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Faculty of Information &
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The screenshot shows a web application interface for a 'Personalised Diet Recommender'. The header includes 'Diet Recommender' with links to 'Home', 'Diet', and 'History', and the user's name 'Nathan Alfred Gozwe Portell'. The main heading is 'Personalised Diet Recommender'. A blue circle with the number '1' indicates the current step, 'Your Details', with a sub-instruction: 'Please ensure that the following information is accurate.' The form is divided into two columns: 'Personal Details' and 'Food Preferences'. The 'Personal Details' column contains fields for Gender (Male), Age (22), Height (cm) (181), and Weight (kg) (97). The 'Food Preferences' column has a heading 'Choose the category of food you would like to eat for each meal:' followed by three dropdown menus for Breakfast (Smoothie), Lunch (Pasta), and Dinner (? Any). A 'Save Preferences' button is located below these menus. At the bottom of the form, there is a section for 'Food Restrictions'.

ICS5111

Mining Large-Scale Data

Utilising Text Mining Techniques for Personalised Diet Recommendations using Heterogeneous Data

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Diet Management

- Surge in **chronic health diseases**
- Researchers use data-driven methods to refine **meal planning** and **nutritional guidance**, merging health and technology
- Empowering 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

▼ context

- 0 "egg"
- 1 "cheese"
- 2 "yogurt"
- 3 "milk"
- 4 "eggs"
- 5 "butter"
- 6 "buttermilk"
- 7 "cottage"
- 8 "cream"

target: "dairy_eggs"

Personal Details

Gender
Male

Age
22

Height (cm)
181

Weight (kg)
97

Body Mass Index (BMI)
29.6 kg/m²
Overweight

Save Details

Food Preferences

Choose the category of food you would like to eat for each meal:

Breakfast
🍳 Omelette

Lunch
🍞 Bread

Dinner
? Any

Save Preferences

Structured Datasets

- FoodData Central
- User BMI & Preferences
- Stopwords

Semi-structured Datasets

- Spoonacular API




Uni Assignments / ICS5111 / Spoonacular / Complex Search

GET `{{SPOONACULAR_BASE_URL}}/recipes/complexSearch?query=chicken&maxCalories=2500&number=3&minCalories=1500`

Params • Authorization Headers (8) Body Pre-request Script Tests Settings

<input checked="" type="checkbox"/>	maxCalories	2500
<input checked="" type="checkbox"/>	number	3
<input checked="" type="checkbox"/>	minCalories	1500
	Key	Value

body Cookies Headers (19) Test Results

Pretty Raw Preview Visualize JSON 

```
1 {
2   "results": [
3     {
4       "id": 637876,
5       "title": "Chicken 65",
6       "image": "https://spoonacular.com/recipeImages/637876-312x231.jpg",
7       "imageType": "jpg",
8       "nutrition": {
9         "nutrients": [
10          {
11            "name": "Calories",
12            "amount": 120.896,
13            "unit": "kcal"
14          }
15        ]
16      }
17    },
18    {
19      "id": 716342,
20      "title": "Chicken Suya",
21      "image": "https://spoonacular.com/recipeImages/716342-312x231.jpg",
22      "imageType": "jpg",
23      "nutrition": {
24        "nutrients": [
25          {
26            "name": "Calories",
27            "amount": 564.436,
28            "unit": "kcal"
29          }
30        ]
31      }
32    }
33  ]
34 }
```


Structured Datasets

- FoodData Central
- User BMI & Preferences
- Stopwords

Semi-structured Datasets

- Spoonacular API



Unstructured Datasets

- Scraped Recipes from Jamie Oliver's Website





BeautifulSoup

JAMIE OLIVER


RECIPES

DISCOVER

BUDGET FRIENDLY

5 INGREDIENTS MEDITERRANEAN

YESCHEF



☆ SAVE

Brussels sprouts Caesar-style

WITH A CREAMY DRESSING & GARLICKY CROUTONS

"Brussels sprouts can be controversial, but this recipe will make anyone love them! In this incredible salad I've also given you a shortcut to make a tangy Caesar-style dressing and a trick to turn stale bread into gorgeous garlic croutons."

SERVES 6 AS A SIDE

COOKS IN 25 MINUTES

DIFFICULTY NOT TOO TRICKY

Vegetables, Christmas, Aussie Christmas, Fruit, Leftovers, Winter salad

NUTRITION PER SERVING							
Calories	Fat	Saturates	Sugars	Salt	Protein	Carbs	Fibre
150	10.6g	3.2g	2.8g	0.5g	7g	8.6g	3.2g
8%	15%	16%	3%	8%	14%	3%	-

OF AN ADULT'S REFERENCE INTAKE

Ingredients

50 g Parmesan cheese , plus extra to serve

Method

1. Finely grate most of the Parmesan into a blender with the zest of half the lemon. Squeeze in the juice of the whole lemon, then add the yoghurt, herbs, Worcestershire sauce, 2 tablespoons of extra virgin olive oil and the anchovies (if using). Blitz until smooth, then

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

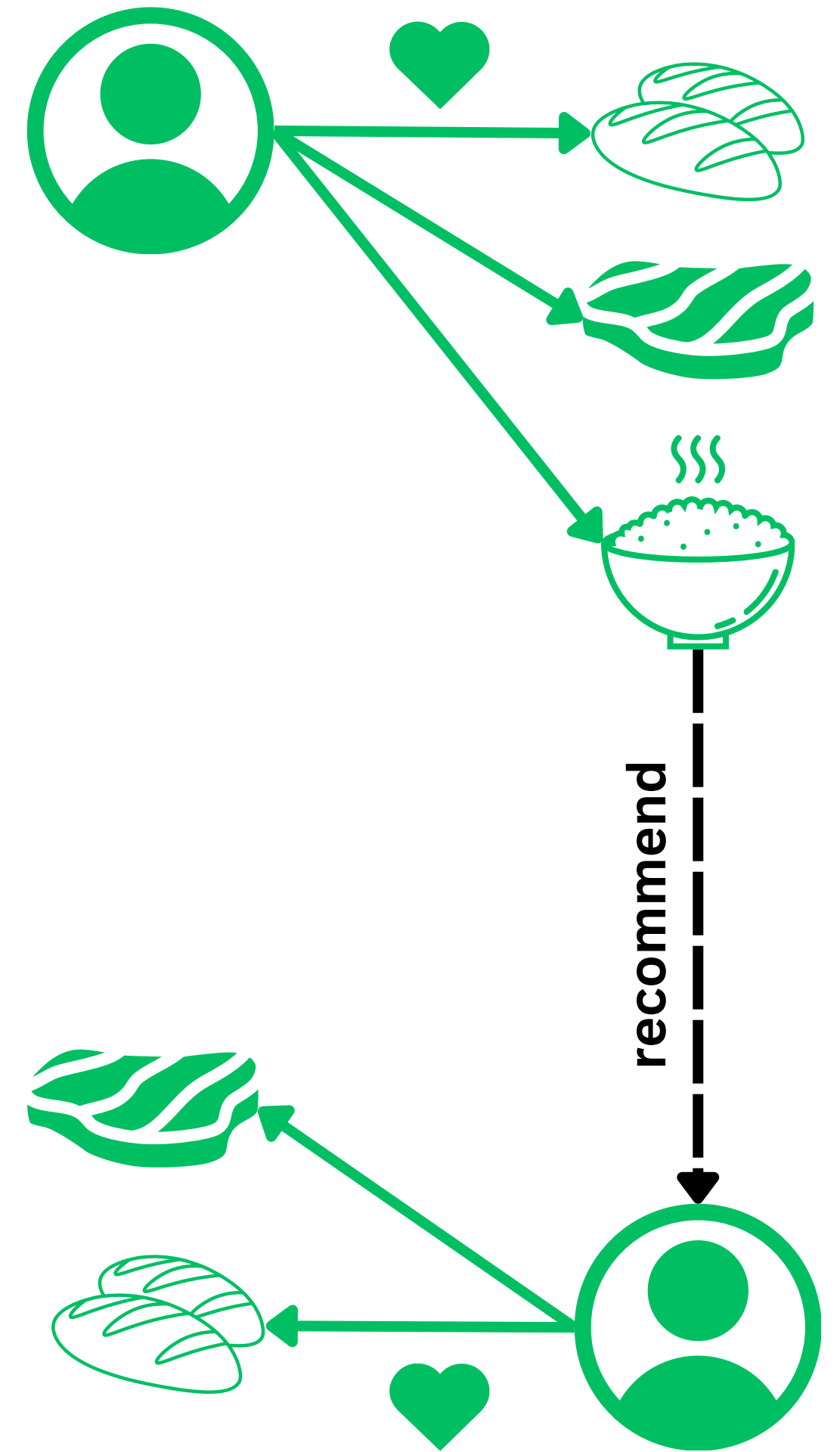
Text **Pre-processing**

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?

