

# Personalized Happy Hours and Their Deals Recommendation System

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## Abstract:

Happy Hours is a time-limited offer strategy which attracts people by providing maximum discounts. People are not aware about these offers going in their nearby areas because of their busy schedule. Mobile device is ubiquity available with customers everywhere and all the time which can help in personalizing advertisements with the help of spatial information and various other parameters. Existing systems use SMS to notify users about advertisements and SMS has limitations. Traditional systems use request-response pattern where user needs to always submit query which ultimately degrades user experience. Also mobile visualization ends up with too much too visualize in a too little display area. Our proposed system considers all of the above issues and leverages the strengths of proactive model and context-aware personalized dashboard for Happy Hours and their Deals recommendations.

*Keywords* — **Proactive Model, Context-aware Personalized Dashboard, Visualization.**

## I. INTRODUCTION

Happy Hours is a time-limited offer strategy which attracts people by providing maximum discounts. Although people are benefitted by such offers, most of the time they are not aware of it and also do not get proper information on it. Newspapers, banners, television and radio which are among the traditional mass media for advertising are restricted to be available only in certain areas as banners in streets, televisions at homes, etc.

For that Internet introduced in marketing to solve the issue of one-way communication, customers can interact with service and product providers on the same media. But it is not available everywhere. Internet segment targeted market but it can't personalize advertisement. When mobile market growth and almost every person own one, marketing researchers found that using mobile

and the most important thing is that it helps marketers to personalize their advertisements when spatial information about customer received as location, preferences and attitudes.

Existing recommendation systems usually follow a request-response pattern, where users need to submit queries and the systems, then return item suggestions. As a result of this, users get many results and find it difficult to browse through them which ultimately degrades user experience. In mobile environments, user experience could possibly be improved by delivering recommendations without any user request or query.

Pro-activity means that the system pushes recommendations to the user when the current situation seems appropriate. Thus, how to present recommended items and possibly notify users is a

main issue. Some systems use SMS to notify users about advertisements and as we know there are lots of limitations with SMS considering its size and attractiveness. Also due to the limited screen space, any mobile visualization can quickly end up with too much to visualize in a too little display area.

Our proposed system for Android mobile application takes care of all of the above issues and not only helps the users to take benefit of the Happy Hours going on in Restaurants but also the deals they are offering. Our approach is leveraging the strengths of proactive model and context-aware personalized recommendation. In addition our application inherits better visualization for recommendation which is more user-friendly.

## II. RELATED WORK

An Mobile Advertising Using Location Based Services (MALBS) System developed based on main mobile characteristics as ubiquity and interactivity[1]. MALBS adopted SMS as the main marketing communication method because all mobile devices support it. However, SMS has limitations in terms of size, attractiveness, etc, people hardly go through the SMS and just ignore it. MALBS uses ranking algorithm for which it considers parameters like distance between subscriber location and publisher location, subscriber preferences information and the time left till advertisement ends. However, there are even other parameters like ratings, discount which can be considered to improve the accuracy of the results. Also, this model uses liner law for calculating distance between advertisement location and customer's location which does not gives exact distance.

A great variety of research and practical applications exist in the area of recommender systems and context-awareness especially in the mobile guides field[2] or the shopping domain[3]. However, proactivity has not gained much attention in personalization and recommender system research. Most systems require the user to perform some kind of action to trigger the generation or retrieval of recommended items. e.g. Happy Hours

India[4] . It is the work of small group of friends who have made it their mission to provide us with the most up-to-date happy hour information with the best deals on happy hours & buffets (Food and drinks )anywhere in our city. User has to select the location and then the application gives details about the restaurants and bars which offers Happy Hours. Also the interface designed for this application is nit user-friendly.

Daniel Gallego et al. [5] in 2011 has designed a two-phase proactive model for mobile recommendation systems. In the first phase, the system determines whether or not the current situation warrants a recommendation. The second phase deals with evaluating the candidate items.

Daniel Gallego et al. [6] in 2011 has designed two options for the user interaction with a proactive recommender: a widget- and a notification-based solution. In addition, our user interface includes a visualization of recommended items and allows for user feedback.

Daniel Gallego et al. [7] in 2012 proposed a model for generating proactive recommendations in e-Learning systems incorporates contextual information to assess whether a recommendation is suitable in a given situation. It also evaluates which learning objects from ViSH are interesting for the user that is being recommended.

## III. PROPOSED SYSTEM

### A. Architecture Model

Our proposed system for Happy Hours and the Deals Recommendation consist of three phases.

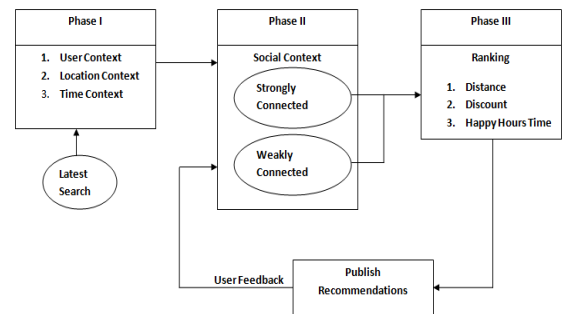


Fig.1 Model for Happy Hours and Deals Recommendation System

**1) Phase I:** In this phase, we have three context i.e., User Context, Location Context and Time Context.

User Context: Preferences of the users which they have already selected and saved for getting notifications and their latest search for 1 month will be taken into account.

Location Context: The range selected by the user, i.e. the distance between the restaurant place and the user's place will be considered.

Time Context: Restaurants Open and Close time will be considered.

**2) Phase II:** In this phase, Social Context i.e., the ratings given by people will be taken into account. Strongly Connected and Weakly Connected clusters are formed based on the scores obtained from the following equation:

$$\text{Rating by Friends} * M1 + \text{Rating by Myself} * M2 + \text{Rating by Anonymous} * M3 = \text{Score(S)}$$

where M1, M2 & M3 are predefined weights.

If the score(S) obtained is above the threshold then it is included in Strongly Connected cluster else Weakly Connected. Results of Strongly Connected Clusters go to Phase III and if there is not even one result in Strongly Connected Cluster then results of Weakly Connected are taken into account.

**3) Phase III:** This is a Ranking Phase, where the result of Phase II are ranked based on Distance, Discount and Happy Hours Timings. The distance between the restaurant and customer's locations is calculated and ranked based on smallest distance. Then Happy Hours deals are re-ranked based on highest discounts and then lastly based on ending time of Happy Hours.

**4) Publish Recommendation:** Final results from Phase III are displayed on mobile in the form of List view & Map view.

Users feedback will be taken which will act as a input to Phase II.

#### **B. Methodology**

1. Initially Customer as well as Retailer will register into the system and then they can login and access the system through website.
2. Customers will create their profiles and select the preferences for the interested products. Also they can update their preferences through website.
3. Retailers will create their profiles and will also update Happy Hours and their deal information through website.
4. All this information is stored in database.
5. Customers will get the information on mobile after they have installed this application in their mobile. Based on the preferences given by user and the current location of the user tracked by GPS in their mobile device, discounts and Happy Hours timings, ranking algorithm will be applied to the fetched results and will be displayed on mobile dashboard where they can view the information either through List or Map. In Map view, when examining the details of POI's we lose the global context. For this arrow technique will be used which will show previous and next POI's as result of which global context will be maintained alongwith the details of particular POI.  
  
Customer's feedback will be taken into consideration for recommendations in the future.
6. Overall our system can be represented as proactive model.

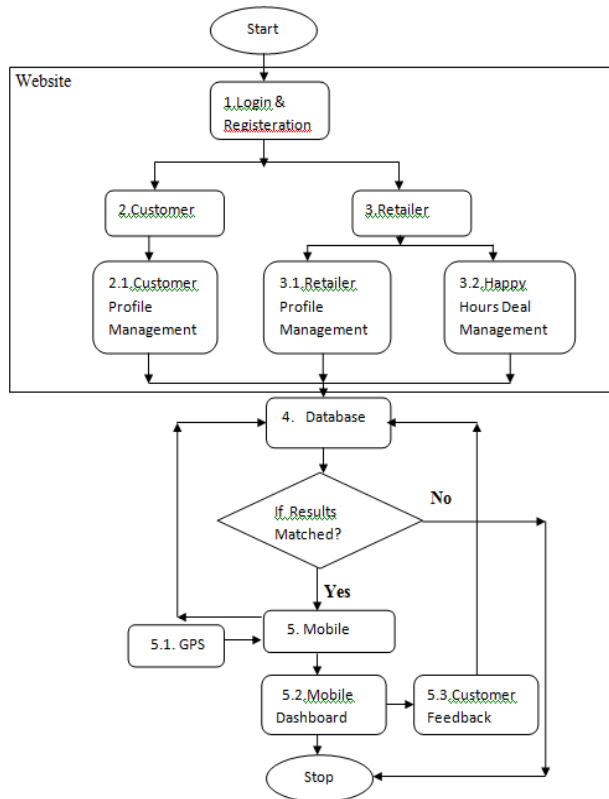


Fig.2 Methodology for Happy Hours & Deals Recommendation System

#### IV. EXPERIMENTAL SETUP

In Happy Hours and Deals Recommendation System, website and mobile device communicated together via HTTP posts to achieve complete functionality of the system. Customers and retailers create and update their profiles through website. Website is implemented in PHP and mobile device is having Android operating system version 4.3. Database will be implemented in MySQL.

#### V. EXPECTED RESULTS

Customers must get right information about Happy Hours and their Deals and at the right time. Customers must get the notifications about Happy Hours and their Deals proactively which improves their experience. Also, they must be able to determine the limit for chosen advertisement distance. Customers must be able to view the Point-of-Interests without losing the global view. Color coding or numbering system must be used for POI's on Google Map. The mobile user-interface designed

for achieving proactivity in context-aware recommender system must be easy, interactive and intuitive. Publishing the deals on website for happy hours should be an easy task for retailers.

#### VI. CONCLUSION

In this paper, a new proactive model in context-aware recommender systems focused on Happy Hours and their Deals is presented. This system will provide platform to retailers for publishing Happy Hours and their deals. Customers will get notifications on these, in context-aware personalized manner, as a result of which they will get an opportunity to be benefitted by them.

#### ACKNOWLEDGMENT

This research work is supported by Prof. Sujata Khedkar, V.E.S. Institute of Technology, University of Mumbai.

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