METU, Department Of Computer Engineering

Graduation Project

Proposal Form

Project Information

Title

NeVA - Meal Recommender

Target

Public [ ] Restricted [x] BilemiyorumAltan

Proposer Information

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IP (Intellectual Property) Information

All Intellectual property including ideation, tool, source code and documentation will belong to proposers.

Project Description and Background Information

Description

Deciding between things you want is a time consuming process, especially if you are indifferent towards the choices you have. Deciding on what to eat is an example of such a situation. The aim of this project is to solve this issue by recommending meals, according to your eating habits and eating patterns. It strives for making the best suitable decision for its user. Developed program will try to learn your likes/dislikes over time and provide suggestions on your past decisions, mood and your patterns of choice. It will start giving recommendations immediately, without any prior information. Its accuracy will improve over time as the user provide more information about his/her preferences by telling what he/she eat.

Similar Products/Projects

There are lots of recommendation systems, specialized in different fields, but throughout our research we couldn't find anything that recommends meals. Most similar products are:
- IMDB - Movie recommendation system based on previous reviews to other movies.
- nara - A recommendation system for places, including restaurants. Works by keeping previous likes/dislikes.
- Zomato - Recommends restaurants, cafes and similar places. Listings are rated and commented by other users. A user can also choose to filter or sort depending on the price or cousine.
- TripAdvisor - Recommends places to visit, stay or enjoy (usually used by tourists). Places are rated and commented by other users.

Justification of the proposal

Ease human life by eliminating complexities of choosing a meal.

There is a lack of personalized meal recommendation products in the current market. There are some recommenders based on your reviews on different meals but nothing specialized in personalized meal recommendation.

NeVA tries to solve a decision making problem using context based time series data. It provides a solution based on its users' profile by keeping data related to each meal choice. It learns over time and makes better recommendations.

Contributions, Innovation and Originality Aspects of the Project

There are lots of recommendation systems in the wild, but there is no specialized product for meal recommendation. Project outcome will be the first application in this specific area.

By the experience gained in this project, different recommendation services, such as wearing, movie and book recommendation services may be developed.

In the future, the project can be integrated into meal order services and their databases.

Technical Aspects of the Project

Involving technical aspects are:
- Cross-platform mobile development,
- Server-client communication,
- Handling RPC calls on a server machine, at scale.
- Database management,
- Learning and applying data mining techniques,
- Applying machine learning algorithms,
- User management and authentication.
- Abstraction of suggestion object, meal: The project will be focused on meal recommendation but "meal" will be an abstract category as much as possible so that the application and produced methodology will be easily extendable to other categories, for which a context based time series data can be used to provide suggestions.

Targeted Output, Targeted User/Domain Profile

The end product will be a mobile application for users and a backend server program. The app will suggest a meal every time it's opened, even without any prior information about the user. Over time its accuracy will improve as the user provides more information. Suggestions will be based on the location, time and user's profile. The users can provide information about what they eat. This information will further be used to increase the accuracy of these suggestions. Users will also be able to see their meal history. Various patterns in the users' behaviour, which is captured by the meal history, will give more information about the users, such as whether they don't like any kind of meal at a given time or a given location. Also users will be able to specify dietary restrictions or preferences, for example a user with an allergy can specify what he is allergic to or a user can specify he/she follows a vegetarian diet. These preferences will also be used to filter the recommendations.

In the literature, success of such recommendations is generally evaluated through metrics such as user satisfaction and user misery. Such metrics will be employed to compare alternative recommendations. In addition, a rating mechanism will be included for the presented recommendation. Also we will compare the recommended meal with the actual decision and will build training/test datasets so we will also have a way to measure accuracy in an offline matter.

The application can be used by anyone that wants to eat and couldn't decide on what. Only necessity is that he/she needs a mobile phone with internet connection.

Project Development Environment

We plan to use C++, JAVA, Python and Swift languages during our project for developing our product's backend server, on-mobile applications and learning modules.
As initial choices we plan to use:
- GRPC for communication between server and clients.
- MySQL for database management system.
- TensorFlow for machine learning framework.

We will adopt incremental development, so that we can increase our accuracy and features with each increment while always being able to collect new data from users. During the process we will use:
- Phabricator for code reviews.

External Support

No external support will be used in this project.

References

Zomato: www.zomato.com (recommends restaurants for individual)
Tripadvisor: www.tripadvisor.com (location based POI recommendation for individual)
IMDB: www.imdb.com
Nara: http://www.nara.me/
GPRC: https://grpc.io