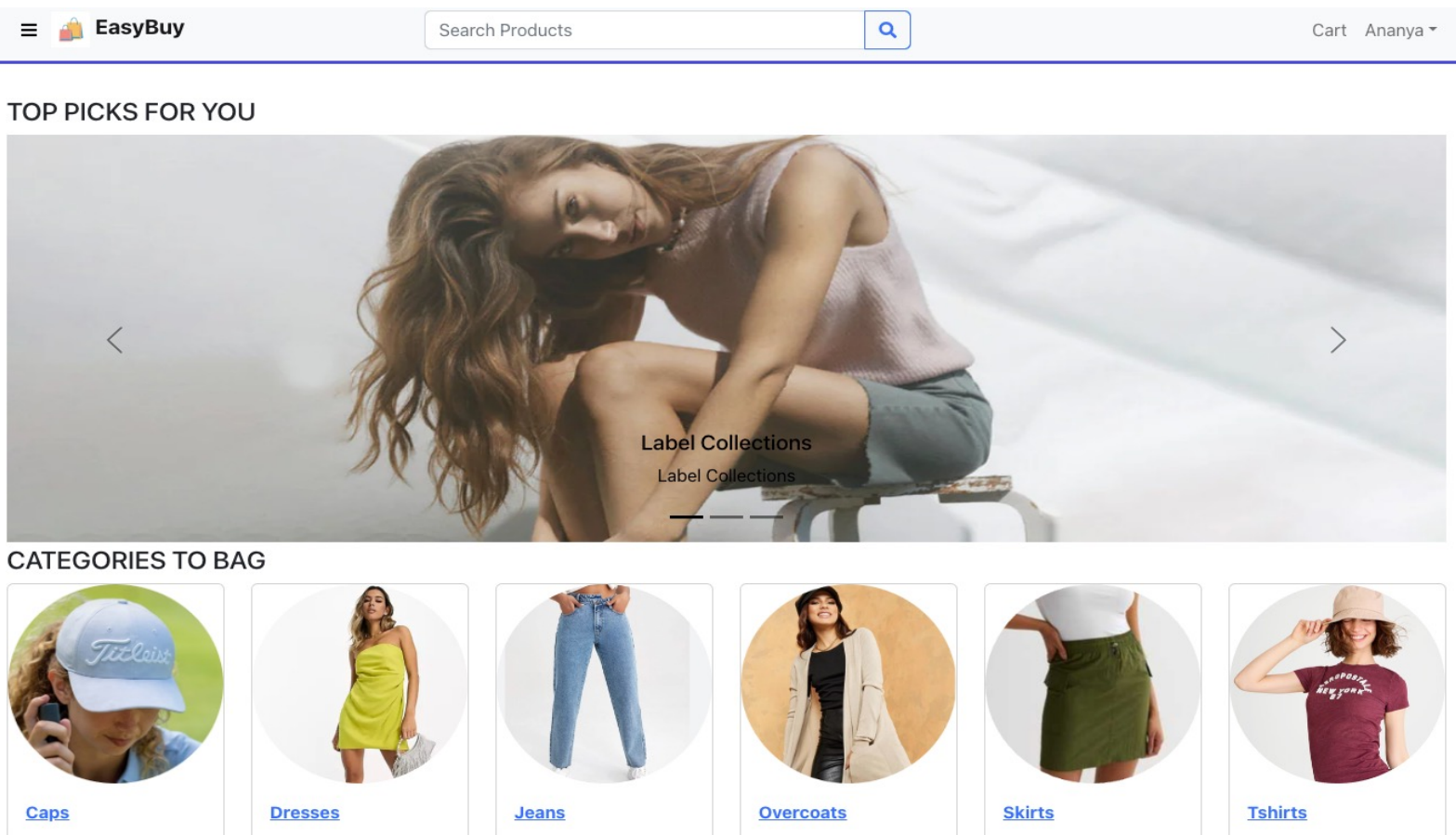




Introduction

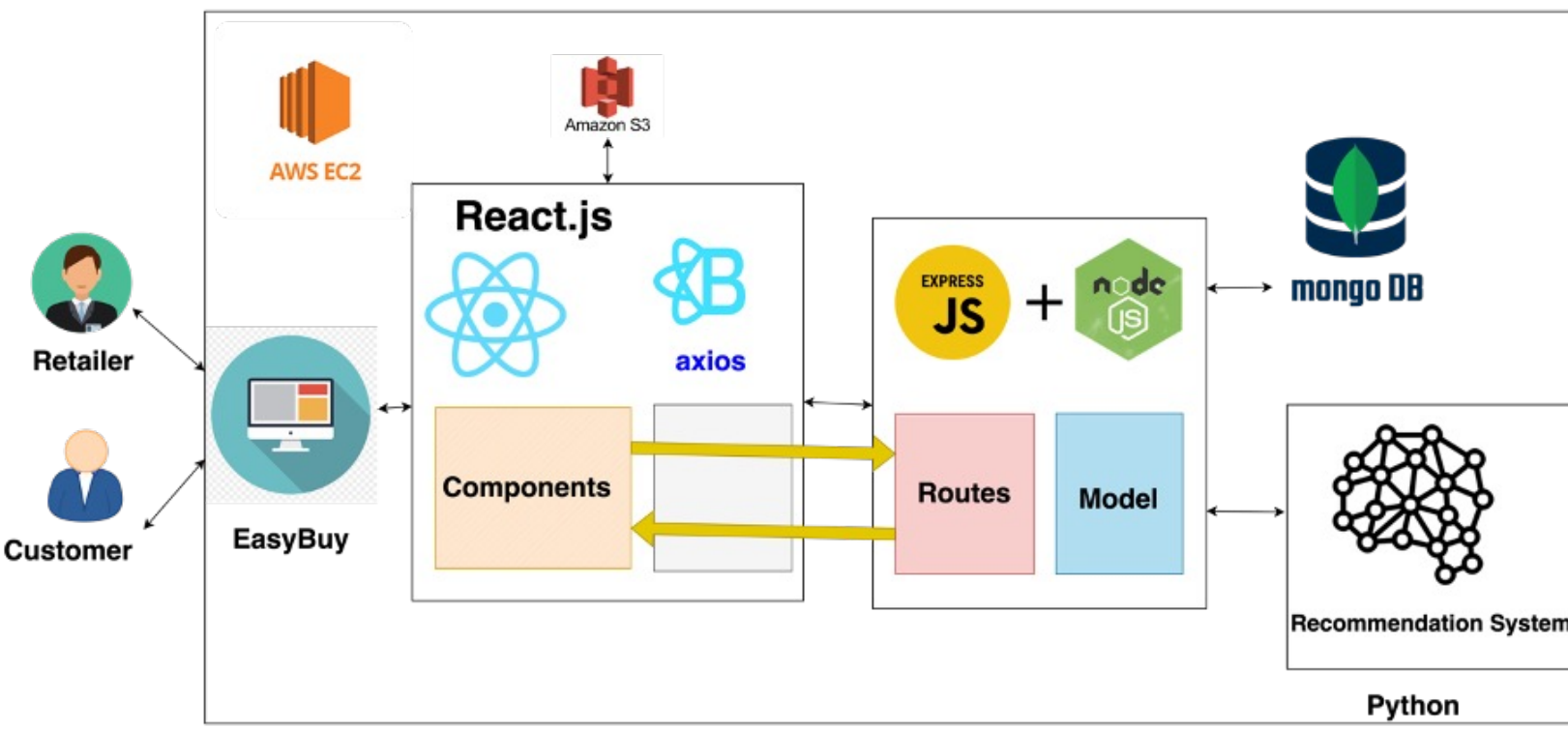
At Easy Buy, we not only elevate your style but make shopping effortless. With a user-friendly interface, interesting product collections, and hassle-free checkout, we make it easy for you to create a memorable first impression with your fashion choices. Our platform analyzes customer preferences and suggests the top-rated items based on ratings from other shoppers.



- We have included a notification feature for out-of-stock items so customers can be informed as soon as they're available again.
- To help retailers stay on top of their inventory management, we're also providing a dashboard that displays the velocity of their products and calculates a marketing metric to give insights into market demand.

Architecture

The diagram provided offers an overview of the comprehensive architecture of our project, having 4 major components: Front-end, Back-end, Recommendation system, and Database system, all of which work together to enable seamless functionality of the application.



- The Front-end component is designed using the React.js library. The Back-end component of the application was developed using Node.js, a robust JavaScript runtime environment for creating web applications.
- The Recommendation system component of the application was developed using Python. Finally, the Database system component of the application was developed using MongoDB.

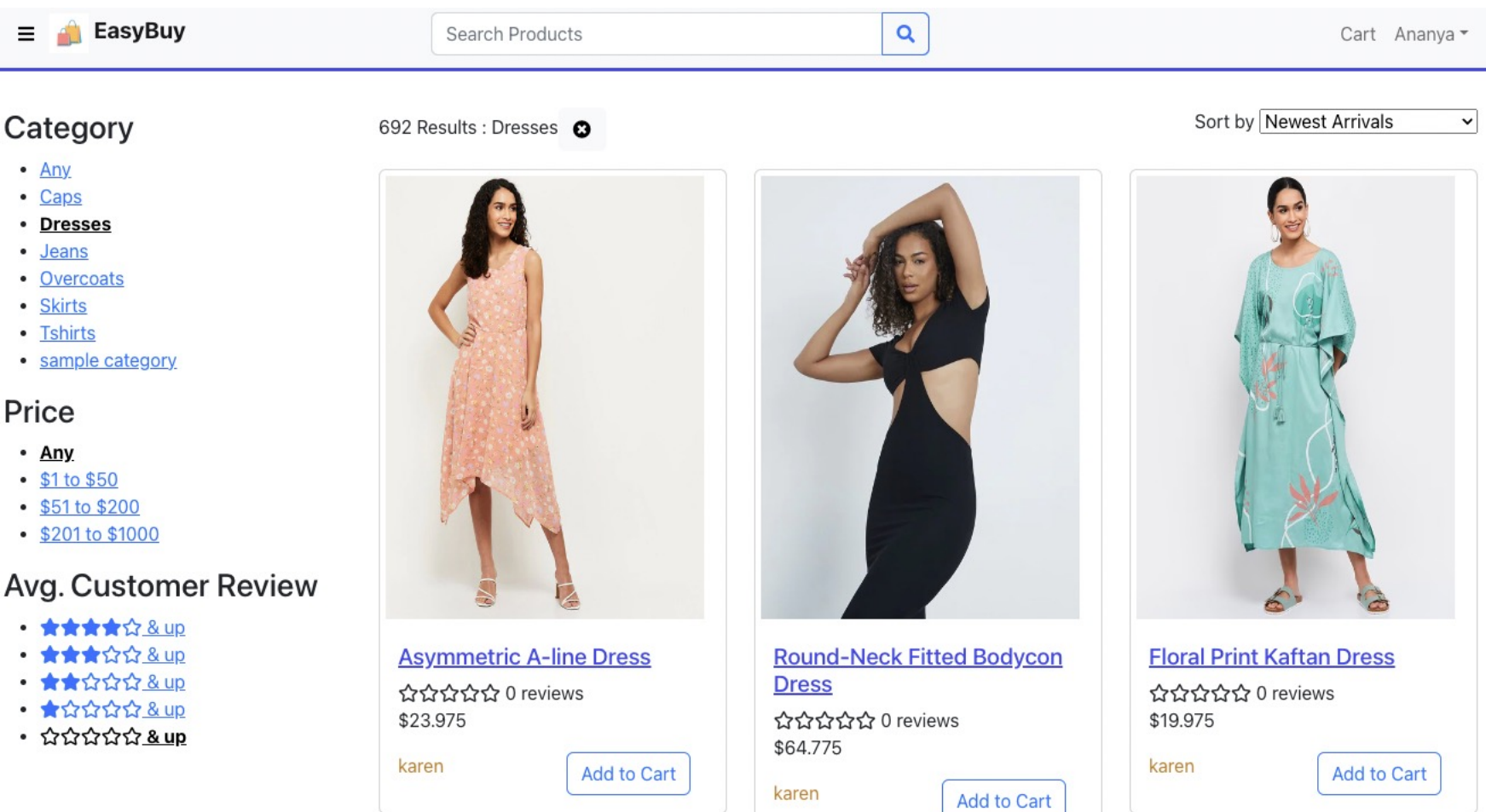
Methods and Results

The application consists of two user types: Customers and Retailers. These are the functionalities offered by the application:

User authentication: The user should authenticate by providing his details on the Login/Sign-Up page to access the services.

Product Search: Customers can search for products based on the name and category. The searched products can be

- filtered based on price, and ratings.
- sorted based on the latest arrivals and price range.



Product Management:

Customers can

- View the details of the product including price, description, ratings
- Rate and review the product.
- Add to the Cart or get notified if the product is out of stock.

Retailers can Add/Update and Delete the Products.

Cart Management: Customers can add the products to the cart and can update the items in the cart.

Order Management: Customers can

- View the order summary and can place the order.
- See the status of the order and the list of previous orders.

The Retailer can see the orders placed and can deliver the order.

Recommendations: On placing the order, the algorithms are run and recommendations are generated which will be displayed on Dashboard.

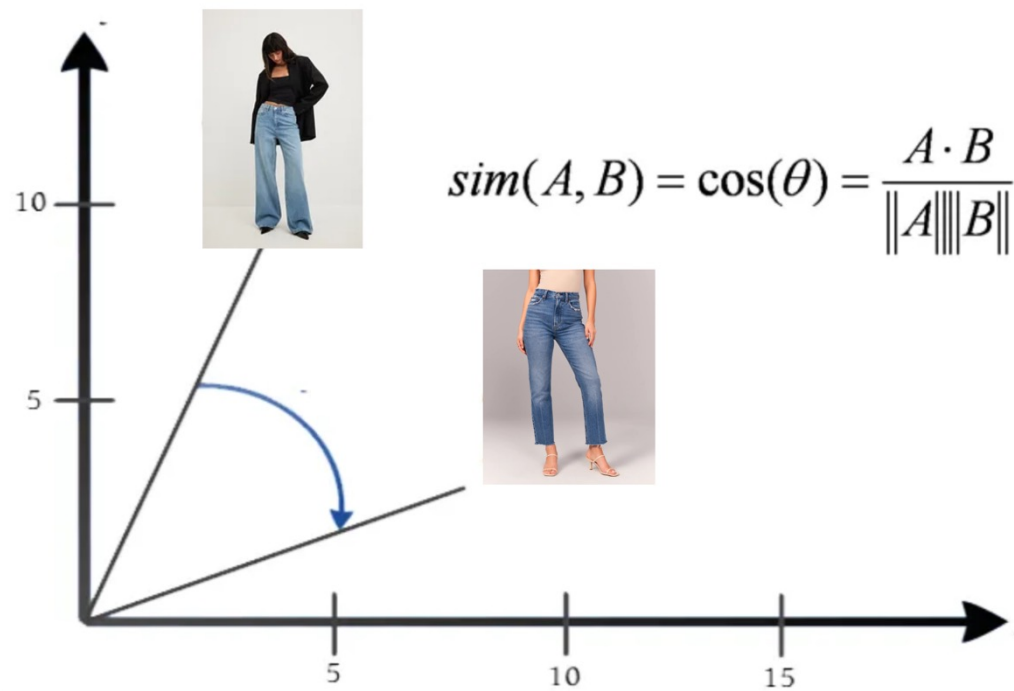
1. You May Also Like: Used content-based filtering to recommend similar products. Calculated the TF-IDF score to determine the relevance of different products to individual customers based on their previous orders.

$$W(x, y) = tf(x, y) * \log \left(\frac{N}{df_x} \right)$$

where,

$W(x, y)$ is the term x within document y,
 $tf(x, y)$ is frequency of x in y,
 df_x is number of documents containing x,
N is total number of documents

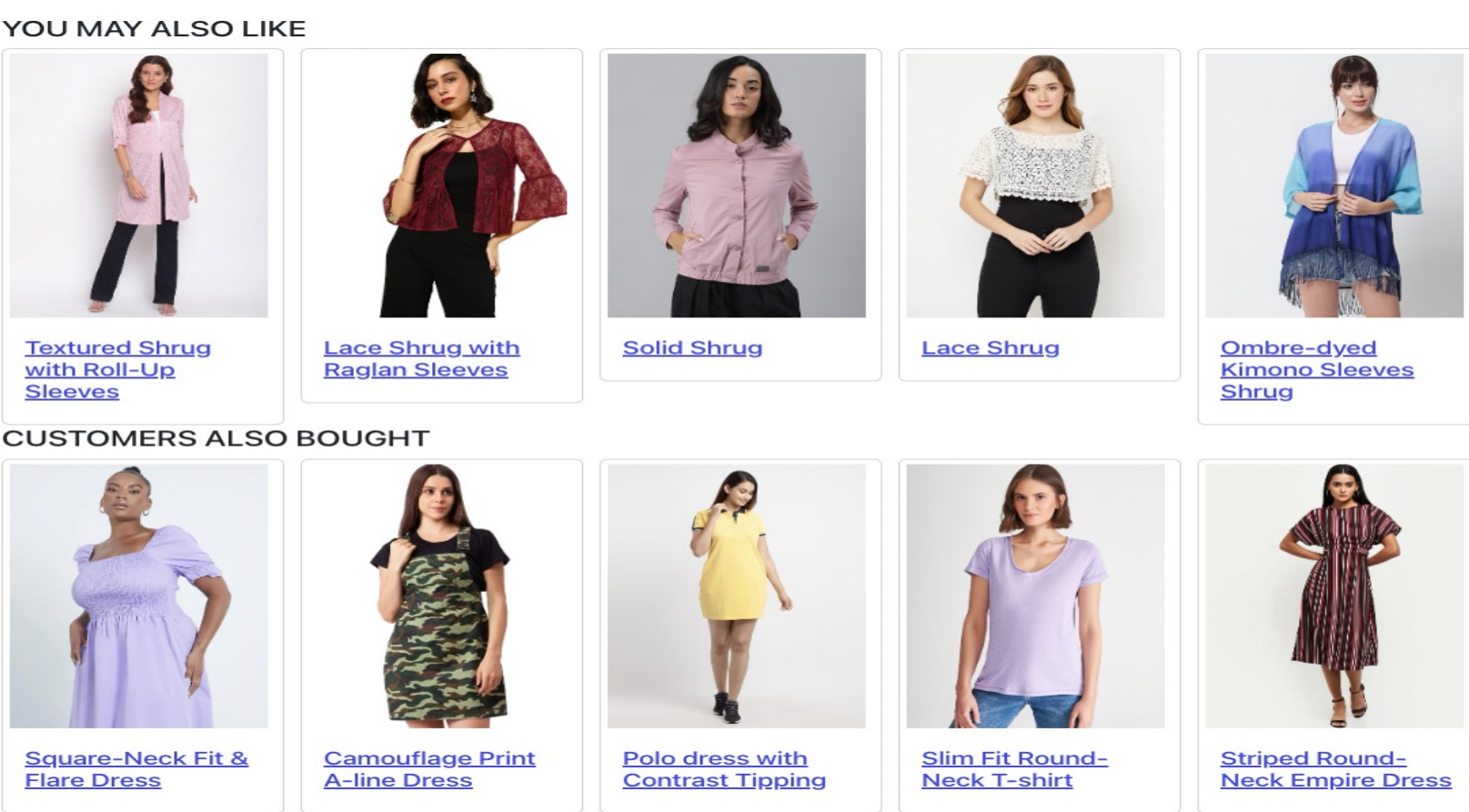
Then calculated the cosine similarity and arrange them according to their similarity based on the input item. This scoring system allows us to generate personalized recommendations by suggesting products that align closely with the customer's interests and preferences.



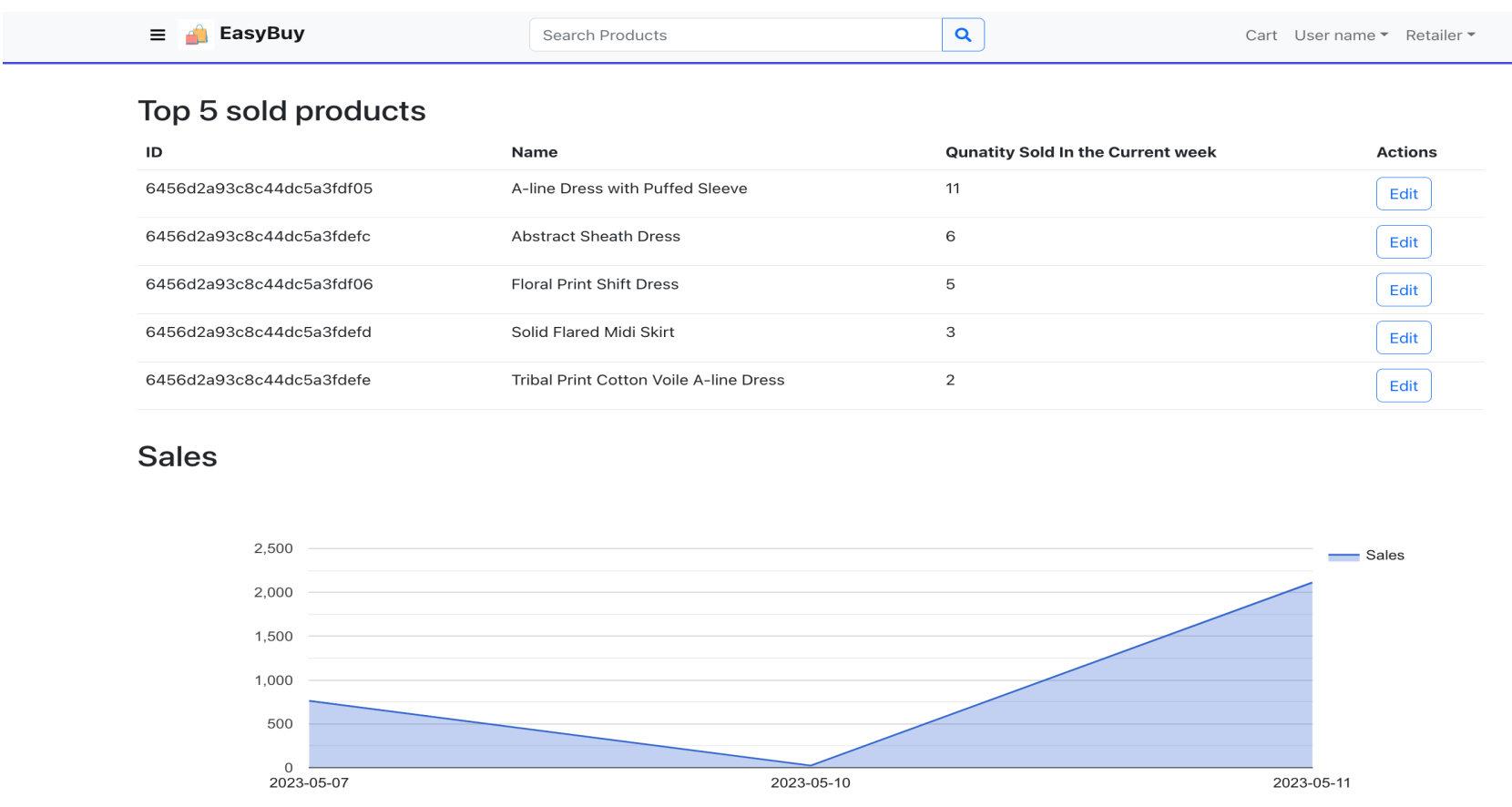
2. Customers Also Bought: Used collaborative filtering to recommend products to a user based on the interests of similar users. Determined KNN with Means, which operates by identifying the k most similar users or items to a particular target user or item. It achieves this by comparing their rating patterns and preferences. Based on the average rating or score of these nearest neighbors, the algorithm generates recommendations for the target user or item.

$$\hat{r}_{ui} = \mu_u + \frac{\sum_{v \in N_i^p(u)} \text{sim}(u, v) \cdot (r_{vi} - \mu_v)}{\sum_{v \in N_i^p(u)} \text{sim}(u, v)}$$

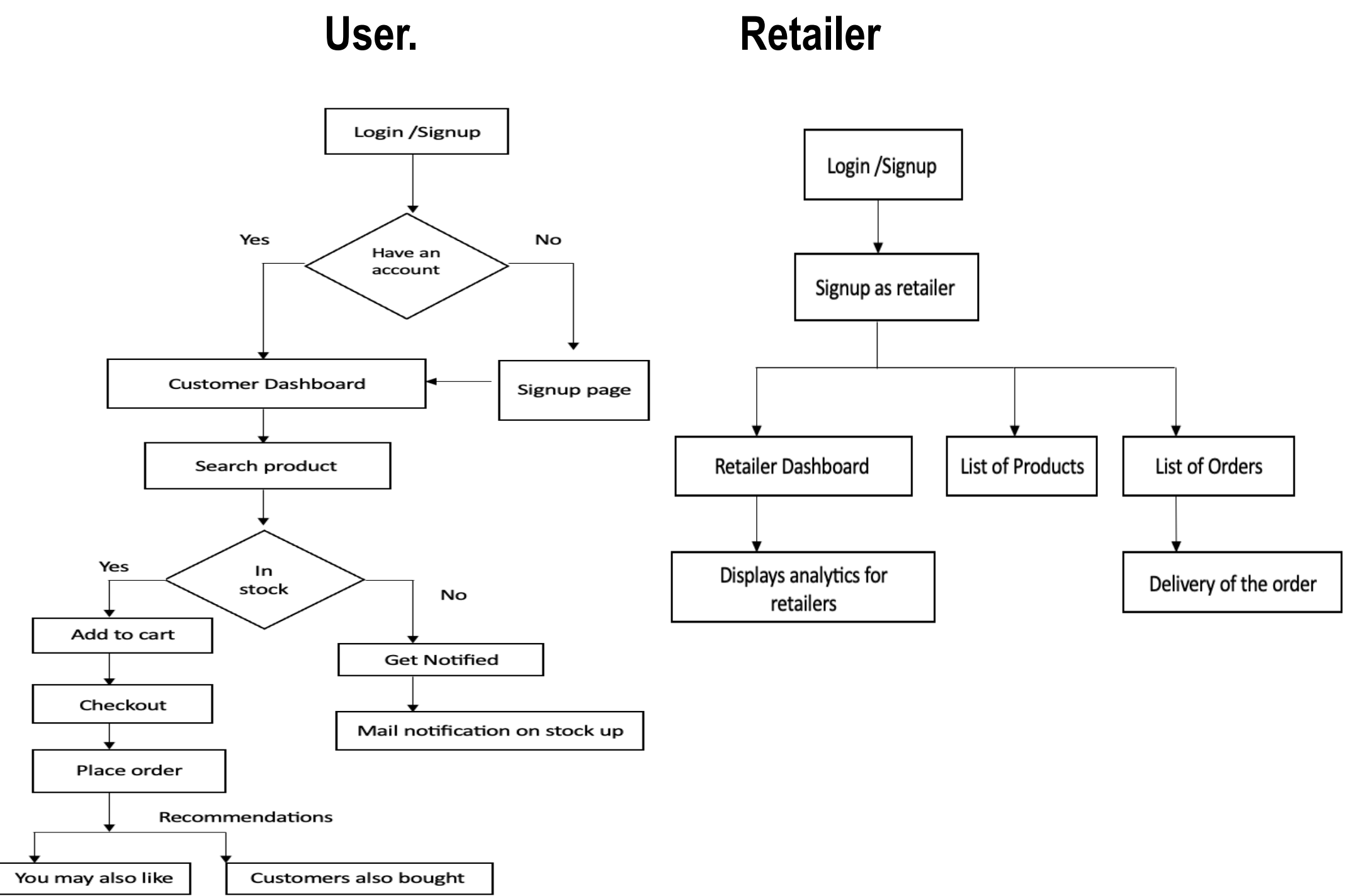
Customer Dashboard:



Retailer Dashboard: The Retailer Dashboard shows product and sales insights to the retailer. The first section shows the top 5 selling products of the current week along with its velocity. The second section shows the sales chart velocity which gives current market insights.



Application Flow:



API Testing

All the backend APIs are tested using the postman and also performed functionality testing ensuring the application's end-to-end flows are working.

Type	API	Inputs
POST	/signUp	User details
GET	/signIn	Username, Password
POST	/addProduct	Product details
PUT	/uploadImage	Image file inserted into S3
PUT	/updateProduct	updated Product details
POST	/deleteProduct	Product Id
POST	/addReview	User rating, review
POST	/createOrder	Order details
PUT	/deliverOrder	order ID
DELETE	/deleteOrder	order ID

Summary/Conclusions

The platform we have developed goes beyond mere convenience by utilizing advanced algorithms to analyze customer preferences, enabling personalized recommendations based on ratings from other shoppers.

The platform assists retailers in managing their inventory effectively through a comprehensive dashboard. Overall, Easy Buy provides convenience, and data-driven decision-making to revolutionize the fashion retail experience.

Key References

- [1] Verma, Ankit & Kapoor, Chavi & Sharma, Abhishek & Mishra, Biswajit. (2021). Web Application Implementation with Machine Learning. 423-428. 10.1109/ICIEM51511.2021.9445368.
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- [3] Singh, Pradeep & Dutta Pramanik, Pijush & Dey, Avick & Choudhury, Prasenjit. (2021). Recommender Systems: An Overview, Research Trends, and Future Directions. International Journal of Business and Systems Research. 15. 14-52. 10.1504/IJBSR.2021.10033303.

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