Diet recommendation for disease

Team: TETRA

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Project Objective

- ❖ Create a web application that asks users to choose a certain health condition

- ❖ Returns a list of foods that may help patients with that condition or help prevent that condition

- ❖ Also returns a list of foods that may be detrimental to those with that condition or may help contribute to that condition

- ❖ Help users make more informed decisions about what foods to eat

Project Methodology

❖ Use a web crawler to gather information from Wikipedia about impact of diet on a list of diseases and conditions

❖ Run sentiment analysis on the information and find foods that appear in the text

❖ Using the results of the sentiment analysis, sort the foods into either positive or negative (ie good for you v. bad for you)

❖ Display the results on the webpage for the user to see

Web Crawler
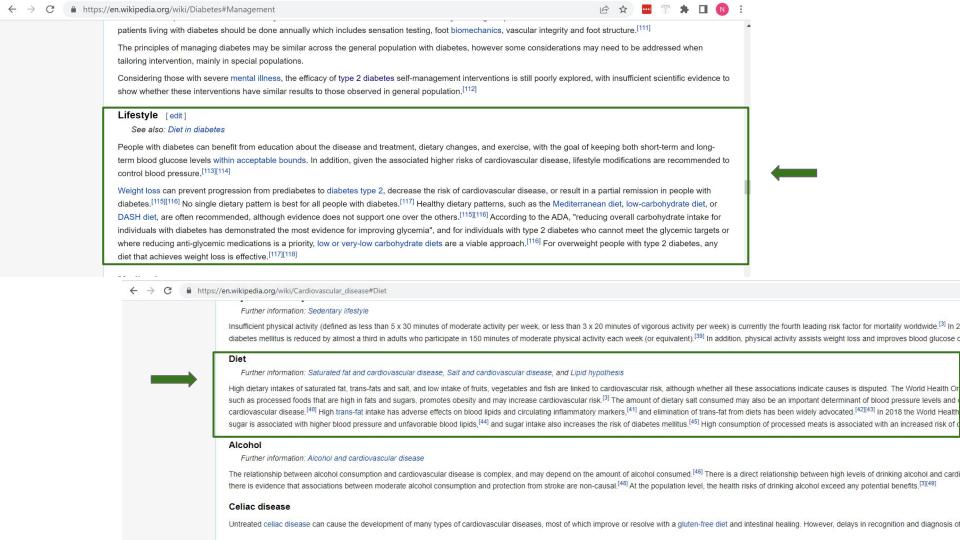
- ❖ Links to prevalent conditions/diseases that are caused or alleviated by dietary choices are chosen.

- ❖ Goal: Collect diet information from the Wikipedia page for each condition

- ❖ Get HTML response for each Wikipedia page and use Beautiful Soup python library to parse HTML to retrieve diet data for each disease

- ❖ Pass this data in JSON format onto the sentiment analysis functions

patients living with diabetes should be done annually which includes sensation testing, foot biomechanics, vascular integrity and foot structure.[111]

The principles of managing diabetes may be similar across the general population with diabetes, however some considerations may need to be addressed when tailoring intervention, mainly in special populations.

Considering those with severe mental illness, the efficacy of type 2 diabetes self-management interventions is still poorly explored, with insufficient scientific evidence to show whether these interventions have similar results to those observed in general population.[112]

Lifestyle   [edit]

See also: Diet in diabetes

People with diabetes can benefit from education about the disease and treatment, dietary changes, and exercise, with the goal of keeping both short-term and long-term blood glucose levels within acceptable bounds. In addition, given the associated higher risks of cardiovascular disease, lifestyle modifications are recommended to control blood pressure.[113][114]

Weight loss can prevent progression from prediabetes to diabetes type 2, decrease the risk of cardiovascular disease, or result in a partial remission in people with diabetes.[115][116] No single dietary pattern is best for all people with diabetes.[117] Healthy dietary patterns, such as the Mediterranean diet, low-carbohydrate diet, or DASH diet, are often recommended, although evidence does not support one over the others.[115][116] According to the ADA, "reducing overall carbohydrate intake for individuals with diabetes has demonstrated the most evidence for improving glycemia", and for individuals with type 2 diabetes who cannot meet the glycemic targets or where reducing anti-glycemic medications is a priority, low or very-low carbohydrate diets are a viable approach.[116] For overweight people with type 2 diabetes, any diet that achieves weight loss is effective.[117][118]

Further information: Sedentary lifestyle

Insufficient physical activity (defined as less than 5 x 30 minutes of moderate activity per week, or less than 3 x 20 minutes of vigorous activity per week) is currently the fourth leading risk factor for mortality worldwide.[3] In 2 diabetes mellitus is reduced by almost a third in adults who participate in 150 minutes of moderate physical activity each week (or equivalent).[39] In addition, physical activity assists weight loss and improves blood glucose c

Diet

Further information: Saturated fat and cardiovascular disease, Salt and cardiovascular disease, and Lipid hypothesis

High dietary intakes of saturated fat, trans-fats and salt, and low intake of fruits, vegetables and fish are linked to cardiovascular risk, although whether all these associations indicate causes is disputed. The World Health Or such as processed foods that are high in fats and sugars, promotes obesity and may increase cardiovascular risk.[3] The amount of dietary salt consumed may also be an important determinant of blood pressure levels and cardiovascular disease.[40] High trans-fat intake has adverse effects on blood lipids and circulating inflammatory markers,[41] and elimination of trans-fat from diets has been widely advocated.[42][43] In 2018 the World Health sugar is associated with higher blood pressure and unfavorable blood lipids,[44] and sugar intake also increases the risk of diabetes mellitus.[45] High consumption of processed meats is associated with an increased risk of c

Alcohol

Further information: Alcohol and cardiovascular disease

The relationship between alcohol consumption and cardiovascular disease is complex, and may depend on the amount of alcohol consumed.[46] There is a direct relationship between high levels of drinking alcohol and card there is evidence that associations between moderate alcohol consumption and protection from stroke are non-causal.[48] At the population level, the health risks of drinking alcohol exceed any potential benefits.[3][49]

Celiac disease

Untreated celiac disease can cause the development of many types of cardiovascular diseases, most of which improve or resolve with a gluten-free diet and intestinal healing. However, delays in recognition and diagnosis o

Entailment Analysis: RoBERTa Model

- ❖ Pretrained entailment analysis model
- ❖ Based on BERT model
- ❖ Cheks hypothesis with respect to premise
- ❖ Thee way classification
  - ➢ Entailment
  - ➢ Contradiction
  - ➢ Neutral

premise (string)	hypothesis (string)	label (class label)
"This church choir sings to the masses as they sing…	"The church has cracks in the ceiling."	1 (neutral)
"This church choir sings to the masses as they sing…	"The church is filled with song."	0 (entailment)
"This church choir sings to the masses as they sing…	"A choir singing at a baseball game."	2 (contradiction)

Sentiment Analysis

```
['is good', 'is recommended', 'is beneficial',
 'is healthy', 'is useful', 'is highly recommended',
 'is highly beneficial', 'is very healthy',
 'is very good', 'is very useful','should be chosen']
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['is risky', 'is harmful', 'is very harmful',
 'is discouraged', 'is highly discouraged',
 'is very risky', 'is unhealthy', 'is very unhealthy',
 'is bad', 'is very bad','should not be chosen']
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❖ In each sentence, we find the food groups that appear

❖ Create positive and negative sentences with the food group
   ➢ For example, for the food group "Vegetables", we create a sentence such as "Vegetables are good for this condition" and "Vegetables are bad for this condition"

❖ Use pretrained RoBERTa model to determine if the new sentence agrees, contradicts, or is neutral to the sentence from Wikipedia

❖ Repeat this process for each food group that appears in the sentence and for each sentence in the list of conditions

Sentiment Analysis

❖ After running sentiment analysis on each positive and negative sentence, store the results in a dictionary

❖ If a positive sentence has high agreement with the Wikipedia sentence, then we can conclude that the food is good for that condition

❖ If a positive sentence has high contradiction with the Wikipedia sentence, then we can conclude that the food is bad for that condition

❖ Categorize each food group as beneficial, detrimental, or neutral for every condition and save the results in JSON format

Web Page

❖ Web page is built using jQuery, CSS, and HTML and interfaces with the raw JSON file from the gitHub repository.

❖ A user will choose a condition from a dropdown list, and results associated with that chosen condition will be displayed.

❖ Users will also have the option to see all non-weighted diet items by clicking button on the lower left-hand side of the page.

Applications

❖ This project can be very useful for people who are suffering from a particular disease or want to learn more about the disease and how diet affects that disease.

❖ If a person is genetically predisposed to a particular disease, paying attention to diet can be extremely important

❖ Knowing what foods are good for a disease and what foods can help contribute to it is particularly helpful

Future Improvements

- ❖ More complex web scraper that can scrape more reputable sites such as Mayo Clinic and lists of links

- ❖ More thorough sentiment analysis and ranking

- ❖ Improve web page aesthetics and include images of the food