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Recommending Food for Immediate Consumption based on User Preferences and Context

ABSTRACT

Search results for food are often unsuitable to satisfy a user's need for selecting food to consume in the immediate future. Moreover, the food suggestions presented in search results are based on collective recommendations rather than individual and contextual factors that are specific to the user. This disclosure describes techniques, implemented with user permission, to provide food options geared toward immediate consumption. The suggested food choices can be determined by taking into account user preferences and relevant contextual and local information.

KEYWORDS

- Food recommendation
- Recipe
- Restaurant
- Search engine
- Virtual assistant
- Food advertising

BACKGROUND

Users often search online for eating recommendations. Searches for immediate eating options, such as "What can I eat now?" often result in a list of nearby restaurants and/or informational articles related to food and/or websites, apps, and services that provide diet plans. Moreover, the search results may not take into account relevant contextual factors, such as weather, availability of locally harvested food options, transportation constraints, etc. Further, an individual's taste preferences vary with different factors such as weather (e.g., humidity), local

food availability, the length of stay in the region (e.g., whether the individual is a local or a visitor), etc. As a result, search results provided in response to user queries for eating options are often unsuitable to satisfy the user's need for selecting food to consume in the immediate future.

Although prior research has examined various food-related aspects, such as providing nutritional information, selecting the right dishes, improving food preparation processes, etc., addressing the need to select food for immediate consumption is typically not covered by the research findings. Similarly, products and applications that help people select a dish typically operate based on an initially provided set of options, such as a restaurant menu. Moreover, food choices suggested by such products and applications are based on collective recommendations rather than individual and contextual factors specific to a person.

DESCRIPTION

This disclosure describes techniques to provide food options geared toward immediate consumption. If users permit, the suggested food choices can be determined by taking into account user preferences and relevant contextual and local information such as time, location, weather, local produce, menu options at nearby restaurants, products at nearby stores, etc.

With user permission, the user preferences and relevant contextual and local information is provided as input to a suitable trained machine learning model that outputs one or more suggestions for dishes for consumption in the immediate future. The user preferences used by the model can be specified explicitly by the users and/or inferred with user permission. Further, users can provide feedback on the presented food suggestions that can be used for iterative improvement of the model. The food suggestion model can be extended by examining the user photo collections with permission, e.g., by using any photos of food and beverages in the collection as an additional factor in determining the food choices.

The presented options can include additional relevant information such as recipes to prepare the item, nearby restaurants that serve the item, list of ingredients needed to make the item, etc. Users can sort the nearby restaurant choices based on distance, rating, and/or other parameters. Further, users can be provided with functionality to order the ingredients of a recipe from an online or local store.
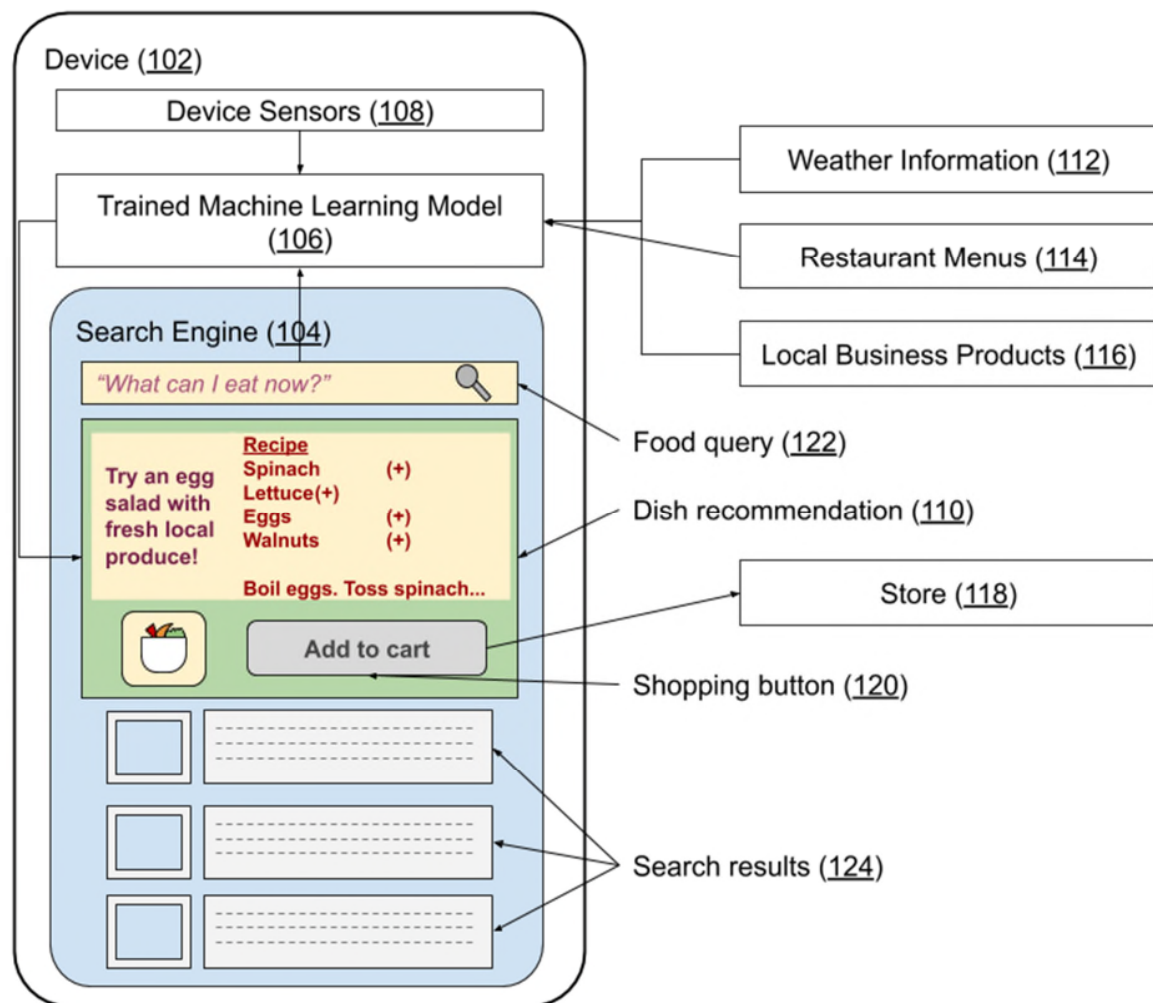

Fig. 1: Receiving a localized custom suggestion for a dish for immediate consumption

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A user seeks a dish for immediate consumption via a food related query (122)

issued to a search engine (104) via a device (102). The query is passed to a trained machine learning model (106) that generates a dish recommendation (110) based on various pieces of contextual and local information accessed with user permission. These pieces of information can include, e.g., relevant contextual data from the device sensors (108), weather (112), restaurant menus (114), and products from local businesses (116).

In the example of Fig. 1, the suggested dish is included at the top of other search results (124) returned in response to the user's query. The dish recommendation ("egg salad") includes a recipe that shows the ingredients for the dish along with an option to add the ingredient to a shopping cart via a shopping button (120) that the user can use to facilitate shopping for the needed ingredients at a local or online store (118).

If users permit, the techniques described above can be extended to enable local restaurants, stores, and food producers to promote their brands and products by advertising within the suggested food choices. Such an extension can be enabled by clustering similar user preferences and contextual parameters and presenting advertisements for appropriate clusters as specified by the requirements of the advertisers.

The suggested food choices can be selected to promote healthy options and avoid known problematic pairings. For example, items that contain excessive amounts of beans and sparkling water can be excluded to avoid potential abdominal issues resulting from the pairing. Similarly, with user permission, suggestions that include unhealthy items (e.g., that exceed dietary guidelines or include alcohol) can be presented such that the quantity is restricted thus promoting a balanced diet without overindulgence. The suggested food options can include dishes that have a high likelihood of being liked by users even if they have never tried them before. The

suggested options can include appropriate pairings of food and drink and/or dessert that work well as a combination.

The techniques described in this disclosure can be integrated within any application that responds to queries related to food such as search engines, voice assistants, maps, store websites, augmented reality applications, etc. Moreover, the techniques can help improve the underlying information index used to drive the search functionality. The model that determines food suggestions can be made accessible via an application programming interface (API) that enables third parties to build custom mobile or web applications pertaining to customized food recommendations delivered with user permission. For instance, restaurants can use such an API to improve food recommendations for repeat customers based on food choices in previous visits; retail store sites can suggest dishes based on shopping selections; photo services can suggest restaurants based on food photos and location; etc.

Implementation of the techniques enhances the relevance and utility of search results returned in response to searches for food options for immediate consumption since the suggested food choices are customized to personal taste that varies across persons and contexts. The presented choices are better suited to user needs and practices as people typically prioritize taste and quality when selecting restaurants and often go shopping for ingredients after first deciding on the dish to consume. Alternatively, or in addition, the food choices suggested by the described techniques can promote locally cultivated or prepared food which is often fresher and healthier. As a result, the visibility of local businesses is improved by connecting them to the most appropriate customers, thus potentially boosting the sustainability of local farming and food production communities.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's food and other preferences, health parameters, activities, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques to provide food options geared toward immediate consumption. With user permission, the suggested food choices are determined by taking into account user preferences and relevant contextual and local information using a suitable trained machine learning model that outputs one or more suggestions for dishes for consumption in the immediate future. The presented options can include additional relevant information such as recipes, restaurants, ingredients, etc., along with functionality to order the needed ingredients from an online or local store. Local restaurants, stores, and food producers can promote their brands and products by advertising them within the suggested food choices. The model can be made accessible via an API. Providing food suggestions in this manner can enhance the relevance and utility of search results for food and promote fresher and healthier locally cultivated or prepared food.

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