does not drain the battery.
- The application should be able to fetch data in a few seconds.

2.2.2 Security

- The sensitive information of the user, such as passwords and credit card information, should be saved in the encrypted format.
- By using a stateless session (JSON Web Token), all data does not need to be saved in a database on the server-side like cookies, it only exists on the client side. It eliminates the CSRF attacks [3].

2.2.3 Scalability

- The prototype of the application should be able to handle 50.000 users and 2000 concurrent users.

2.2.4 Usability

- The interface of the application should be very easy to adapt and use in a few minutes for a new user.

2.2.5 Modifiability

- Further implementations should be added without difficulty to the current system. Therefore, the system must be built and prepared for future modifications.

2.2.6 Availability

- The system should be available 24 hours on any day of the year, including holidays.

2.2.7 Accessibility

- The application should be accessible on at least 60% of Android devices.

2.2.8 Legal and Regulatory Requirements

- The terms of service and privacy should be accepted by the user before the usage of the application. The user must allow their body measurement data to be used to get size recommendations.

2.2.9 Reliability

- Since the database receives crucial information from the users, such as credit card information, full postal address, and body measurements; any program crashes or data loss should not happen in any case.

2.2.10 Robustness

- The system must handle all possible errors since any error in the purchase phase could be dangerous.

2.2.11 Efficiency

- The application should load and show posts 3 seconds after it is started.

2.2.12 Compatibility

- The user should be accessing any data from another device that the user signed in.

3 References

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