

State of the art - Diet Optimizer

This document means to gather and summarize how diet optimization websites mainly work. How they manage to appeal to the user and what techniques they use to offer the best services possible. We will start by studying how diet optimization is managed and viewed on the current market. Then we will observe the different services offered by various websites on the internet. We will then compare those functionalities to the goal of the Diet optimizer website we are working on and decide, given our objective, what would and wouldn't be useful. Additionally, we will observe some ideas that could be implemented but were not found on the various websites we studied. Finally, we will discuss about how those ideas could be implemented and what tools we have to improve the website.

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Context

Starting a new diet is never easy and losing weight is even harder. Diet managing websites have understood that well and that's why given the websites we saw, we can see that the main goal is not to have the best or the most recipes. It seems the most fundamental thing is to make it seem like changing your habits is easy. That is why on the market, every diet optimizer has a very user friendly interface and colors everywhere. Simply to make it look less scary.

The other thing about the diet optimization market is that there exists a lot of different diets and some have other goals than others. Someone might want to change its weight (and it could be to gain some) while someone else might start to follow a gluten-free diet for medical reasons. That is why every user is not here with the same objective and this can make websites very confusing to use. This is why Diet optimization websites often have well organized sections and customized goals for users.

Thus we can say that currently, diet optimizer are more of a communication than a calculation business. The whole thing is about making the user believe he will reach his goal easily and without having to think too much as long as he follows the instructions he is given.

Functionalities of diet websites

To perfect our diet optimization website we must look at what are the different functionalities offered by already existing diet management websites. Here are the main functionalities we noticed during our observations.

- Two different kinds of goals

In general most of the diet managing websites distinguish two kinds of goals for users who use them. The first kind of goal is to try to have a particular way of eating. For instance a user might come to start eating vegan or he might have discovered he is gluten intolerant and want to start eating gluten free because of his health condition.

The second kind of goal is to change diet in order to achieve a goal the user has in mind. It is not exactly for instant medical reasons or to try a way of living. The user might come because he noticed his eating habits were not healthy and he wants to exercise more, lose weight or even try to eat less carbs in order to have a healthier lifestyle. Knowing why the user want to change his diet seems to help the website give more personalized directions to a healthier way of eating.

- Reaching your goal

The user can select what he wants to focus on (atkins, balanced, gluten free, glucose control...). The sites propose recipe according to different types of diets and the user's goals. It's often use for weight loss goals or low carbs diet. The user can enter the weight he wants to reach for instance, or if he wants to become vegan. It helps the user to gradually reach his goals.

Goals can be very different : bodybuilding, fat loss, nutrient density maintenance...

- Exercise propositions

Along with diet advices, some websites also offer the explanations of different exercises to help the user keep a healthy lifestyle. Those websites usually emphasize on weight loss and balanced diet more than lifestyle change and health condition. They suggest those exercises daily and propose a daily follow up of what the user has to do to ensure he does enough physical activity. Those exercise vary in difficulty and intensity to lead the user to something he will more likely be able to follow. The exercises are given with the explanation of what the user has to do and how long it takes. since those websites usually follow weight loss, those exercises are often paired with both a weight and an exercise tracker to follow the user's evolution. It is then possible to see how many calories were burnt with each exercise and see a graph of the daily calories burnt. Some websites also advise some personalized exercises given the information they have about the user. They use the habits and diet the user want to follow to see if he has to burn more or less calories to reach his goal.

- Most famous propositions.

Some websites have a part of their frontpage showing the most liked recipes they propose on the website. It can also be the most liked exercices, foods or types of diet. Some can

even be graded by users. Every element of a list can be selected and the user is redirected to the page of the selected element. It can also be proposed according to the user's profile.

- List of the recent food used by other users

It works the same as the list of famous propositions. The user can find the recent recipes used by the others users, or the recent exercises made. It can also be proposed according to the user's profile.

- List of the new food/recipes proposed by the websites

Here a list again, and on the same principle than the two others list, the user will see the food, recipes and exercises recently added to the website. Once again they can be proposed according to the user profile.

- User's profile

In the majority of the websites, the user has to answer questions to create his profile. The user must enter various information about himself, his wishes and his lifestyle habits. The profile can be summarized in 5 main themes :

- Account Information : email, name..
- Body Details: weight, height, age, sex, health conditions (asthma, pregnant, hypertension ...), allergies, ...
- Goals: weight goals (loss or gain), lowcarbs, bodybuilding, vegan diet, gluten free;..
- Macronutrient Targets : type of diet like vegan, gluten free ...
- User's lifestyle habits : activity level, kind of food you mostly eat, motivation

Some site call the profile the user's nutritional fingerprint.

- Personalized report

Some site generate a report with the data given by the user in this user profile. The report can be a simple summary of the information given by the user, or it can also give some advices. With this report, the site classes the user and advise him different things :

- A kind of diet, for instance : 3-days diet, 3-hour diet, low carbs diet...
- optimal foods for his needs
- optimal recipes following his goals
- optimal menu (for a whole meal (starters, main course, desert))

It can propose new lifestyle habits like : Better snacking between meals.

- Suggestion :

In function of the user's profile, the report or just a few elements like height, weight, goal or diet type, websites suggest many different things:

- Goals advised : according to the user lifestyle, some goals are advised if the user want to have a healthier lifestyle.
- Diet advised : Different kinds of diets to reach your goals in the best possible way while respecting your eating habits.(gluten free...)
- Recipes/food advised : A list of recipes and ingredients for the user, respecting his diet goal and his activity level to keep a healthier lifestyle. Price and cooking time are often given with this information.
- Menu advised : several recipes advised for a whole balanced meal.

- Daily menu advised : full breakfast, lunch and dinner suggested to eat in a healthy way for the whole day. Sometimes, according to the kind or duration of the diet, the website might even advice for several days.
- Exercises advised : Some personnalized exercises depending on the age, physical condition, lifestyle and goal of the user.

In general, websites suggest a full diet plan.

Some websites even suggest restaurants near the user's location or even restaurant chains that are convenient for some kinds of diets (like gluten free or for diet loss). In the same idea, some shops are advised where the user can buy the food he is advised to eat. It could be the food for the recipes he selected or even what the website proposed him to eat. Thus the user can cook the recipes he wants with food he bought locally.

- Diary and charts

Some websites offer a diary to follow the evolution of the user's diet. It is mostly used in diets with goals like losing weight or reducing carbs for instance. This evolution is often measured daily.

Websites propose Lifestyle detection (for instance : you eat too much meat) and daily follow-up of what the user eats or cooks. The website can then advise some recipe and kind of food according to your daily consumption.

Some of them offer a daily evolution of the user metrics, presented as a chart. It can monitor weight evolution or calories burnt for each day for instance. The websites often give a summary of all thing that the user consumed (percentage/grams of fat, carbs, ...). Websites compute the Daily evaluation of the user's consumption and activity level to suggest meals and exercises the most adapted to your day.

Some websites even implemented the principle of lifiescore. Some kind of weekly score evaluating the user's health according to several metrics like nutrition and activity. They then recommend recipes or foods according to this score.

The diary also allows to store the preferred foods, recipes and exercises of the user. It is also possible to create recipes by giving the ingredients and writing each steps.

An estimation of the nutritious information for these recipes can then be made by the website.

- Calories counter (of your meal/plat...)

Some websites offer the possibility to estimate the calories (or others nutrient intake) consumed per day depending on what you eat.

Some websites do the same thing but with calories burned during an exercise or during your day depending on your activity.

These data can be represented by a chart or a graph.

- Nutrition advice and information about diet in general

In many websites we can observe various articles about general nutrition advices. These articles are often organized by theme (ex: low carb) and are coming along with some suggested recipes. They explain many things about the different kinds of diets and nutrition advices about the human body.

- Article scanners to have info about a food item

Some applications offer the possibility to scan a product in a shop and see the nutritious intakes of this product. (However this would be complicated to implement for our website)

- Connected switch

Some applications even offer the possibility to connect to a smart watch to instantly monitor the calory intakes, amount of exercise done, etc.

- Forums & blogs

There are usually a forum to discuss and get advices from other users. There are also some blog posts from experts.

- Often available in app format

Since everybody is now using his smartphone very often, these websites figured it would be more convenient to create apps to allow the user to manage their diet more frequently.

- Help tab

There is usually a help tab to explain how the website functions.

Possible improvements for the Diet optimizer

From what the website appears to offer currently, it seems that the aim of the diet optimizer website is to propose different recipes according to the different needs of the user. Thus it is pretty convenient if the user already knows what kind of food he needs. However, given the functionalities we saw previously, we can see that the diet optimizer website already has a lot of those functionalities already implemented. What it lacks however is advices for the user and explanations of what the user should aim for.

Indeed a large majority of the websites we observed offered a detailed follow up of the user according to his lifestyle, allergies and medical conditions.

Here are some of the improvements we can do to make the diet optimizer website more interesting for its users.

- Goal report and user profile

The website already implements a survey to know what the user wants and what he can and cannot eat. Allowing the user to have access to a quick report of what the website knows of him and what is advised for him would help the user to be more aware of what type of recipes he might want to choose. This report could advise a diet plan and/or new lifestyle habits.

Moreover, the already existing survey for a recipe search is containing a lot of information. However it has to be filled every time. The website could create a user's profile containing most of this information and store it, then automatically applying it to recipes search without

asking the user. Thus making the search lighter and suggesting optimal parameters for every search. If the user would like to change those parameters he could simply go to his profile to change them.

The creation of the user profile would only need some changes in the Model of the database and the creation of several views in order to allow the user to see those reports. It would also need some tweaks in some of the already existing views to make the tab clickable.

- Long term menu proposing

According to the user's needs, the website could suggest a large number of various, balanced and healthy meals helping him to reach his goals on a multiple number of days. For example, a vegan person could arrive on the website and ask for menus for the next three days. An algorithm would then search enough vegan recipes to last the user for 3 days. The website could also propose a whole menu for each meal with entry and/or main course and/or dessert, of course with the associated recipes. It could also calculate the number of nutrients the user would need in those three days to make sure the user have everything he needs.

For this the website would need to select several lists of recipes (main course, dessert and starters) per meal and calculate a score according to the different nutrients the user would need per day. The objective would then be to find a good matching of recipes to optimize this score as much as possible. If the user asks for several days, the algorithm would repeat, but putting aside already used recipes.

- Bad habit detection

The website could store for each user the recipes he recently ate. According to what those recipes contain, it would be possible to detect what kind of food the user eats too much or not enough. The website could then advise new ways to eat, different recipes or diets to help the user change his bad habits and go back to a balanced diet.

For this we would need to calculate, according to the user's profile, the percentage and quantity of nutrients he needs to consume (fat, carbs, protein, calories, etc) per day or per week. Then according to the history of recipes he cooked, calculating the effective percentage of what he consumed and if any anomaly is detected, the website would alert the user.

- Recipe Popularity

Adding the possibility to grade recipes would allow the website to arrange them and show the most popular ones. Even more interesting, when the user searches for recipes, it would be possible to show the most popular recipes first and show their grade. The user would then have less difficulty choosing between every recipe suggested.

For this it would only need to change the model of the database to store the grades of the users and some minor tweaks to views to allow users to vote and see the most popular recipes.

- Suggestion

Currently the website propose some recipes after launching a search. It could propose recipes independently from any search the user made, in a separate tab. Those recipes could be selected using information like the food recently consumed, according to the

recipes he liked ,recipes recently searched or new recipes. It could also be interesting to vary the type of recipes (proposing something else than rice if the user ate some yesterday for instance). Showing the user recipes with his favorite ingredients but also with new kinds of foods to make him discover new recipes. It could suggest some seasonal recipes or new ones from the database. Finally it could also propose recipes to fight bad eating habits. This tab would also be a good place to show the most popular recipes.

The input of our algorithm would be all the foods and recipes we defined earlier (liked ones, recent ones, etc). The algorithm would then have several recipes as outputs, without taking in account the user's profile. Once we have these recipes, a filter would be applied on these according to the user's profile.

However we would have to determine how this algorithm functions. We think this could be possible by using a prediction deep learning algorithm. We would need to break down recipes in variables and label them beforehand.

Recipe websites we could scrape.

Here are the different websites we observed that could be scraped to "feed" the database. they have been selected according to the information they contain and if they are potentially scrapable. The following recipes all have the information asked by diet optimizer except for the price per serving. However it is possible to calculate it so this is not a big issue.

Those websites have also been selected because their html is organized enough to enable a loop to scrape recipes one by one in a single algorithm.

<https://www.allrecipes.com/recipes/>

<https://www.hellofresh.com/recipes/>

<http://www.eatingwell.com/recipes/>

<https://www.skinnytaste.com/recipes/>

<https://www.diet.com/recipes/>

<https://www.tasteofhome.com/recipes/>

<https://www.taste.com.au/quick-easy>

Conclusion:

The current diet optimizer website has a functional recipe sorting algorithm that is very useful. However it lacks a bit in communication to the user and needs a few more improvements to explain to the user what his goals are and what he can be searching for.

The few improvements we suggest mainly focus on solving this issue. Fortunately the website already tries to do a personalized approach to diet managing for the user, which will make it easier to change in this direction.

Additionally, adding a social dimension to diet managing can help users have an easier time improving their lifestyle and sharing their efforts but it can also help the website know what recipes are most liked and then be more precise in its recommendations to the user.