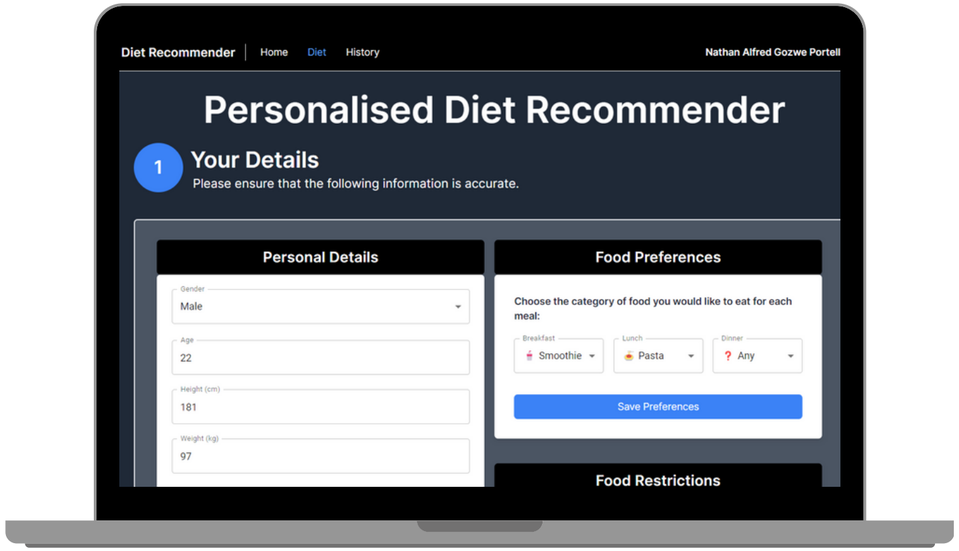
L-Università ta' Malta
Faculty of Information & Communication Technology
Department of Artificial Intelligence



ICS5111

Mining Large-Scale Data

Utilising Text Mining Techniques for Personalised Diet Recommendations using Heterogeneous Data

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OLEG GRECH

Diet Management

- Surge in **chronic health diseases**
- Researchers use data-driven methods to refine **meal planning** and **nutritional guidance**, merging health and technology
- Empowing of individuals to make **personalised**, informed meal plans

Aims & Objectives

01

Gather datasets for generating meal plans

Structured
Semi-structured
Unstructured

02

Apply text mining & NLP techniques

Beautiful Soup
Word2Vec

03

Design an interactive dashboard

Personal Details
Food Preferences
Dietary Goals
Meal Plan

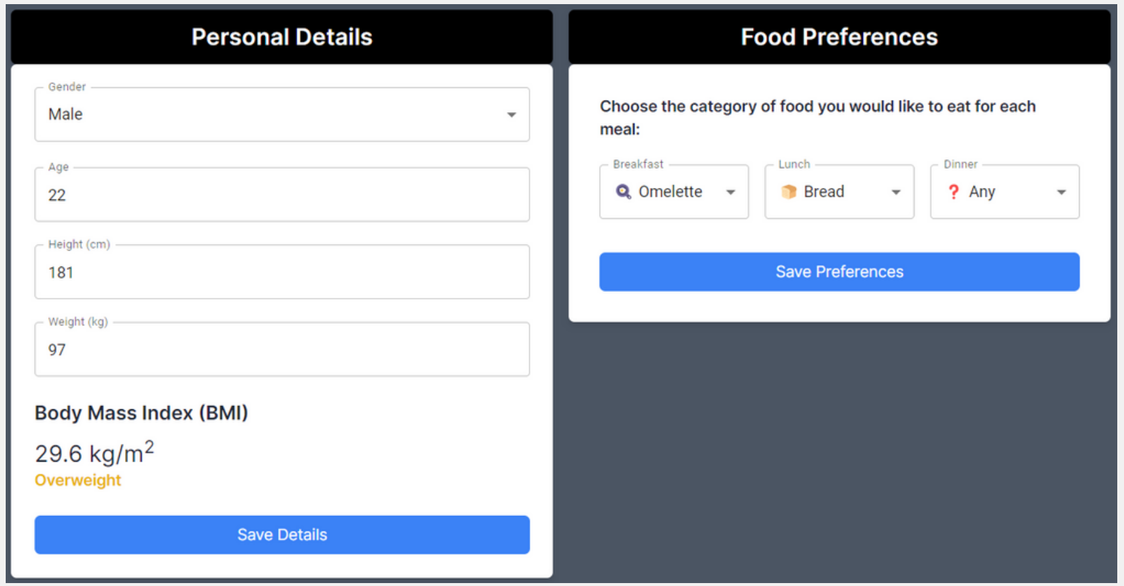
04

Evaluation

User Testing
Feedback
Results

Structured Datasets

- FoodData Central
- User BMI & Preferences
- Stopwords

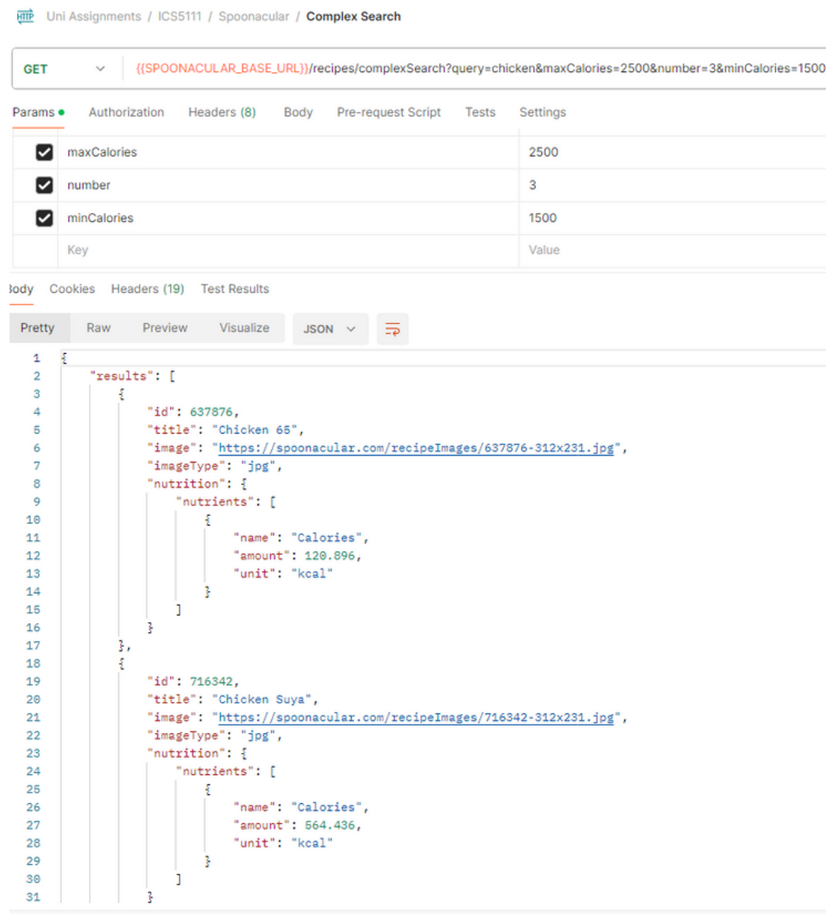


Structured Datasets

- FoodData Central
- User BMI & Preferences
- Stopwords

Semi-structured Datasets

- Spoonacular API



Structured Datasets

- FoodData Central
- User BMI & Preferences
- Stopwords

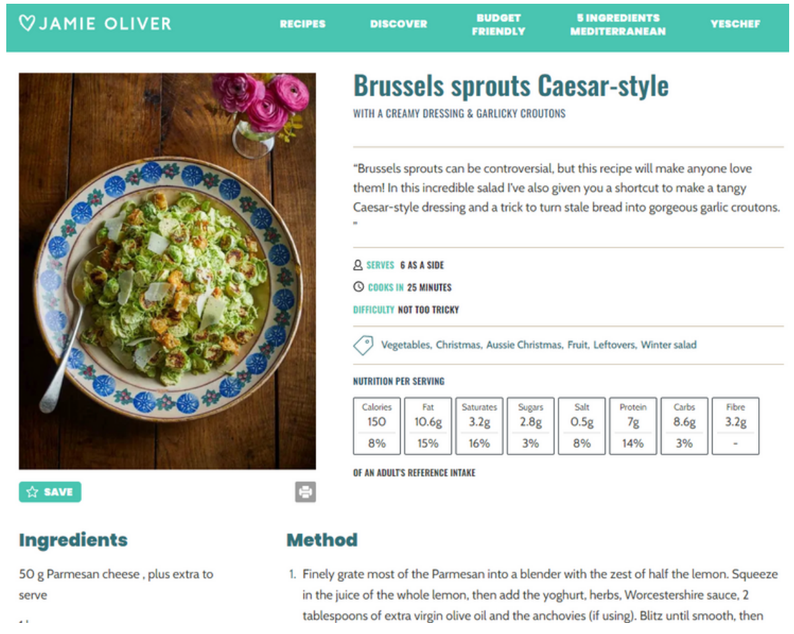
Semi-structured Datasets

- Spoonacular API

Unstructured Datasets

- Scraped Recipes from Jamie Oliver’s Website

Mining Data



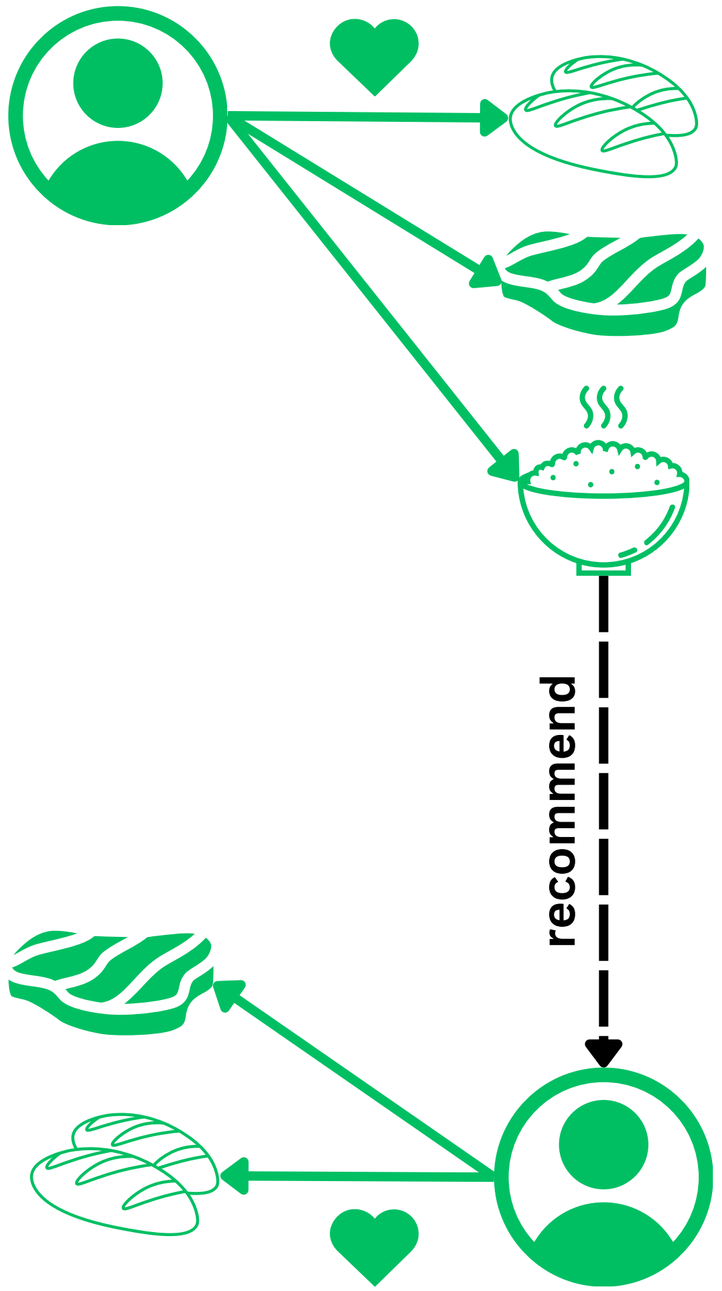
- Implementation of **Beautiful Soup** for web scraping
- Extraction of recipes and their information from **jamieoliver.com**
- Utilisation of **Word2Vec** for semantic analysis of textual data

Word2Vec

Technology	Developed in **TypeScript** **Python** was also utilised for plotting the Word2Vec vectors
Use Cases	Extracting **Recipe Titles** for Alternative Recipes Extracting **Ingredients** from Recipe Instructions
Processing	Text **Pre-processing** **Training** the model 'Foundation Foods' dataset

Collaborative Filtering

Age	Gender
Height	Weight
Food Preferences	Food Restrictions
Selected Meal Recommendations	Unselected Meal Recommendations



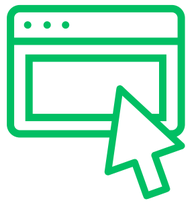
Proof of Concept

DETAILS

Technologies

Web Application
Next.js
TypeScript

Web Scraping & Visualisations
Python



Pages

Introductory
Meal Planner
Meal History
User Account

User Feedback

Star Rating
Saving of selected meals
Saving of unselected meals

User Testing

Number of Participants	10
Recommendations Score	4/5 ★
System Usability Score	93.3%

01

Additional Preferences

Meal preparation time
Cooking skill levels
Multiple users

02

Continued Generation

Show more meals, prioritising by suggestion accuracy

03

Alternative Recipes

Align the alternatives with the preferences as well

04

More Details

Additional information on ingredients
Breakdown of nutritional information

Limitations & Challenges

- **Limited Data Availability**
  Meal Preference Data
- **Challenges with Word2Vec Implementation**
  Developed using Typescript
  Existing libraries were outdated

Future Work

- Gathering additional user information
- Integration with wearable devices
- Incorporation of additional ML models for refined predictions
- Implementation of mechanisms for continuous user feedback

Conclusion

With proper dieting, many chronic diseases can be prevented while also promoting one’s overall well-being.

This project integrates user profiles, nutritional databases, and scraped recipes, to develop an intelligent diet recommendation system.

Proof of Concept

DEMO

ics5111.vercel.app

Thank you
for your time

Any questions?