WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Recipe Finder Web Application Using Convolutional Neural Network

Dr. C K Srinivasa[1], Harshitha S[2], Mounisha G[3], Nandini P[4], R Kavya[5]

[1]Dept of CSE, Ballari Institute of Technology and Management, Ballari, India

[1]srinivasck9@gmail.com, [2]harshitha0836@gmail.com, [3]bitm.mounisha@gmail.com, [4]Nandiniparmi23@gmail.com, [5]Kavyar1909@gmail.com

ABSTRACT—

Food is really important for people, and all love trying out different tasty dishes. Sometimes, they pick ingredient but they can't decide what to cook using available ingredient. To sort such problem used a system program that recognizes and classify different recipes from the specified ingredient based on text and user can provide with the available food image using image search to get the recipe of that food.

Traditional methods of addressing this issue by using deep learning techniques because these offer promising solutions. Here training the deep learning model using a large dataset of different recipes and on the pre-processed images using the math called CNN (convolutional neural networks) that will allow the system to recognize features and that are characteristics of specific dishes. This achieve an accuracy of 77.7%, which is quite impressive.

Keywords— CNN (convolutional neural networks), Image and Text recognition of ingredients, Deep learning model.

1. INTRODUCTION

In today's world where people care a lot about their health, they try to eat good food that helps them to stay balanced and healthy. But sometimes, they come across ingredient they don't know about or aren't sure what to cook with it. To overcome this problem, a technology is introduced that can recognize ingredient and suggest list of recipes that go well with it. While there are lots of cooking websites and apps out there, sometimes it's hard to follow the recipes they provide. However, with new technology that can recognize ingredient, it could make cooking and choosing recipes a lot simpler and more enjoyable for everyone. The solution employs an innovative and practical approach by using Convolutional Neural Networks (CNNs) to enhance the process of finding recipes.

2. LITERATURE SURVEY

In paper [1] the author discussed about A Food Recipe Finder Mobile Applications Based on Similarity of Materials is a mobile app that has a feature to search for recipes based on material owned by the user. In this app we develop, the user is asked to load the materials owned, then the application will look for recipes that have the material most similar to the material owned by the user. In article [2] the author presented an approach A cooking recipe recommendation system is demonstrated which runs on a consumer smart phone. Object recognition is carried out in a real-time way and recommends cooking recipes according to the recognized food ingredients. It points a built-in camera on a mobile device to food ingredients, thereby, the user could obtain recipe lists instantly. The main objective of the system is to assist people who cook to decide a cooking recipe at grocery stores or kitchen. The proposed system adopts object recognition of food ingredients. The research [3] Deals with a recipe recommendation method that is based on the user's food preferences. For extracting the user's food preferences, use his/her recipe browsing and cooking history. In the previous work, consideration was only existence of non-existence of each ingredient in the cooking recipe for extracting the preferences. In order to reflect the truly user's preferences, this paper propose a scoring method of cooking recipes based on user's food preferences and the quantity of the ingredient in a recipe. We are taking the method of recommending recipes truly based on user's preferences and available ingredients. Consequently, recipes are filtered according to user's preferences. The Journal [4] of This system is designed as a mobile application, including the deep learning method, to answer people's questions during the day. This paper proposes an approach that recognizes the person's materials with image processing technology and presents the most suitable meal suggestions to be made with those materials. The article [5] Recommends "easy" cooking recipes by analyzing the content of recipes and considering user's condition. The system learns user's preferences on cooking methods, food categories at any time when users operate the system by observing the patterns of retrieving their interesting types of recipes. Whenever a user uses the system, the system learns user's preferences on ingredients. The proposed system adopts such a recommendation system by taking the user's preferences into consideration. The research

[6] proposed system is to build a mobile app that has a feature to search for recipes based on material owned by the user. The system suggests recipes according to the vegetables and fruits available to the user. User scans the available ingredients and android application displays a list of possible recipes online. The application is personalized, which means the recipes displayed are filtered according to the user's preferences and health conditions. The

research title [7] Proposes ingredient recognition using deep based approach and retrieves the recipes for the estimation of nutrition facts necessary for various health relevant applications. Ingredient recognition and food categorization is done by exploiting the mutual and fuzzy relationship between them. It demonstrates the feasibility of ingredient recognition. The report [8] Proposes an integration of a deep neural network with a recommendation system. Only the interested ingredients are extracted from the user's favorite recipe. The features are extracted from the analysis of favorite ingredients then a user profile is evaluated by a model of deep neural network (DNN). The system also collects history of selected dishes along with user profile in a database. The model will predict the next dishes using a temporal prediction model on the profile and eating history. In paper [9] author Discusses about displaying food image to cooking instructions conversion through compressed embeddings using deep learning. A unique method is proposed for obtaining the compressed embeddings of cooking instructions of a recipe image. For this cross-model training of CNN, LSTM and Bi-Directional LSTM are used. From this paper, the proposed system adopts the method of automatic recipe recommendations and information retrieval system. In research [10] the author describes about the Designing and developing an iOS based mobile application which allows user to search local recipes based on given ingredients. In addition to that, the utilization of the presence of the camera in the smartphone is also used to conduct recipe search from detected food. In journal [11] the author Builds a mobile food recipe application by using forward chaining method. This application was created on android platform by using Java programming language and SQL Lite as the database. The objective of this application is to facilitate the process of searching and to increase the efficiency of searching. This application will display recipes to users according to the category inputted to the application. The paper [12] titled Photo2Food is an AI-driven food recommendation system that will suggest food recipes based on ingredients currently present with the user. Users will need to take Photo/photos of all the ingredients; The algorithm will detect each ingredient present in the picture and return a result of recipes that can be made using those available ingredients. The research [13] describes about the system proposed in this study is aimed for personalized recipe recommendations and provides a recipe browsing service to customers. Most traditional programs are constructed on a client-server architecture, with the client managing user interface and the server handling business operations and data maintenance. The abundance of recipes, on the other hand, eventually results in knowledge overload The article [14] discusses about the feature of this application is that recipes would be displayed to the user based on the ingredients provided in form of text, voice or image. In this paper [15] author propose a recommendation system for recipe using Convolutional Neural Network (CNN) which is used for supervised learning in order to analyze the data. Recommended Recipe contains diverse ingredients, cooking procedure, categories and so on. The recipe which includes the ingredients mentioned by user with proper nutritional values will be a good recommendation.

3. PROPOSED METHODOLOGY

As the image analysis-based approaches are crucial for recipe identification a proper classification is essential for ensuring accurate recipe finding, which our proposed method facilitates. In this proposed approach, the classification of recipes is performed by identifying the images and text using Convolution Neural Network (CNN) of deep learning. The below diagram (Fig1) depicts the proposed method for finding the recipe. This approach comprises of following stages.

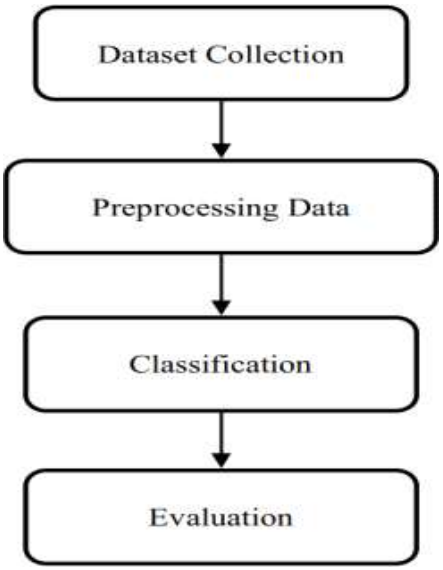

Figure 1: Architecture for recipe finder

Mathematical Notation:

Let X be the input data with periodic boundary conditions, W be the learnable weights, and b be the biases. The convolution operation with periodic logic can be represented as:

$Z = (X * W) + b$

After applying the convolution operation, you can then apply an activation function σ as usual:

$A = \sigma(Z)$

Where (A) is the activated feature map.

i. In the first stage the CNN model using deep learning is loaded and split dataset "Indian Food Classification Dataset".

ii. In the second stage the model is been preprocessed with 70% of data and performs the training for the above-mentioned dataset by using the VGG16 (Figure 2), Resnet50 and Mobilenet models (Figure 3). The following steps involved in the VGG16.

iii. In the third step the model is tested with 30% of the data based on the images and text.

iv. Then followed by the classification which is performed based on the requirements provided by the user.

STEPS:

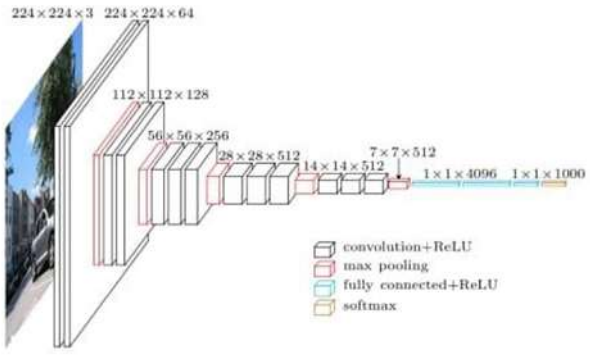

Figure 2: VGG16

a. Initially, import the libraries for VGG16.

b. Object should be created for training and testing the data.

c. The model is initialized.

d. The data is passed to the dense layer, then the model is compiled.

e. Import libraries to the monitor and control training, then the trained/validation data is visualized.

f. Finally, evaluate the model.

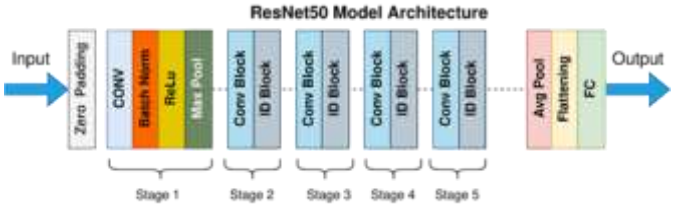

Figure 3: ResNet50

4. RESULT AND DISCUSSION

The proposed approach has been implemented and tested for correctness and complete-ness by taking several case studies and found results are valid. The proposed approach is demonstrated by considering the recipe "DHOKLA".

Following is system's architecture:

• **Registration**: An individuals need to register with the system using username, mail id and password.

• **Login:** After successful registration, user can login and get authority to access system and navigate through modules.

• **Admin:** In this system admin is responsible for managing modules, like adding ingredient, adding recipe, updating and deleting.

• **User:** In this system **user can navigate through home page, and can search for recipes by providing image or text input.**

STEPS:

i. Initially, when users open the application, they encounter with multiple options such as about, registration and login.

ii. The user is requested to register and then login the application.

iii. Here user is redirected to another page where he encounter's multiple options such as upload, search, review.

iv. Now, the user can either upload or search the dish, let's consider the user has uploaded the image of dish dhokla then the application is redirected to another page.

v. The result page consists of the recipe name followed by the ingredients, making procedure and making video link is also been provided.

vi. The user now is been provided with some features such as adding the dish to favorites, and also provided with feedback option as well so, users can comment on the dish.

vii. The application works same with text search, here the users should provide the ingredient as input, so that a list of recipes is displayed based on the provided input.

viii. The users can also share the experience by rating and giving feedback of the application as well.

Figure 4: Here, when the user has uploaded the image of dish dhokla, the user is able to view the dish name followed by ingredients required, making procedure, along with the video link of that particular dish.

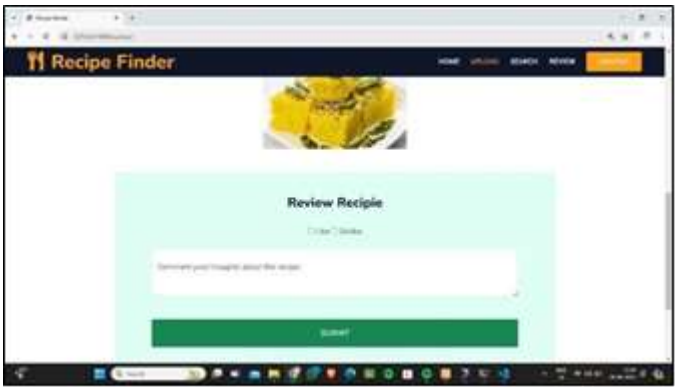

Figure 5: User is provided with some features such as reviewing the recipe and adding the comments i.e. feedback of that recipe.

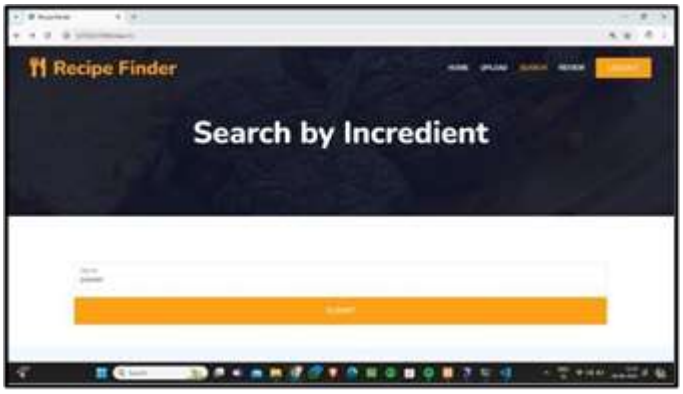

Figure 6: Here, the user can search the recipe by providing the input of an ingredient in this case the input given is paneer.

Figure 7: The result page has the recopies' related to the given input ingredient.

5. CONCLUSION

In summary, a recipe finder that utilizes both image and text inputs, which powered by CNN (Convolutional Neural Network) algorithms, which represents an innovative and efficient way to assist users in discovering and cooking delicious meals. By analyzing both the visual appearance of ingredients and the accompanying text descriptions, this technology offers a comprehensive solution for recipe discovery. Through the integration of CNN algorithms, the recipe finder can accurately identify ingredients and suggest relevant recipes, enhancing the user experience and simplifying the cooking process. This approach combines the power of artificial intelligence with the convenience of modern technology, revolutionizing how people explore and enjoy the delights.

6. REFERENCES

[1] G. A. A. S. a. F. U. Pangestu, "Food recipe finder mobile applications based on similarity of materials.," International Conference on Sustainable Information Engineering and Technology (SIET), pp. 156-161. IEEE, 2018., Malang, Indonesia, 2018.

[2] T. S. T. M. a. K. Y. Yoshiyuki Kawano, "A Mobile Cooking Recipe Recommendation System with Food Ingredient Recognition," Department of Informatics, The University of Electro-Communications, Tokyo, 182-8585 Japan.

[3] S. A. Y. M. a. S. N. Mayumi Ueda, "Recipe Recommendation Method by Considering the User's Preference and Ingredient Quantity of Target Recipe," Proceedings of the International MultiConference of Engineers and Computer Scientists 2014 Vol I, Hong Kong, 2014.

[4] S. a. S. A. Kul, "A Smart Recipe Recommendation System Based on Image Processing and Deep Learning," Springer International Publishing, 2021.

[5] A. Y. &. I. Kobayashi, "Easy Cooking Recipe Recommendation Considering User's Conditions," Proceedings of the 2009 IEEE/WIC/ACM International Conference on Web Intelligence and International Conference, Milan, Italy, 2009.

[6] A. S., S. S. S. T. R. V. H. Abhijith V, "SMART CUISINE RECIPE FINDER," Department of Computer Science, A P J Abdul Kalam Technological University, Edathala, Aluva.

[7] J. C. a. C.-W. Ngo, "Deep-based Ingredient Recognition for Cooking Recipe Retrieval," City University of Hong Kong Kowloon, Hong Kong.

[8] P. P. &. J. H. TossawatMokdara, "Personalized Food Recommendation Using Deep Neural Network," King Mongkut's University of Technology Thonburi, 2018 Seventh ICT International Student Project Conference (ICT- ISPC), 2018.

[9] M. K. &. T. Singh, "Food Image to Cooking Instructions Conversion Through Compressed Embeddings Using Deep Learning," National Institute of Technology Hamirpur,H.., Chandigarh University IEEE 35th International Conference on Data Engineering workshops (ICDEW), Punjab,INDIA, 2019

[10] A. A. Khadar and M. S. Nagraj, "Design and implementation of ZigBee based smart grid system for power management," 2017 International Conference On Smart Technologies For Smart Nation (SmartTechCon), Bengaluru, India, 2017, pp. 1339-1343, doi: 10.1109/SmartTechCon.2017.8358584.

[11] H. H. William, "Resepfinder as an iOS-Based Local Cooking Recommendation," 4th International Conference on Computer Science and Computational Intelligence 2019 (ICCSCI), Jakarta, Indonesia, 2019.

[12] , S. Irawati, "AplikasResepMasakanBerbasis Mobile DenganMenggunakan Metode Forward Chaining," Proceedings Seminar Nasional Riset IlmuKomputer (SNRIK 2016) Universitas Muslim Indonesia, Indonesia, 2016.

[13] D. S. M. B. (. Prateek Sikarwar, "Photo2Food Recipe Recommendation," International Journal of Innovative Science and Research Technology, Bangalore, India, 2022.

[14] G. R. Sanil, "'COOKPAD: KNN Based Recipe Retrieval Using Ingredient Recognition," International Journal of Innovative Research in Science, Engineering and Technology, 2018.

[15] S. G. M. S. K. Rahul Dandekar, "FOODIE An Android Application," International Journal for Research in Applied Science & Engineering Technology (IJRASET), Mumbai, 2016.

[16] N. M. G. P. AlkataiGholve, "Recipe Recommendation System," International Journal of Advanced Research in Computer and Communication Engineering, Pune, India, 2019.