Shop-Easy: An Online Shopping Framework Emphasizing Vocal for Local Using Location and Review Based Services

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Abstract. Nowadays the trend of online shopping is increasing day by day. A huge transformation and usage of online applications for shopping day-to-day essential items have been experienced during Covid-era. To further facilitate the online shopping industries, the local shopkeepers, and the customers, in this paper an efficient and organized online shopping platform is presented, which can be used by local shopkeepers to showcase their products digitally and by customers to easily manage and organize their day-to-day shopping-related tasks. With this proposed platform, the local regional shopkeepers can introduce their shops and products to nearby residents from time to time which makes their shop to be known by everyone, selling their products in an easier way and helps them in maintaining their ledger on a daily basis. Further, the proposed system will assist the customers by helping them in keeping track of their shopping lists timely and by choosing the best shop according to the location, item, and review-based notifications and reminders.

Keywords: Shopping · Online · Recommendation · Product · Location-based services · Notification

1 Introduction

In today's era, the trend of online shopping is increasing day by day. A lot of online shopping applications can be seen on the internet for various shopping-related tasks. Nowadays big companies and startups are moving towards instant delivery of essential and daily usage items to customers. One can see a huge transformation and usage of shopping applications for essential and daily usage items also in Covid-era. Due to this increase in the trend of online shopping, there is a significant loss of small shopkeepers who are unable to give facilities to customers as big giants. Due to a lack of resources and lack of money, they are unable to advertise themselves which led them backward day by day. The users also in online shopping usually experience a lot of issues such as searching or getting the correct product, as it is not possible for everyone to choose the best or required product among the enormous variety of available products on the internet. Moreover, it is not possible for everyone to use an online shopping platform

V. Sugumaran et al. (Eds.): AIR 2022, CCIS 1738, pp. 518–530, 2022.
https://doi.org/10.1007/978-3-031-23724-9_47

effectively due to a lack of technical knowledge. Still, a lot of people prefer their nearby stores for day-to-day items purchasing but, in some cases, they face an issue if the locality is new to them.

Today in the busy schedule users usually maintain a shopping list and then forget to even look at it and this will make it of no use. Secondly, when people move to a new city, they rarely know the locality, it took time and sometimes money to understand the best shop near them. Moreover, for shopkeepers also setting up a shop is a difficult and time-consuming task because it requires understanding the customers and their needs. Keeping these things in mind we came up with a digital approach to solve these problems. Although a large range of shopping applications are available in the market, with the power of advanced technologies there is always a scope for improvement.

In this paper, a user-friendly online platform for both customers and shopkeepers is proposed that emphasizes on "Vocal For Local" initiative also which was started by the government of India. With this proposed framework, the local shopkeepers of any particular area can introduce their product digitally and can also provide a detailed overview of the product also such as selling price, GST, profit in an organized manner. The shopkeeper can update the price or the product list any time and any number of times and also provide the shopkeepers the details of highly demanding products in their locality, moreover making the billing easy for them. On another side, the proposed system can generate notifications to customers to remind them about the correct time to buy the goods on the basis of the surroundings of their mobile phone, further, this application will provide a review of the shops and the product to the user. Moreover, the user will know is there any offer by any nearby shop and there will be a better recommendation system and product searching system near to their home or location.

With the aim of proposing a better platform for shopkeepers and customers, the work related to the proposed system is structured as the discussion on the existing platforms related to the proposed work is presented in Sect. 2. The functionalities of the proposed system, design, and implementation details along with the various interfaces of the proposed application are presented and explained are discussed in Sect. 3. The paper is concluded by presenting the discussion on the work in Sect. 4.

2 Background and Related Work

In our daily life, people generally face the issue of forgetfulness, like sometimes they forget their tasks like shopping or doing some other activity due to a hectic schedule or engagement in other tasks. This gives them a guilty feeling of being unable to do their tasks timely and wasting their time also. Users usually maintain a shopping list and then forget to even look at it and this will make it of no use. Nowadays various mobile-based applications and stand-alone devices are present in the market such as Apple Reminders, Alexa which can perform various tasks for users. Such application provides many features like voice interaction, setting alarms, music playback, playing audiobooks, making to-do lists, providing weather, latest news, sports news, and many other things. Apple Reminder provides the feature of creating a list and setting up the notifications which can be location-based also to the users. These platforms are provided with a user-friendly interface so that they can be used more easily. These platforms are

consisted of voice interaction, setting alarms, making To-do lists, and many other things. Most of these types of applications are very general which can be used as maintaining the shopping list effectively. The description of some of the devices and applications is presented in Table 1.

Table 1. Analysis of existing related applications

Apps/Devices	Description
 Amazon's Alexa [7]	It is a virtual assistant technology which mostly based on a polish speech synthesizer (lvona) that provides many features like voice interaction, setting alarms, music playback, playing audiobooks, making todo lists, providing weather, latest news, sports news, and many other things if a person not having these echo dots they can use their mobile application on their phone.
 Apple's Reminder loco [8]	It's a software which comes preinstalled on iOS devices like macOS, watchOS. It provides the feature of creating a list and setting up the notifications which can be location-based also. In this application, you can modify the position radius also for customizing location-based services.
 Google's Nest Mini [9]	Google Nest, previously named Google Home, is a line of smart speakers developed by Google under the Google Nest brand. The devices enable users to speak voice commands to interact with services through Google Assistant. Both in-house and third-party services are integrated, allowing users to listen to music, control the playback of videos or photos, or receive news updates entirely by voice.
 To-Do List App [10]	To-Do List is a software that provides a platform to add your task easily, it provides voice based interaction to maintain the list (e.g. for instruction "buy milk Monday", the task "buy milk" will be added on the coming Monday as your due date). You can put new tasks in your Inbox and then move them to relevant projects; you can also set due dates
 Tick Tick [11]	Tick Tick is time tracking software operated by Higher Pixels (former The Molehill), that offers online time tracking and reporting services through their website along with mobile and desktop applications. Tick tick tracks time based on clients, projects and tasks, either through a timer or through manual entry.

As mentioned in Table 1, the existing applications and devices can be used effectively to maintain the shopping list and setting reminders also, whereas the real-time applicability of these applications to provide location-based services is still not functional.

Further, when a person moved to a new city, they rarely know the locality, it took time and sometimes money to understand the best shop near them. And as a consumer when someone changes their locality or goes to an unknown place it becomes a challenging task for them to search for their required product or to find a good shop in that locality.

Considering the point of local shopkeepers in a specific society, the setting up of a shop is a very difficult and time-consuming task because it requires a proper understanding of the customers and their needs. Also, with the increasing trend of online shopping, small shopkeepers face a backlash from the big giants of the digital market who captured the market through the means of smartphones and the internet by providing the customers with a variety of products at home and it becomes exceedingly difficult for shopkeepers who have no access to such platform to reach their customer in a smart and advanced way to sell out their goods so they can earn their living. Thus, it takes too much time for them to establish their shop to spread it to every person in the nearby locality. Local shopkeepers also face difficulties to introduce new schemes and offer on their products to their nearby customers.

As the online shopping platforms gained huge popularity among customers so it is the need of the hour to introduce small shopkeepers' products on the online platforms, thus with this paper a user-friendly Shop-Easy Online framework is proposed to local shopkeepers and customers to provide a location and review-based shopping experience to both customers and shopkeepers.

3 Shop-Easy: Proposed Shopping Framework

The development of an efficient shopping application always being a challenging task for developers, as shopping includes a lot of subjective features such as the brand of product, its price, and preferred choice. But with the development of innovative technologies, there is always an option of developing a better and optimized platform. Thus, here an online shopping framework is presented considering local shopkeepers and users in mind. The various functionalities, design, and implementation approach is discussed in further subsections.

3.1 Proposed System Functionalities

The proposed shopping platform "Shop-Easy" is designed with the help of novel technologies to provide both consumers and shopkeepers a stage to perform their tasks more effectively and easily with a better user interface and databases for storing their data securely and systematically. Features of the proposed system are described in Table 2.

Through Shop-Easy, the user will have the feature to schedule their tasks smartly and get notification of that task according to the location or time. The customer will be able to view the shop according to their location. Further, the user will be able to provide a review of the shop as well as the product. The products will also be recommended to the customers according to their offers and promotion through the proposed portal. On the other side, the shopkeeper can introduce their product digitally and can assess the market in their benefits. The portal also provides the feature of maintaining their ledgers effectively. They can assign the offer on particular products through portal to

attract customers. Using recommendation and review system shopkeepers can assess the market and the customers can also choose the best option among the given options present on the platform. Further, the customers can customize their portal by adjusting the threshold distance according to their comfort so that when you cross that value you will be easily notified by the app to buy your product or to complete that task.

Table 2. Proposed functionalities of shop-easy platform

Functionalities to shopkeepers	Functionalities to customers
Location and distance-based addition of shop in "Shop Easy" portal	Portal to know about the location based local shops and their products
Digital showcasing of the product on the portal	Maintenance of shopping lists smartly on the portal
Real-time display of offers to customers	Location and product based notification to customers
Maintenance of ledger at the portal	Offer based product recommendation notification to customers
Reviews and promotion of shop to nearby societies	Product comparison to get the best deal

3.2 Proposed System Functionalities

The proposed system is designed to provide two types of interfaces to users, one for the consumers and another one is for shopkeepers. For the consumers, the system is designed to provide a location and time-based notifications of nearby shops. The proposed system is designed to provide two types of interfaces to users, one for the consumers and another one is for shopkeepers. For the consumers, the system is designed to provide a location and time-based notification of nearby shops. An easy interface is designed to maintain the shopping list effectively. On the other hand, Shopkeepers can register their shops and add/update their products on the application and can advertise any kind of sale in the neighborhood to attract new customers. Moreover, Shopkeepers will get full monitoring of their monthly, and yearly sales and can invest smartly. The working of the proposed system is depicted in Fig. 1 and is described below:

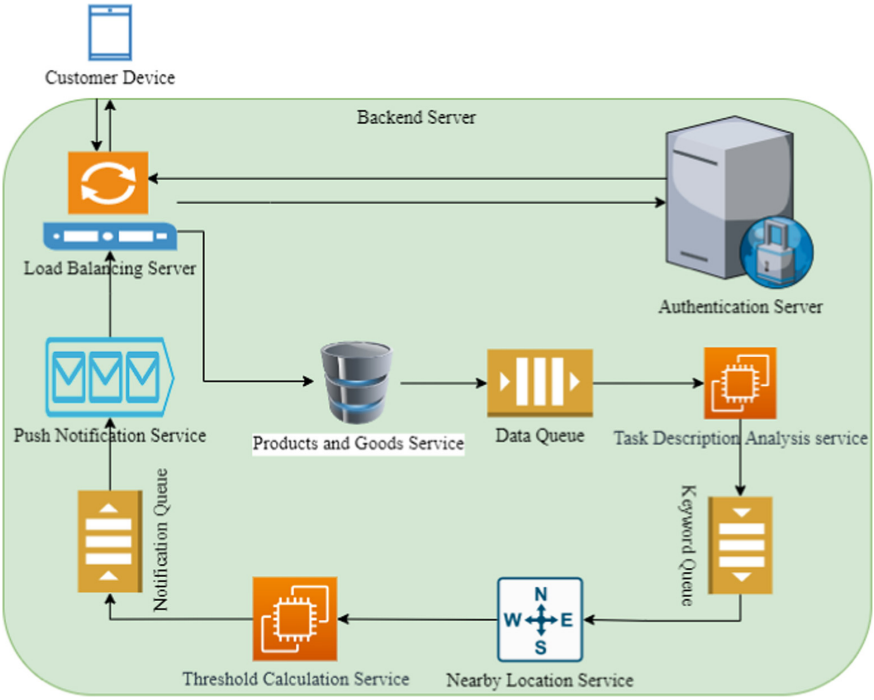

Fig. 1. System design flow diagram

As presented in Fig. 1, different types of servers and services have been used for implementing the Shop-Easy Platform, which are further discussed below:

- Load Balancing Server balances the load of the whole platform so that there should not be any delay due to load on any other services of the system. Basically, a Load Balancer is a reverse proxy as the user does not know how many services are running behind the load balancer. It helps in horizontal scaling of the system if there is too much load on one service then there can be many replicas of that service to fulfill all the requests in no time. For selecting replicas it uses consistent hashing. In the Shop-Easy platform, Load Balancer is used for path-based service selection. Like if a user is Logging-in or Signing-in then this type of request should assign to the Authentication Server. It balances the load if multiple users need to get access to the shopping platform for their smooth processing of different requests. Users will get the login into the platform through the means of some credential used for authentication here authentication server will come into the effect,
- Authentication Server has an internal database to store the user information and the login credentials. All this information is taken at the time of signing-in. And login credentials are used in a log-in process to authenticate the user. If the credentials are correct a token is generated and given to the user for a particular amount of time to prove his/her identity. And there is a cache that stores these tokens to verify the logged-in user identity in no time. After a regular interval, the server renews the token

to avoid any kind of misuse. After the authentication gets done, the user can sign in into its account where different actions like adding the task, making the record related operation can be performed which is done using product/goods record service.

- Product/goods record Service- After Authentication if a user adds a product or wants to edit the previously added products, all these kinds of requests will come to this service. This service will store data in a database for future use. Here ML based model is incorporated to give the best recommendation of the products to the user like if a user is purchasing eggs, then recommend him to buy bread to make bread omelet. If the user bought the product from that shop, then user have option to rate the quality of that product that will also be displayed here and according to this review next product recommendation will be made according to the user interest. To perform this type of activity one need to fill the description of its product, where Task Description Analysis service come into the effect
- Task Description Analysis Service- To get the related shop for the user, this service performs text analysis on the product and on its description provided by the user. It strikes out the related keywords form the input provided by the user. For maintaining a glitch free movement of data between the services, system have data queue between every service connection so that after processing the data, the services can simply push their results into queue. After extracting the keywords, this service pushes them into keyword queue from where low latency best shop location finding service access it. This service is further used in the user feedback analysis also. After the addition of tasks like, adding the shopping list etc., the proposed shopping platform suggests the shops related to the shopping list along with the location of the shop using the Nearby Location Service.
- Nearby Location Service plays the main role in the functioning of the whole proposed system. This service has maximum load and complex calculations due to the constant stream of user's GPS coordinates, thus its replicas are used for better performance. The service picks the keyword from the keyword queue and check-in its database to find the best shop for the user. Shops will be ranked according to the review provided by the previous customers of that shop and also the smallest Euclidian distance from the user's location. The two types of scenarios can occur in this case, one when the shop is previously registered with the shopping platform, and another one is when shops are not registered. The Google Maps Nearby API is used to find the best nearby shops for the user, which further uses the Threshold Calculation Service to get the best shop for a particular product.
- Threshold Calculation Service: This service picks the list provided by the Nearby Location Service, and using user's speed it sets the threshold range for the user, e.g., if the user is walking then the threshold can be set up to 100–250 m but if a user is in the car, then 1–5 km threshold can be set. Finally, the shops, which will be selected after the threshold calculation service, will be notified to the user using the push-notification service.

- Push Notification Service: In laymen's term the job of this service is to send the push notification to the user which is not an easy task because the system has to maintain a stream of notifications with the user as there can be many products notification to be sent to the user simultaneously. This service is based on the pub-sub model where there are three entities namely publisher, topic, and subscriber. In the proposed Shop-Easy system the publisher is the threshold calculation service, i.e., the service that publishes the data. Topics are the related data box-like groceries can be one topic, stationary can be one topic so publisher add data to that related topic. Subscriber are the end-user who subscribes to their selective topic. This model is very helpful because there can be many users in the same locality who need the same product. So, they can simply subscribe to a topic and then the load on the system will be much less.

Customer Side Designing. As mentioned above, the Shop-Easy platform for the customer's side is implemented, where the user can use the platform in the following way:

- User installs the Shop-Easy application and all the requests from the application will go to the server and the requests related to sign-up and login will go to the Authentication Server.
- Once the Authorization will be done, a reply will be sent back to the system.
- User can add the tasks using Add Task Page.
- All the tasks listed with the user's current GPS location will be sent to the server.
- Load Balancer server will then distribute the request to the Product/goods record service.
- Via Data Queue, Product/goods record service server will forward this request to the Task Description Analysis service.
- Task Description Analysis service will put product-related keywords to the keyword queue.
- Nearby Location Service will pick the keyword from the queue and find the shops near the user and forward them to the Threshold Calculation Service.
- In Threshold Calculation Service User and shop relative distance will be calculated and if that distance is within the threshold then a request will be forwarded to the Notification service.
- Notification Service will send the notification to the user.

Shopkeeper Side Designing. Similar to Customer side designing, the signup and login process is same for shopkeepers on the Shop-Easy platform. The flow of shopkeeper side designing will be as:

- Shopkeeper can register their shop by providing shop name and by providing access to GPS location.
- Shopkeeper can give a short description about the shop.
- Can list all categories of products available in his shop on Shop-Easy Platform.
- Can also update any special offer or any important notification as a banner
- This banner will be visible on the map information like special discount or non-availability of some product.

3.3 Results and Discussion

The various results generated during development of the Shop-Easy online shopping platform are discussed below. The system is developed by considering some assumptions and dependencies such as:

- User should add at least five products
- GPS should be turned on while using Shop-Easy system on user's mobile phone.
- Customer should have an active internet connection.
- Shop-Easy mobile application requires many supports from mobile application like permission to use GPS, Camera, Internet, File Storage.
- User should allow the application to use all these mobile features for the working of the application.

As explained in the previous sections Shop Easy will be a user-friendly platform that will make the user shopping experience more familiar. Some of the results of Shop-Easy platform are presented as Fig. 2 shows the entities of the Shop Easy user along with their data type in the form of which data is stored. Figure 3 presents the different functionalities performed by the user along with the activities performed by the server in the Shop Easy to fulfill the User request. When the user adds some task in the form of data then this data is encapsulated by the platform and sent to the server where different processes are performed on it like the recording of task, text/speech analysis, product-oriented keywords to fulfill the user's request.

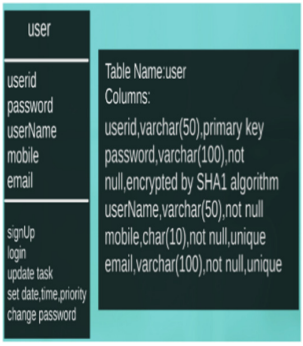

Fig. 2. Shop-Easy class diagram

Fig. 3. Customer side designing

Figure 4 represents the initial screen of the Shop-Easy Platform, where user can register or log in in the system as presented in Fig. 5 and 6 respectively. After the user gets registered then he/she will be able to see the login page as shown in Fig. 7, where currently no task is added.

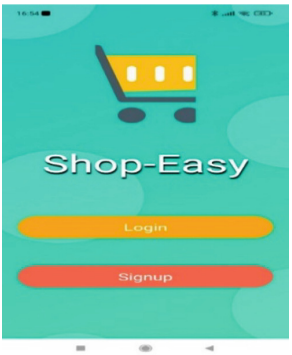

Fig. 4. Shop-Easy initial screen

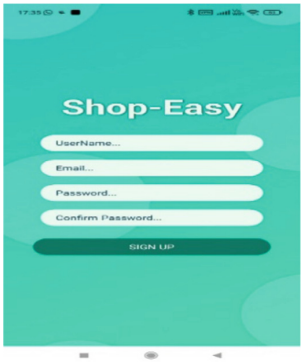

Fig. 5. Sign up screen

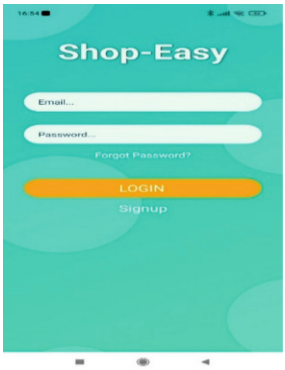

Fig. 6. Login screen

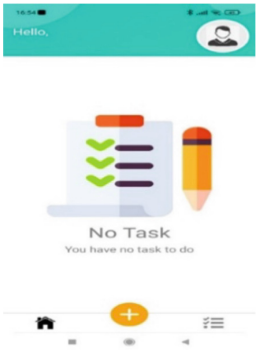

Fig. 7. Home screen

The user can also maintain their profile by updating person details on Shop-Easy platform as shown in Fig. 8.

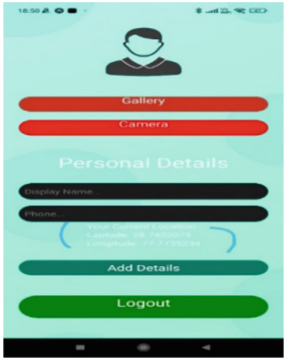

Fig. 8. User profile page

Fig. 9. Add task page

Further, the user can maintain the shopping list by adding products using add task page in the proposed system as shown in Fig. 9 and 10 respectively. The user can add different categories of tasks which can be seen in Fig. 11.

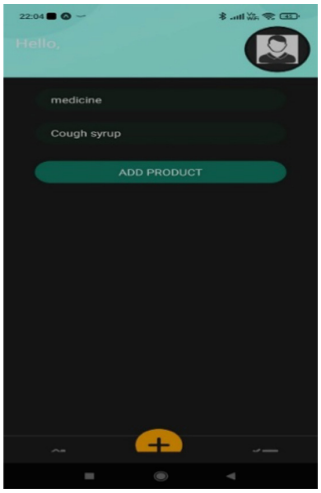

Fig. 10. Creation of tasks list

Fig. 11. Different categories of tasks in Shop-Easy platform

Now according to the maintained list, the Shop-Easy platform recommends the location and review based best shops to user as shown in Fig. 12 and 13.

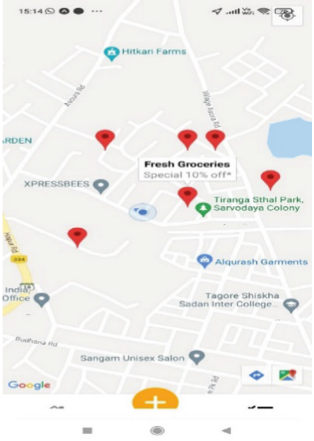

Fig. 12. Discount and location based shop recommendation through Shop-Easy platform

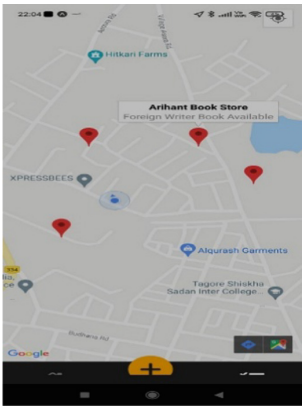

Fig. 13. Recommended shop along with a description provided by shop keepers

4 Comparative Analysis of Features of Proposed System

To check the novelty and efficacy of the proposed online shopping platform, a comparative analysis of features of the proposed system is done with some of the existing applications which are summarized in Table 3. As claimed by the authors in this paper, the proposed Shop-Easy platform is providing some required features which can provide the more friendly and easy shopping experience to both local customers and shopkeepers.

Table 3. Comparative analysis of features of Shop-Easy shopping platform

Features available	Time base reminders	Location base reminder	Notification of nearby shops	Review system	Ledger for shopkeepers	Customer rating system
Jio Mart [12]	No	No	No	Yes	No	Yes
Meesho [13]	No	No	No	Yes	No	Yes
Tick [11]	Yes	No	No	No	No	No
To-Do: List [10]	Yes	No	No	No	No	No
Shop Easy	Yes	Yes	Yes	Yes	Yes	Yes

5 Conclusion

In this paper, a Shop-Easy Online framework is proposed with the aim of providing an efficient environment for customers and local shopkeepers for maintaining their tasks smartly. In comparison to existing systems, the proposed system includes features that target mostly local shopkeepers and customers to provide them with location-based services. The system can be used effectively to increase the sale and popularity of the local shopkeepers in nearby localities. The rating and review feature of the system can also provide more visibility to shops in nearby localities. Further, the location and time-based notification facility to customers will be proved as a time-saving solution to customers. For future additions, the WhatsApp Bot can be incorporated into the system to make its operation more swiftly. With the increasing online shopping trends, the proposed system can be proved to be a money-saving and time-saving platform for both shopkeepers and consumers.

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