Applications of machine learning in creating personalized meal recipes.

Article consideration

1. This article is relevant for the chosen project because it refers to a system based on deep learning that has the potential to generate recipes based on images of prepared meals, bringing an alternative approach to generating recipes based on the users' food inventory
2. This article is relevant for the chosen project because it refers to a system that is able to make meal recommendations for academic environments, based on the metabolic rate and diet types of the students, and nutrition experts' opinion.
3. This article is relevant for the chosen project because it refers to a more personalized food prediction algorithm, based on the regional customs and recipes. It takes into account the regional differences between recipes, and tries to predict the best recipe for a given region.
4. This article is relevant for the project because is introduces the use of generative Ai language models in the creation of recipes based on a users' preferences and given input.
5. This article is relevant for the chosen project because it refers to a browser system that allows the user to check ingredients and recipes for 14 different allergen categories

Article structure

Article 1

The structure of the article is quite simple in this case, showing the current literature on the subject and the gaps in previous works, the results and conclusions of the study.

1. Abstract
    a. The study discusses the development of an automated system for recognizing food in images and offering suitable recipes.
2. Introduction
    a. It introduces a reverse cooking system that utilizes photos and ingredients to generate cooking instructions, allowing for the consideration of ingredients individually or as a whole.
3. Literature Survey: "Using deep learning for food and beverage recognition", "Sparse Model in Hierarchic Spatial Structure for Food Image Recognition" are surveyed
4. Research Gaps in Existing Work: Finds that deep learning can be used for generating good recipes based on the images it received

5. Results: Descriptive Statistics, Inferential Statistics, Qualitative Data Analysis
6. Conclusions: The results show that the deep learning model can effectively create recipes with high accuracy
7. References: 10 citations, links to other works and books

Article 2

The structure of the article is more rigorous that the previous one, showing the background, methos used, research data research process, results

1. Abstract
    a. The study discusses the role of recommender systems in improving people's health by using a hybrid approach combining collaborative filtering, content-based and knowledge-based models.
2. Introduction
    a. The research applies machine learning models to recommend food choices to university students, while showing the effectiveness of recommender systems in managing dietary recommendations for health.
3. Background: Recommender systems in general and food recommender systems in particular have been previously investigated.
4. Methods: Food reservation data has been collected from students of the university
5. Research data
    a. Profile and personal information for each student
    b. Data of each food

6. Modeling food recommender system for students
    a. Model Evaluation method
    b. Model output
7. Research process
8. Results:
    a. Results of the Best hyperparameters in food recommender system for students
    b. Results of the models based on the evaluation criteria
    c. Comparison of results and evaluation based on ROC curve
9. Proposed food recommender system
10. Satisfaction and Performance Evaluation of Recommender System Recommendations
11. Conclusion: The importance of creating a balanced dietary plan for the students of the University
12. References: 22 citations, links to other works and literacy, books on the subject

Article 3

The study analyzes 15,000 food images from China, the US, and Germany to identify common visual trends related to food choice, finding that the look of a meals plays a key role in determining food preferences across cultures.

Machine learning classifiers that were trained on one culture showed shared visual similarities between the US and German recipes but differences for Chinese users.

The structure of the article is quite simple in this case, showing the background for the study, the chosen data and the methods, the use of machine learning for preferences identification and a summary and the conclusion.

1. Abstract
2. Introduction
    a. Research Questions
        i. RQ1a. Can appreciated and less appreciated recipes within each food culture be differentiated using machine learning approaches, based solely on automatically extracted features from online recipe images?
        ii. RQ1b. Can stable patterns of visual food preferences be identified that cross food cultures using the same machine learning approaches?
        iii. RQ2a. Which factors, derived from recipe images, influence the food preferences of human users in different food cultures?
        iv. RQ2b. Is it possible to identify visual features that help identify food preferences across food cultures?
3. Background: the topic spans across many fields: Psychology, Anthropology and Computer Science
4. Data and Methods: Explains the Data sets of food visual features and appreciation surveys, the data comes from online studies and questionnaires
5. Identifying intra-cultural visual food preference with machine learning approaches: Finding the preferences between western and Asian recipes and the differences between the recipes
6. Summary and discussion: Replies to the questions that were asked. It seems that the algorithm can predict the preferences across the recipes from the Us and China
7. Conclusion: Found that the accuracy of selecting of the preferences is 67% across recipes from Us, Germany and China
8. References: 108 citations, links to other works and books, cited 1 time

Article 4

The structure of the article is somewhat simple in this case, showing some of the related work done in the field, the preliminaries, evaluation of the recipes, the results and the conclusion.

1. Abstract
    a. The abstract introduces the EvoRecipes framework, which combines Genetic Algorithms and generative AI to create novel recipes while considering user preferences.

    b. The Genetic Algorithm explores a broad solution space for recipes, using the preferences of the user as a part of the optimization process, while language models generate the textual content of the recipes.
2. Introduction
3. Related Work: Flavor Graph as an alternative, based on Ai that is used to predict relations between food and chemical compounds.
4. Preliminaries
    a. RecipeOn: It is an ontology that guides the user in preparing recipes as a systematic process
    b. RecipeKg: knowledge grapgh that takes 0.8 million known recipes created by humans
5. Evo Recipes: A generative Approach for evolving context-aware recipes
6. Qualitative Recipe Evaluation: recipes generated by the Ai are evaluated using procedural metrics and surveys
7. Result : use of Chat GPT Da Vinci model to create user readable recipes
8. Future work: Tune the parameters for recipe evolution
9. References: 16 citations, links to other works and books

Article 5

The article has a ramified structure that goes through related work, earlier findings and problems, the acquisition of data for training, the evaluation and the conclusions drawn from the research project.

1. Abstract
    a. The abstract discusses the issues and challenges related to food allergen awareness and the need for an improved labeling system and more protection for persons with allergies.
    b. It goes through the development of a system using machine learning to classify the cuisine style and allergens, as well as the development of a browser add-on that informs the users about allergens in their recipes.
2. Introduction: Motivation, Goal, Overview
3. Related work: refers to
    a. Cuisine Classification: categorization of known recipes
    b. Allergen Classification: categorization of known allergens
    c. Findings
        i. Misclassification for similar cuisines
        ii. One-vs-Rest and Feature Amount
        iii. Noise in Public Recipes
        iv. Class Imbalance
        v. Stratification of Multi Labeled Data
    d. Related Solutions
    e. Proposed system and Existing Solutions Distinction
4. System Concept and Methodology
5. Data Acquisition
    a. Kaggle Dataset
    b. Openfoodsfacts Dataset

    c. Dataset Preprocessing
    d. Cuisine Classification
        i. Hyperparameter Tuning
        ii. Machine Learning classifier
    e. Allergen Classification
        i. Hyperparameter Tuning
        ii. Machine Learning classifier
6. Evaluation: evaluation the trained classifiers
    a. Evaluation and Classifiers
    b. Cuisine Classification
    c. Allergen Classification
    d. Evaluation of Proposed system
        i. Results
        ii. User Study Shortcomings
7. Conclusions: Includes all of the challenges and proposes multiple areas for future work and
    a. Summary
    b. Challenges and Problems
    c. Known limitations and Discussions
    d. Future Extensions and Development
        i. Performance
        ii. Language
        iii. Datasets
        iv. Machine learning classifier
        v. Regional cooking terms
        vi. Feedback loop
        vii. Integrations
8. Author Contributions
9. Funding
10. References: 38 citations in the references, links to other works, datasets; 2001 views, 3 citations. Relatively new research paper.

Bibliography

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4. Muhammad Saad Razzaq, Fahad Maqbolol, Hajira Jabeen, Muhammad Ilyas, EvoRecipes: A Generative Approach for Evolving Context-Aware Recipes https://ieeexplore.ieee.org/document/10185050/references#references
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