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Aggregator application for tailoring with the integration of geo-fencing to analyze customers and fashion designers

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ABSTRACT

The fashion aggregator is an android application that connects the tailor and the user from their remote location. This application plays a major role in reducing time consumption by letting the user, sketch their clothing design through the developed interface designed using Interactive genetic algorithm. Also, the geofencing feature with proactive fast low resource algorithm helps the user to locate tailors within a radius of three kilometers. The tailorapplication displays the orders placed by the users. The tailors are listed based on ratings given by the previous user. Once the request is accepted by the dressmaker, the tailor updates the days required to complete the task. Simultaneously the cost calculations are made through the application and displayed to the user. The user can track their order through the application. This application is developed with the help of java programming language andGoogle maps API along with the android studio.

Keywords: *Geofencing, Interactive genetic algorithm, proactive fast low resource algorithm, design interface,tailor application.*

1. INTRODUCTION

Mobile applications play an indispensable role by providing various services to the users. It connects people, information, and service providers in a specific handle. In conventional times, the aggregator applications deliver efficient services to the user by drawing syndicated content from various online sources and displaying it in a single location for user convenience. Examples of aggregator applications are Ola, Uber, wooplr, etc. They integrate features like order tracking, finding the nearby store, my cart, payment gateways, costcalculators, and my favorites.

The InStyle is a fashion aggregator application developed for connecting tailors and users. A design interface is developed for users to design their own clothing. The tailors are allocated within a certain range, and the boundary and areas are determined using the geofencing feature. The user can choose their tailors based on the ratings awarded by the previous user.A separate application is availed for the tailors. To view the requests, update the order status for accepted orders, and access the feedback.

The paper is organized as follows. Chapter 2 discusses the existing applications related to the sketching. Chapter 3 explains the existing geofencing mechanism. The proposed system is explained in chapter 4. Chapter 5 contains the application output, and result with a comparison of the existing and proposed application. The paper is concluded in chapter 6.

2. EXISTING SKETCHING APPLICATION

There are only specific brands developing applications for fashion-based sketching. The fashion sketch application is recognized for designing female clothing. The application is partitioned into two parts:

I. Graphic sketching interface
II. Data storage

2. a. Graphic sketching interface

The graphic sketching interface in the fashion sketch application presents different options, like neck designs, gowntypes, sleeve patterns, and fitting designs[3]. The user can choose from the options. After the sketch is complete, the users can view the output. The fashion sketch app uses single stroke lines to visualize the design. The java programming language is used to develop the application. Fig .1. depicts the system architecture of the fashion sketching application[1].

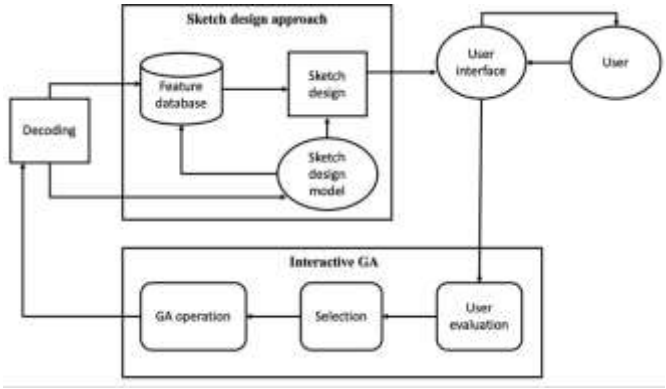

Fig.1. The System Architecture of fashion sketch application

The fashion sketch application has a sketch design model, database, and multi sketch designs. Layman's can use this model to develop the designs reflecting their references. The interactive genetic algorithm enhances the design process. The outline for the fashion sketch is as follows:

1. A user subjectively chooses the waist model, skirt length, skirt model, neckline, upper body structure, and garment type.
2. A sketch design model creates shape, style, and key style components in the database according to the decoding of the style information, the multi-stage sketch design engine merges them according to the decoding of the style data to generate the outline, and then the design is displayed on screen for users to evaluate.
3. A user subjectively evaluates the outline and chooses the more favorites ones.
4. The system adjusts design according to users' evaluations by using genetic operations of crossover and mutation, and the modified skirt candidates are displayed again for evaluation.
5. The system iteratively implements procedures (2) and (4) to produce models for the user's subjective evaluation. If the useris satisfied with some design, the system can end the design process. Fig.2 and 3 depict the fashion sketch design interface.

Fig.2. Selection of garments in fashion sketch application

Fig.3. Output generated by fashion sketch application

In Fig.2, the user may choose the garments from the available options. Fig.3. Depicts the outline of the design based onoptions chosen by the user. The disadvantage of this applicationis that it provides illustrations solely for western wear, like gowns, skirts, and long blouses.

2. b. Features Data storage

A database containing general components of garments is shown in Figure 4 and Table 1[2]. At the initial level, the outline silhouette blouse is segregated based on the variety of neck styles, body fitting, and length. At the second level, the garment gown is subdivided into twelve classes, and then theyare further classified into five classes, while five key style elements are further classified, respectively.

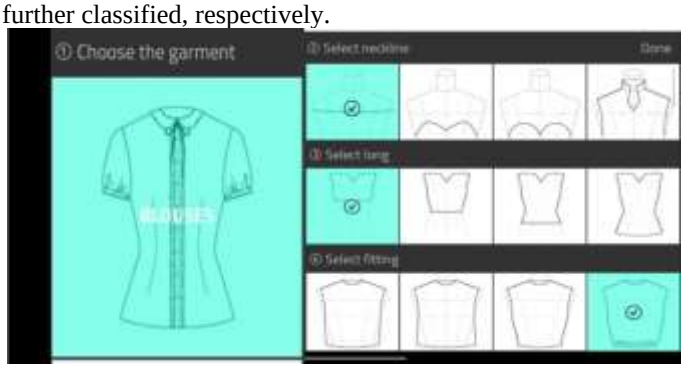

Fig.4. Displays available garments at the initial level

Table.1. Displays the classification of gowns

3. GEOFENCING MECHANISM

The geofence is a virtual geographic boundary that enables the application or software to trigger a response when a mobile device enters or exits a particular area. Geofencing is used in supply chain management. They use geofencing in managing logistics, warehousing, freight, and transportation. Ola, Uber, and other product delivery applications use this feature to locate their customers in a particular geographic location[5]. They trigger a transactional notification when the driver reaches a particular area or guides them by availing the shortcuts to reacha destination in a short time.

4. PROPOSED SYSTEM

The proposed application integrates the features of effective data collection, design interface and geofencing for efficient user experience and a highly reliable app for customizing the clothing's of user

The application is classified into different modules as follows:

1. Login module
2. Main page module
3. Design interface module
4. Find my tailor module
5. Geofencing module
6. Tailor application.

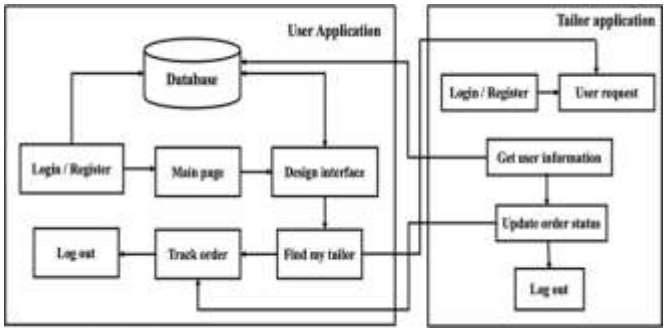

Fig.5. System architecture of InStyle application

4.A. Login module

The login module collects the user information. The module is built using java programming language and android studio bumblebee. The google firebase is used to store the user data. Fig.6. Shows workflow in the login module.
The outline for the login and register page is described:

1. Once the user enters the application, they are prompted to enter the username and password. The details are validated by comparing them with the database. If the user's entered data is correct, they are further allowed to use the application. If the data entered is incorrect, they are asked to enter the correct data.
2. The forget password option is provided to reset their password or generate a new password.
3. If the user is new to the applications, the user is directed to the registration page
4. The user must enter the name, phone number, Mail Id, username, and password.
5.A notification pops if the password is less than six characters, non-usage of numbers, and special characters.
6.The data collected from the user is stored in the database and diverted to the login page. Andprocedure 1 is continued.

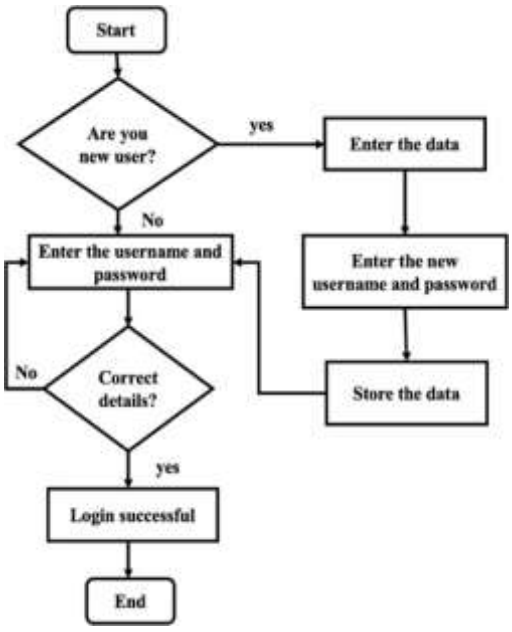

Fig.6. Login Module

4.B. Main page module

The main page module links modules login page, design interface, order tracking, and find my tailor in a single page. It consists of action buttons that link to the other pages. Once the user completes all the actions. The user can exit the app by swiping to the main page module. Fig.7. depicts the architectureof the main page module.

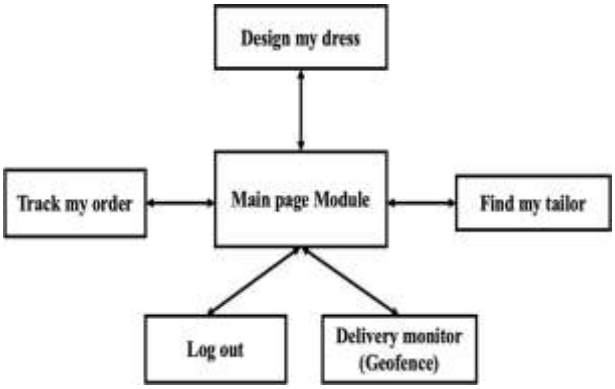

Fig.7. Main module Architecture

4.C. Design interface module

The design interface module is developed using java programming language and android studio. Here, the images of the outfits are stored in the form of a table in the drawable field.In this research, the data used here are tops and bottoms. for tops, the image of the neck design and sleeve design is added to the database. The bottom wear features like pant style are stored as an image in a database. Here, the user can select the designs from the displayed options, and the stored images are merged into a single design and stored in the database for further precedence. This module makes use of the interactive genetic algorithm.

Fig. 8 illustrates the interactive genetic algorithm[1]. Here the user chooses the garment style. Then it leads to the first population phase, the features are provided to the user based on their choice or randomly generated. The information about the garment is decoded from the database and presented to the user. The user evaluates the design. If it is satisfied, then the processis completed here. Otherwise, the user may redesign the optionsor suggestions provided to applications.

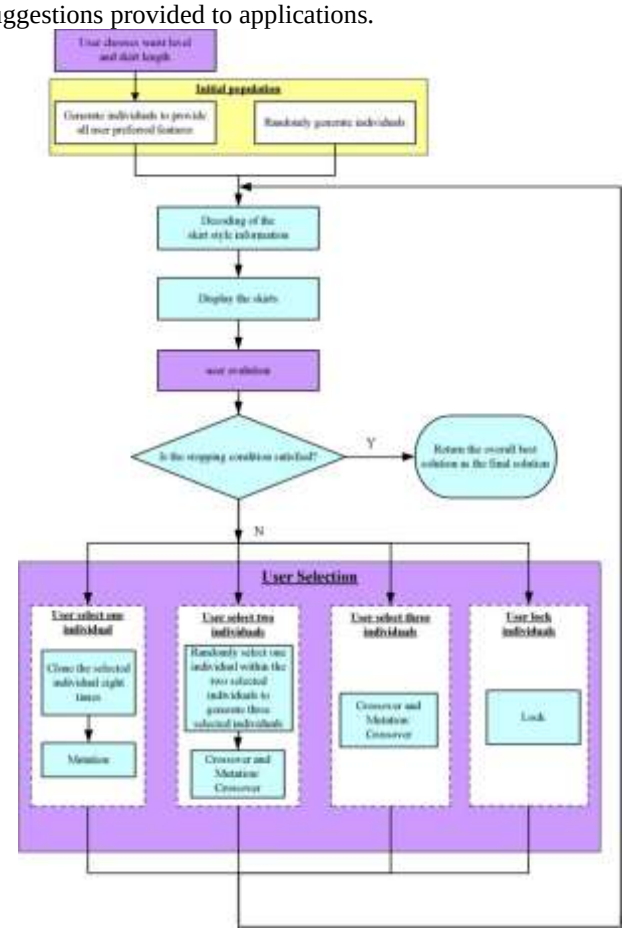

Fig. 8. Block diagram of interactive genetic algorithm

4.D. Find my tailor module

The nearby store feature is used to find the tailors, dressmakers, and boutiques near the user location. the google maps API is a set of application programming interfaces that provides location-based services[7]. This module comprises a conditionwhere the user may find only tailors, dressmakers, and boutiques[6].

Algorithm for Find my tailor follows as
1.If (access location == true)
2.{
3. Request the user to select requirement from the option
4.Click find
5.Mark the locations based on the request.
6.Return
7.}
8.Else
9.{
10.Display dialog box to enable the location11.}

4.E. Geofencing Module

To track the customer in a particular area geofencing is used. This module utilizes a proactive fast low resource geofencing algorithm[3]. This algorithm works with trajectory-based topological join queries. Here, if the polyline defining the trajectory intersects one or more minimum bounding rectangles, the algorithm calculates the intersection between thegeofences and the trajectory. It analyses the result obtained above and returns a composite topological predicate, which tells whether the object entered, crossed, or left that precisely delimited area. The pseudocode for the geofencing module [3]is shown below.

Input : F : set of geospatial objects making geo-fences idx :index of the set of geofences route : trajectory travelled by the object

Output: predicate, position with respect to the fence

```
1.        // list of FeatureIDs of the MBRs in
2.        // the index intersecting the route
3.        I = getIntersection(idx, route)
4.        foreach pos ∈ I do
5.            prev pos=getPrevPosition(route);
6.            // checks if the prev_pos was
7.           // inside the current MBR
8.          if (getIntersection(F[i],prev pos)!=null) then
9.              wasInside = true; else
10.         wasInside = false;
11.       End
12.       Intersections = getIntersections(pos, route)
13.       if (wasInside) then
14.          if Intersections number is odd then
15.             The object left the fence
16.         else
17.            the object is still inside
18.         end
19.       else
20.          if Intersections is empty then
21.             the object is still outside
22.          else
23.             If Intersections number is odd then
24.                the object entered the fence
25.             else
26.               the object crossed the fence and it is outside
27.              end
28.          end
29.         end
30.       end
```

Algorithm 1: PFLGA description

4.F. Tailor application

This module is developed only for the tailors. Where the tailors, dressmakers, and boutiques can register their business. To get noticed by the user through InStyle application. The tailor can view the order request. The request shall be chosen based on their convenience. The tailor updates the status of the order completion manually. Through this, the consumers track their orders easily[4].This application is developed using Figma[9]. The Fig.9. diagram depicts the architecture diagram of the tailor module.

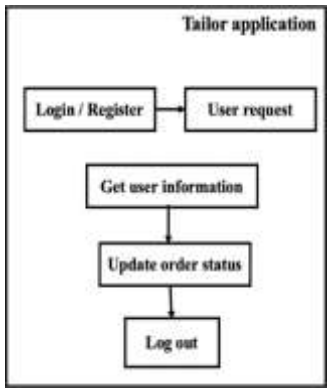

Fig.9. Architecture of tailor application

5. RESULT

The InStyle is a complete tailor aggregator application developed to ease the customization of clothing. The figure shows the output of the modules login, find my tailor, design interface, geofencing, and tailor application module.

Fig.10.Login and Register page

Fig.11. Geofencing the area of the user to track and completethe order

Fig.12. Tailor near the location of the user

Fig.13. Final sketch of the design sketched by the user

Fig.14.Login page of tailor module developed using Figma.

Fig.15.Tailor profile in tailor application.

Fig.16.Order availability in tailor application.

6. CONCLUSION

In this application, an Interactive genetic algorithm is used to design the clothing of the user. To find nearby stores in a particular location are found using google maps API. Geofencing is used in the tracking of orders and customers within a specific boundary using a proactive fast low resource geofencing algorithm. Through these features, the user is provided with a complete app-based clothing customization experience effectively. To enhance the application, automated body measurement feature, voice-based clothing design, neural based attribute suggestion for designing and feature like styling with augmented reality will be added in the application in future.

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