International Journal of Future Generation Communication and Networking
Vol. 13, No.3s, (2020), pp. 1042–1053

Recommendation of Indian Cuisine Recipes Based on Ingredients

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Abstract

The Recipe Recommendation Program for Indian Cuisines is a program that learns from the past tastes of a user's favorite recipes to recommend a fresh, untested cuisine. The basis of the recommendation is the ingredients that the user has already liked in the recipesIndia's traditional cuisine has been largely refreshing owing to its impressive use of herbs and tastes. Indian cuisine is renowned for its broad variety of dishes. The cooking style moves from the city to the district and is usually divided into South Indian and North Indian cuisine. India is very much praised for its variety of multi-foods accessible in various and inn resorts, suggestive of unity in a number of ways. The staple food in India involves maize, rice, and chana (Bengal Gram) heartbeats that are the most important. At present, there has been a great deal of improvement in the Indian sense of taste. Bengali cuisine is exciting because of its excellent usage of panch phoron, a word used to apply to the five essential flavours, to be a common mustard. Fenugreek seed, cumin seed, aniseed seed, and black cumin crop. Likewise, other dishes from all over the world are a mix of flavors that nourish taste buds.

Keywords— **Recipe; Food; Cook Book; Recipe Retrieval; Android; Recipe Generator; The Meal chart.**

I. INTRODUCTION

There are many varieties of Indian cuisine available with the same ingredients. Traditional cuisine in India consists of a wide variety of locally available spices, herbs, vegetables and fruit. In this article, we set forth a system that proposes Indian cuisine recipes based on the ingredients available and the taste of the cuisine. For this job, we did web scraping to create a list of the varieties of the recipes and then to implement the content-based method of machine learning to suggest the recipes. This system is based on the recommendation of Indian Cuisines.

India's traditional cuisine has been largely refreshing owing to its impressive use of herbs and tastes. Indian cuisine is renowned for its broad variety of dishes. In this article, we proposed a suggestion system for Indian cuisine using ingredients that suit the cuisine and the taste of food. To do this, we've done site scraping to create a database of Indian cuisine and gather details regarding all the recipes and ingredients used in the kitchen. The issues mentioned above, such as the cold start, need to be addressed. One of the ways we can do this is by linking each user to their social network profiles and suggesting recipes that their friends like. Heterogeneity can be addressed by building better, more dynamic creepers. In the future, therefore, it will be possible to enhance the food recommendation by using hybrid approach [12] and web crawling methods where the extracted meta-data is more important. [13] Future changes may involve allowing recommendations on the basis of the regional area where the food originated, or on the basis of a chef whose dishes the customer enjoys. The program may also use the proximity of the consumer to recommend specialty dishes served in nearby restaurants.

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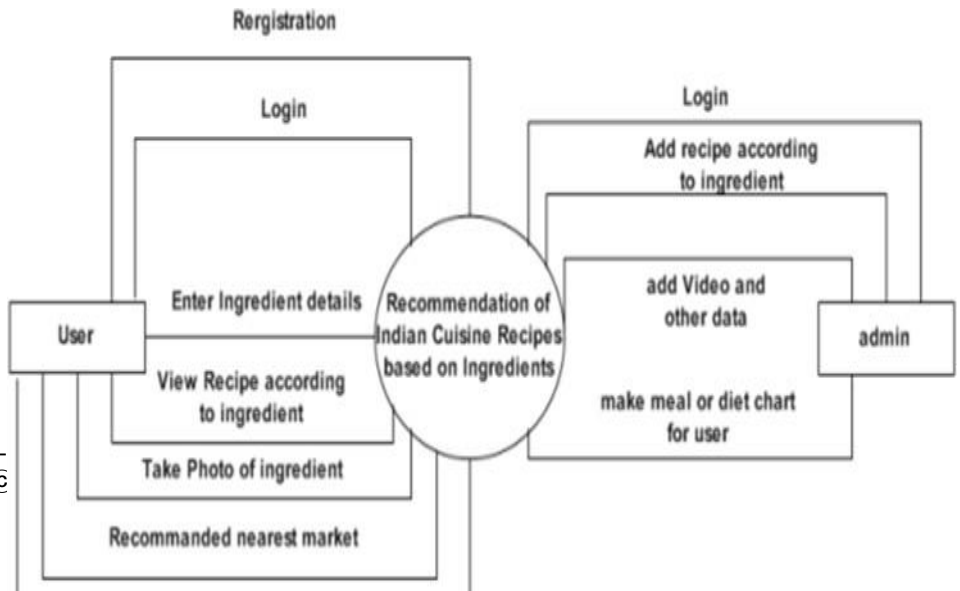
II. METHODOLOGY

The suggested program carries out the cycle of recommending new kitchens to the customer and has been presented with a detailed selection of dishes obtained from the internet, along with details on the ingredients and steps of each recipe. For each person, the system stores dishes that the person likes and attempts to align their recipes with those in its database, and eventually the system offers the user top scores. Method implementation is a mixture of more than one prediction methodology to forecast the element for consumers, the methodology utilized is interactive and content-based. Essentially, it overcomes the downside of the small user-item ranking issue in collective filtering techniques and the question in cold start in content-based techniques. These techniques are co-ordinated and used together to provide the user with a recipe based on the input of the ingredient to the system. The app will feature direct integration with user input ingredients, so you'll know what ingredients you've got so you can cook great meals. The application will provide full details of the recipe information that will include details of the recipe, instructions on how to prepare a dish, ingredients, preparation time along with photos as guides to great food.

One of the major classes used to implement the application is the class that calculates the similarity between users / items using the Pearson Correlation Coefficient. In user-based collaborative filtering, once users have been identified with the items they rated, the Pearson correlation coefficient is used to calculate the similarity between users. Similarly, in collective filtering based on objects, Pearson Correlation Coefficient is used to measure the resemblance between items based on users who rated products.

```
def sim_pearson(prefs,p1,p2):
   # Get the list of mutually rated items
   si={}
   for item in prefs[p1]:
   if item in prefs[p2]: si[item]=1
   # Find the number of elements
   n=len(si)
   # if they are no ratings in common, return 0
   If n==0: return 0
   # Add up all the preferences
   sum1=sum([prefs[p1][it] for it in si]) sum2=sum([prefs[p2][it] for it in si])
   # Sum up the squares
   sum1Sq=sum([pow(prefs[p1][it],2) for it in si]) sum2Sq=sum([pow(prefs[p2][it],2) for it in si])
   # Sum up the products
   pSum=sum([prefs[p1][it]*prefs[p2][it] for it in si])
   #Calculate Pearson score
   num=pSum-(sum1*sum2/n)
   den=sqrt((sum1Sq-pow(sum1,2)/n)*(sum2Sq-ow(sum2,2)/n)) if den==0: return 0
   r=num/den
   return r
```



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III. ALGORITHM

A. OCR

OCR consists of seven main phases, such as Image Scanning, Pre-processing, Segmentation, Feature Extraction, Classification and Recognition, Post Processing. The pre-processing task concerns the removal of noise and the variation in the image. The scanning stage takes up the file. The accuracy of the picture depends very much on the scanner being used. In realistic uses, scanned images are not ideal. There may be some noise due to any unwanted information in the picture which can create a distortion in the identification of the characters in the picture. Pre-processing requires eliminating noise from photographs by adding filters such as Gaussian filter, Gabor filter, etc., and proper transfer of image as a coloured picture may be transformed to a grayscale or a binary picture for further processing of the file. The extraction process of the product requires the identification of the appropriate element. The classification and recognition phase of the OCR process is the extraction phase of the process. After hitting the end of the OCR cycle, some post-processing measures are required, e.g. labeling of meta-data documents or proofreading of OCR error correction documents and spelling errors. The OCR is currently in development and a great deal of improvement remains to be made in this technology. The future extent of this is OCR in mobile apps, identification of handwriting, identification of different languages except English (such as Arabic, Devanagari, Telugu text), retrieval and processing of images from film, processing and preservation of old papers, and many more. This OCR method is a area of study in pattern detection, artificial intelligence and computer vision. This is the electronic or mechanical translation of recorded, handwritten or illustrated pictures into machine-encoded language.

B. Content – Based Filtering

Content-based recommendation approaches essentially consist of comparing the characteristics of the object to the user profile and ultimately suggesting the items with the best fit. This is a semantic screening system used to select products based on a contrast between the contents of the objects and the consumer profile. Words must be interpreted in such a manner that both the user profile and the objects can be contrasted in a meaningful way. Content-based recommendation systems shall take into consideration the data generated by the customer, both explicitly and indirectly. This suggestion method is largely focused on the characteristics of the piece.
keyword or phrase is considered to be an attribute and its weights contribute to the importance of the interaction between the keywords and the text. Various term weighting systems are usable, such as Term Frequency-Inverse Text Frequency Estimation.
TF: It measures the frequency of a term in the document. Since the size of a document may vary, It will be futile to use simple count. Hence this count is normalized.

TF(w) = (Number of times term w appears in a document) / (Total number of terms in the document).
IDF(t) = log_e(Total number of documents / Number of documents with term t in it).
Combining the TF and IDF measures, we can define the TF- IDF weight of a keyword in a document :
Weight = TF X IDF.

C. Collaborative Filtering

Collaborative screening is used to customize feedback based on the actions of people of common interests. User-based filtering and item-based filtering approaches are two of the most commonly employed strategies in the suggested schemes. CF techniques use information from an active user's neighbourhood to make predictions and recommendations. It can be based on an item purchased by the user. Collaborative Item-based filtering is used because it deals well for broad data sets. It is a social filtering technique; basically, it filters information based on other people's advice. Here we are

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applying the-to-item method, i.e. Collaborative filtering approach based on object. In this method, rather than calculating correlations between individuals, ratings are used to assess the similarity between objects. In this test, we use the Pearson Correlation Coefficient to determine the similarities between the two consumer ranking pairs. This approach is very robust in itself relative to User-based shared filtering as the average object gets a lot more ratings than the average consumer.
The algorithm is as follows:
List all the items with the given ratings to them by different users.
Calculate similarity between the items using Pearson correlation coefficient: Where,

$$r(X,Y) = \frac{\sum_k (X_k - \overline{X})(Y_k - \overline{Y})}{\sqrt{\sum_k (X_k - \overline{X})^2 \sum_k (Y_k - \overline{Y})^2}}$$

X_k : Rating of person X for item

$\overline{X}$: Mean Value of person X ratings

Y_k : Rating of person Y for item k

$\overline{Y}$: Mean Value of person Y ratings

Similarly measure the similarity of all the N number of rating pairs for a specific element. Filter the similarities between the objects in such a manner that the objects are in downward order. Produce weighted table for scores that ran / the things by multiplying the ratings by level of similarity for specific users. Find the weighted scores average by dividing the weighted score by a total of the similarity ratings.
List N user items by sorting out the weighted average scores.

II. RESULTS

In our System we can search recipe using available ingredient so their result is given below.

1. Home Screen

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2. Category Screen

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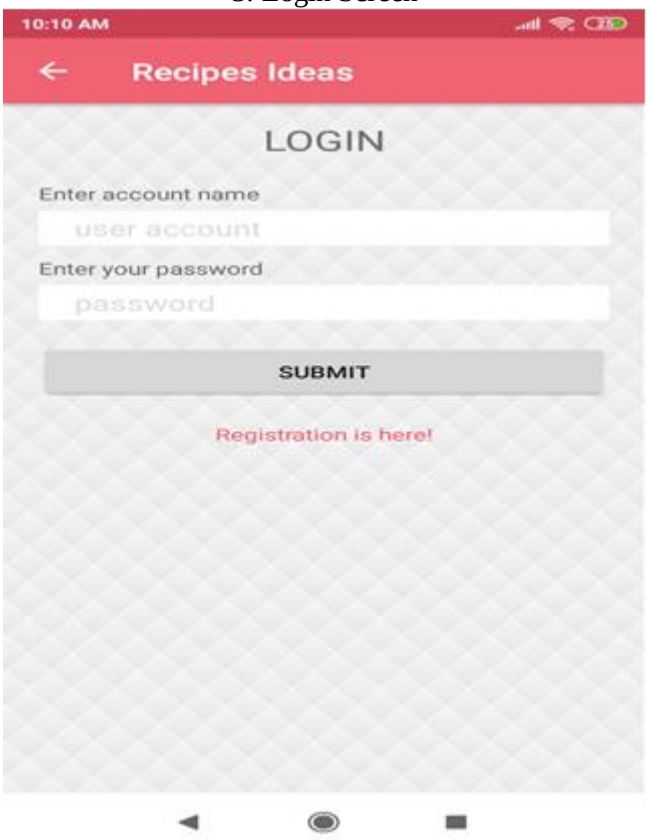
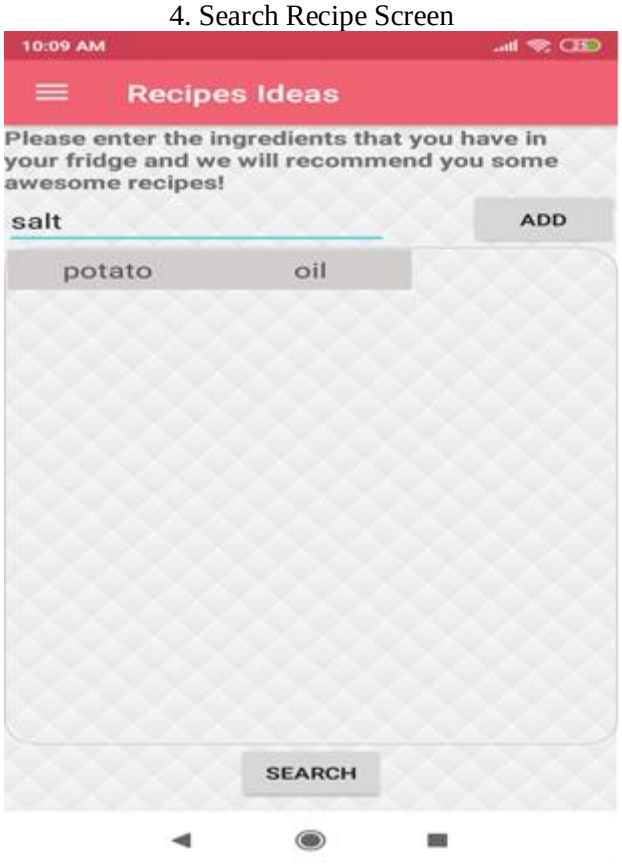
3. Login Screen



4. Search Recipe Screen



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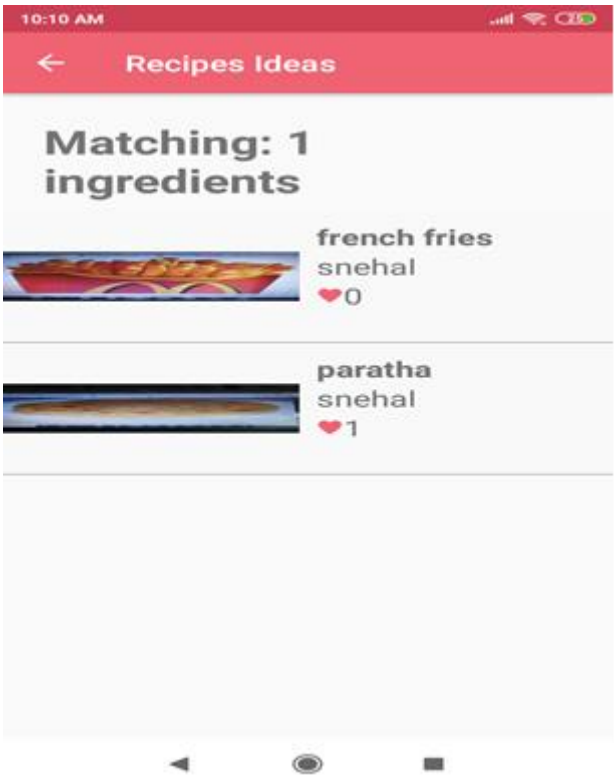
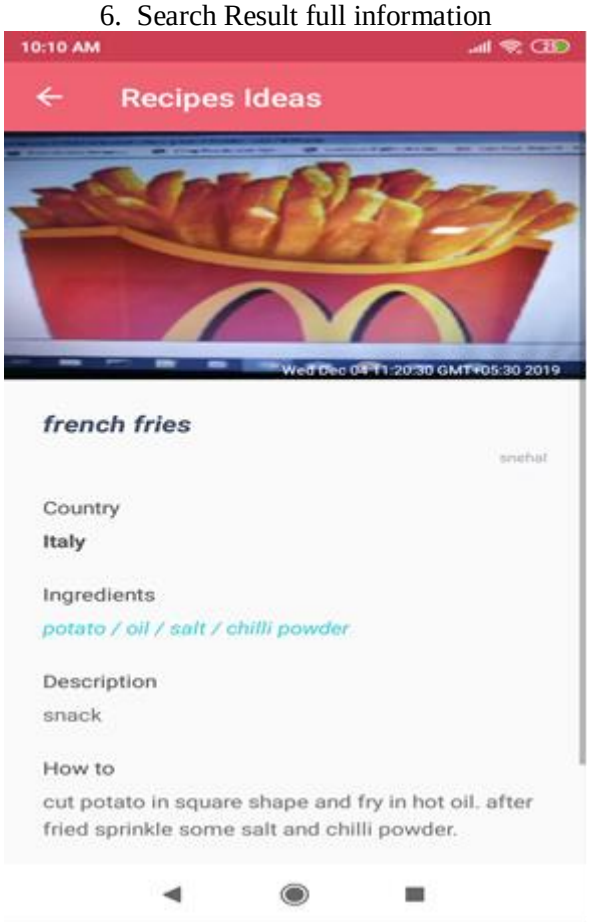
5. Search Result



6. Search Result full information



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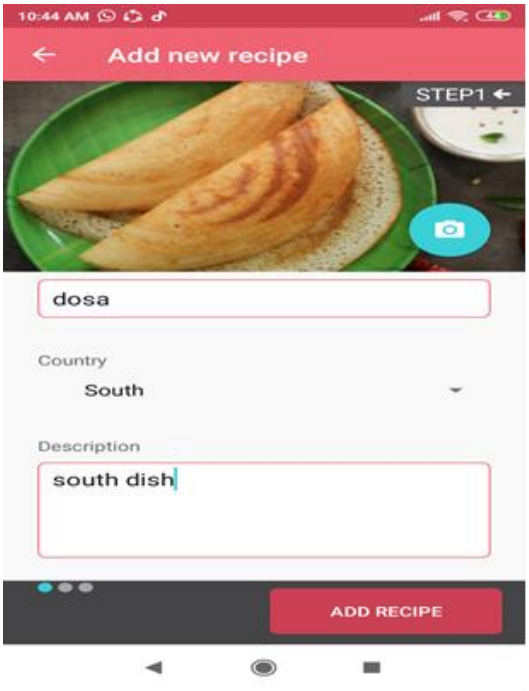
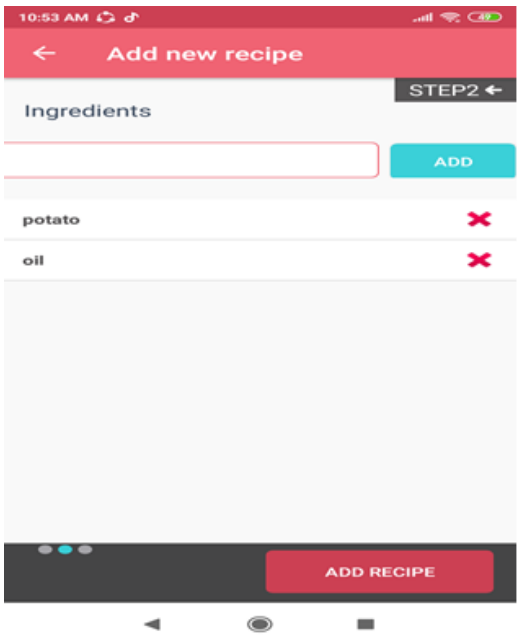
7. Add recipe screen





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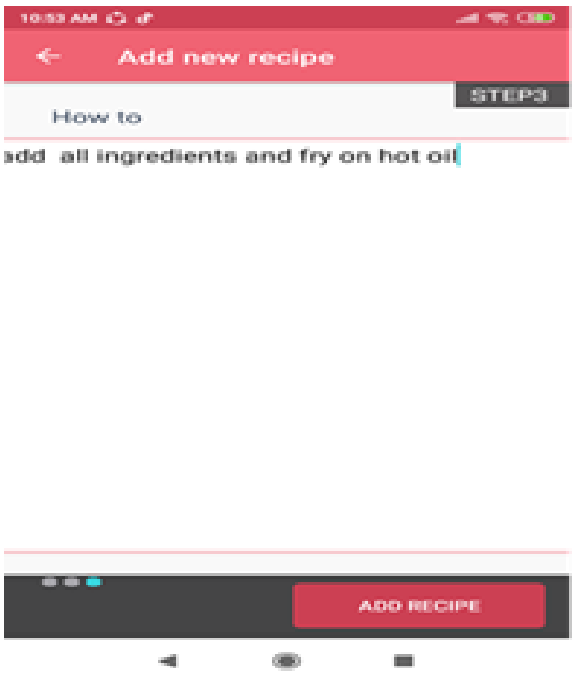

8. Diet Chart Screen

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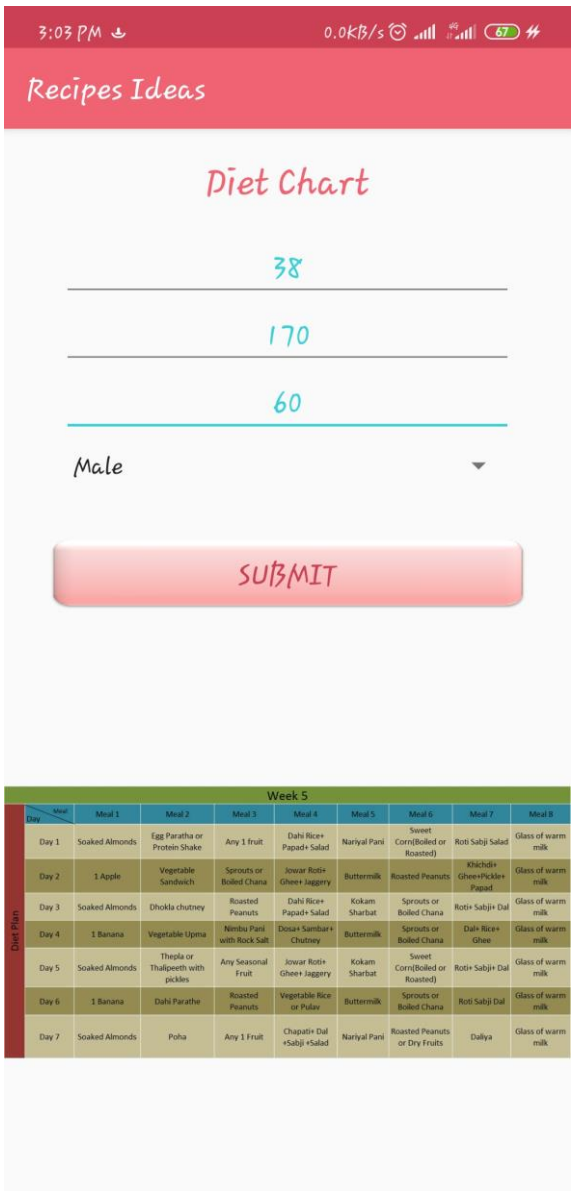

Week 5

Day / Meal	Meal 1	Meal 2	Meal 3	Meal 4	Meal 5	Meal 6	Meal 7	Meal 8
Day 1	Soaked Almonds	Egg Paratha or Protein Shake	Any 1 fruit	Dahi Rice+ Papad+ Salad	Nariyal Pani	Sweet Corn(Boiled or Roasted)	Roti Sabji Salad	Glass of warm milk
Day 2	1 Apple	Vegetable Sandwich	Sprouts or Boiled Chana	Jowar Roti+ Ghee+ Jaggery	Buttermilk	Roasted Peanuts	Khichdi+ Ghee+Pickle+ Papad	Glass of warm milk
Day 3	Soaked Almonds	Dhokla chutney	Roasted Peanuts	Dahi Rice+ Papad+ Salad	Kokam Sharbat	Sprouts or Boiled Chana	Roti+ Sabji+ Dal	Glass of warm milk
Day 4	1 Banana	Vegetable Upma	Nimbu Pani with Rock Salt	Dosa+ Sambar+ Chutney	Buttermilk	Sprouts or Boiled Chana	Dal+ Rice+ Ghee	Glass of warm milk
Day 5	Soaked Almonds	Thepla or Thalipeeth with pickles	Any Seasonal Fruit	Jowar Roti+ Ghee+ Jaggery	Kokam Sharbat	Sweet Corn(Boiled or Roasted)	Roti+ Sabji+ Dal	Glass of warm milk
Day 6	1 Banana	Dahi Parathe	Roasted Peanuts	Vegetable Rice or Pulav	Buttermilk	Sprouts or Boiled Chana	Roti Sabji Dal	Glass of warm milk
Day 7	Soaked Almonds	Poha	Any 1 Fruit	Chapati+ Dal +Sabji +Salad	Nariyal Pani	Roasted Peanuts or Dry Fruits	Daliya	Glass of warm milk

Diet Plan

V. DISCUSSION

In our program we introduce a few more functionality such as check recipe using the current ingredient picture and recommend a good recipe for the consumer and also include the closest shop for the ingredients that are not present.

VI. CONCLUSION

The Suggestion feature lets consumers make choices by utilizing products they already have to check for the most appropriate recipe. The program helps the consumer to check for suitable recipes according to interest.

Provides diet chart focused on the physiology of the patient. The program saves time and effort in looking for the recycling with minimal specifications. Ultimately, this gives customized feedback to consumers, which is beneficial to all.

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VII. FUTURE SCOPE

The program helps you to locate a recipe either by providing your name, or by inserting ingredients into the search area. If text is chosen as content, the search box question would allow you to insert as many ingredients as you want. This then produces a selection of possible recipes that you can create using the products that you have at hand or by including a new element. Similarly, we should use the voice as feedback, making it easier for users to check for recipes simply by saying voice ingredients and finding fantastic dishes. Whereas the consumer should press pictures of ingredients when the image is selected as input and post it in the search box, the correct results would be given for this. The App also helps you to save your favorite recipes for more use.

ACKNOWLEDGEMENT

We would like to thank Prof. B.B. Gite for his immense encouragement and feedback.

REFERENCES

[1] Thakkar, Priyank, et al. "Combining User-Based and Item-Based Collaborative Filtering Using Machine Learning." Information and Communication Technology for Intelligent Systems. Springer, Singapore, 2019. 173-180.
[2] Qian, Yongfeng, et al. "EARS: Emotion-aware recommender system based on hybrid information fusion." Information Fusion 46 (2019): 141-146.
[3] Pereira, Nymphia, and Satishkumar L. Varma. "Financial Planning Recommendation System Using Content-Based Collaborative and Demographic Filtering." Smart Innovations in Communication and Computational Sciences. Springer, Singapore, 2019. 141-151
[4] Wang, Haoyu, et al. (2018) "A Stock Secommendation System Using with Distributed Graph Computation and Trust Model-Collaborative Filtering Algorithm." 2018 2nd IEEE Advanced Information Management, Communicates, Electronic and Automation Control Conference (IMCEC). IEEE)
[5] Zhao, Rui, and Kezhi Mao. "Fuzzy bag-of-words model for document representation." IEEE Transactions on Fuzzy Systems 26.2 (2018):794-804.
[6] A Hybrid Approach with Collaborative Filtering for Recommender Systems Gilbert Badaro1, Hazem Hajj1, Wassim El-Hajj2, Lama Nachman3 1Electrical
[7] DISCOVERING THE IMPACT OF KNOWLEDGE IN RECOMMENDER SYSTEMS: A COMPARATIVE STUDY Bahram Amini1, Roliana Ibrahim2, Mohd Shahizan Othman3 1,2,3 Faculty of Computer Science and Information Systems, Universiti Teknologi Malaysia (UTM), 81310 Malaysia.
[8] Role of Web Usage Mining Technique for Website Structure Redesign Sadik Khan*1, Dr. Yashpal Singh2, Dr. Kalpana Sharma3.
[9] A Framework for a Recommendation System Based On Collaborative Filtering and Demographics.
[10] Data Engineered Content Extraction Studies for Indian Web Pages, Bhanu Prakash Kolla and Arun Raja Raman.
[11] Kolla, Bhanu Prakash, and Arun Raja Raman. "Data Engineered Content Extraction Studies for Indian Web Pages." Computational Intelligence in Data Mining. Springer, Singapore, 2019. 505-512 [7]
[12] Patel, Ankit Dilip, and Yogesh Kumar Sharma. "Web Page Classification on News Feeds Using Hybrid Technique for Extraction."Information and Communication Technology for Intelligent Systems. Springer, Singapore, 2019. 399-405.
[13] Goswami, Saptarsi, et al. "A review on application of data mining techniques to combat natural disasters." Ain Shams Engineering Journal 9.3 (2018): 365-378.
[14] Zhao, Rui, and Kezhi Mao. "Fuzzy bag-of-words model for document representation."IEEE Transactions on Fuzzy Systems26.2 (2018): 794-804.

ISSN: 2233-7857 IJFGCN

[15] Sang, Jitao, Ming Yan, and Changsheng Xu. "Understanding Dynamic Cross-OSN Associations for Cold-start Recommendation." IEEE Transactions on Multimedia(2018).
[16] Khan, Sadik, Yashpal Singh, and Kalpana Sharma. "Role of Web Usage Mining Technique for Website Structure Redesign."International Journal of Scientific Research in Computer Science, Engineering and Information Technology3.1 (2018).
[17] Logesh, R., and V. Subramaniyaswamy. "Exploring Hybrid Recommender Systems for Personalized Travel Applications."Cognitive Informatics and Soft Computing. Springer, Singapore, 2019. 535-544.
[18] Sun, Y., Fang, M. and Wang, X., 2018. A novel stock recommendation system using Guba sentiment analysis. Personal and Ubiquitous Computing, 22(3), pp.575-587.
[19] Exploring Hybrid Recommender Systems for Personalized Travel Applications R. Logesh and V. Subramaniyaswamy.
[20] Web Page Classification on News Feeds Using Hybrid Technique for Extraction, Ankit Dilip Patel and Yogesh Kumar Sharma.
[21] Understanding Dynamic Cross-OSN Associations for Cold-start Recommendation Jitao Sang, Member, IEEE Ming Yan, and Changsheng Xu, Fellow, IEEE
[22] A novel stock recommendation system using Gubasentiment analysis
[23] YunchuanSun1•MengtingFang2•XinyuWang2
[24] Non-Personalized Recommender Systems and Userbased Collaborative Recommender Systems
[25] H. Abdool, A. Pooransingh, Y. Li, “Recommend My Dish: A multisensory food recommender”, Communications Computers and Signal Processing, 2015.
[26] Xuehui Mao, Shizhong Yuan , Weimin Xu, “Recipe recommendation considering the flavor of regional cuisines”, 2017 2nd International Conference on Communications, Information Management and Network Security. IEEE 2017
[27] Mino Y, Kobayashi I. Recipe recommendation for a diet considering a user's schedule and the balance of nourishment[C]// IEEE International Conference on Intelligent Computing and Intelligent Systems. IEEE, 2009:383-387.
[28] Quercia, D.; Lathia, N.; Calabrese, F.; Di Lorenzo, G.; Crowcroft, J., "Recommending Social Events from Mobile Phone Location Data," Data Mining (ICDM), 2010 IEEE 10th International Conference on , vol., no., pp.971-976, 1317 Dec. 2010
[29] “ACM Recommender Systems”: http://recsys.acm.org/2012/call_for_papers.html, May 25, 2012 [Apr. 21 2012]
[30] Armknecht, F.; Strufe, T., "An efficient distributed privacypreserving recommendation system," Ad Hoc Networking Workshop (Med-Hoc-Net), 2011 The 10th IFIP Annual Mediterranean, pp.65-70, 12-15 June 2011.
[31] Konstan, J.A.; Riedl, J.; , “Recommended for you,” Spectrum, IEEE, vol.49, no.10, pp.54-61, October 2012.
[32] N. Koenigstein, G. Dror, and Y. Koren, “Yahoo! music recommendations: modeling music ratings with temporal dynamics and item taxonomy,” in ACM RecSys 2011. ACM, 2011, pp. 165–172.

ISSN: 2233-7857 IJFGCN