A VISUALLY-AWARE FOOD ANALYSIS SYSTEM FOR DIET MANAGEMENT

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ABSTRACT

This demo illustrates a visually-aware food analysis (VAFA) system for socially-engaged diet management. VAFA is able to receive multimedia inputs, such as the images of food with/without a description to record a user's daily diet. Such information will be passed to AI algorithms for food classification, ingredient recognition, and nutrition analysis, to produce a nutrition report for the user. Moreover, VAFA profiles the users' eating habits to make personalized recipe recommendation and identify the social communities with similar eating preferences. VAFA is empowered by state-of-the-art AI algorithms and a large-scale dataset with 300K users, 400K recipes, and over 10M user-recipe interactions.

***Index Terms*—** Diet Management, Classification, Recommendation, Community Discovery

1. SYSTEM OVERVIEW

With the development of the Internet and AI technology, systems of healthy diet are emerging around the world. However, existing research and databases for health management, such as foodlog [1], are generally based on the western diet data, leading to the short of the large-scale datasets and analytical results of Chinese users and recipes. Therefore, this paper presents a visually-aware food analysis (VAFA) system for socially-engaged diet management. As shown in Fig. 1, VAFA may support the users to record their dietary intake with multimedia inputs, and produce a nutrition report with AI algorithms, which are trained by a self-collected large-scale dataset with more than 300K users, 400K recipes, and 10M user-recipe interactions. As a result, VAFA achieves the state-of-the-art performance of 87.3% in food classification. More importantly, VAFA may profile the users' eating habits to make personalized recommendation and social community discovery, which enhance the system adherence of the users.

2. DEMO SETUPS

The VAFA system is implemented on Windows10 with six 2.8Ghz CPUs. (1) **Front end**: The Vue framework is applied to interact with the back-end using Axios; (2) **Back end**: The Flask framework and PyTorch are used to build the backend and implement algorithms, and the data is managed by PostgreSQL; (3) **Community discovery injected social cloud module**: It visualizes with Echarts the user communities with similar eating preferences detected by GHF-ART

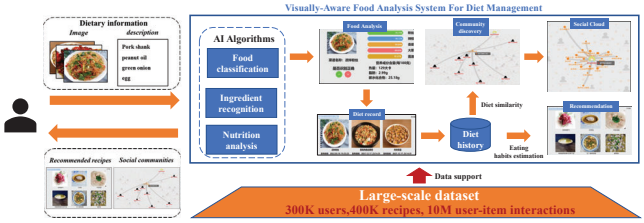

Fig. 1. Framework of VAFA system for diet management.

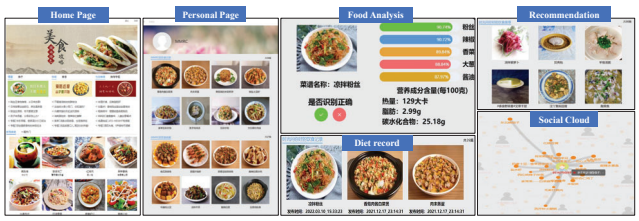

Fig. 2. Demonstration of the functional modules of VAFA.

[2]; (4) **Food analysis module**: ATNet [3] is trained on the extended MeishiChina dataset for predicting food classes and ingredients. It has achieved 87.3% Accuracy, outperforming the baseline by 9.6%, and the nutrition report is informed by nutrition knowledge which follows Chinese DRIs standards; (5) **Food recommendation module**: PiNet [4] is trained by more than 10M user-item interactions and achives 8.11% Precision, outperforming existing methods by 6.29%.

3. DEMO CASES

As shown in Fig. 2, our system is demonstrated in the following procedure. First is the homepage which contains the popular recipe. Next is the personal page which includes users' diet history and recipes recommended by the system. Then there is a nutrition report of the image uploaded by the user via food analysis. Finally, the social cloud provides users with communities discovery based on diet similarity.

4. REFERENCES

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