Part 1 Interim Report

# Introduction

## Project Background

Physical health is one of the fundamental areas in which the people need to take care in order to thrive in life. This includes both the diet every individual undergoes combined with activities to upkeep physical aptitude. Not everyone has the time to exercise through the recommended amount of “**150 minutes [**moderate-intensity]” or “75 minutes [vigorous] of aerobic activity per week”. What everyone has time to do is diet effectively, in which I personally had the insight growing up with. However, I know many people who did not get this knowledge.

According to a guardian article in 2018, “Almost 20% of deaths worldwide are attributable to an unhealthy diet”, while the American Dietic Association supports “appropriately planned vegetarian diets, including total vegetarian or vegan diets” as they are “shown to be healthful, nutritionally adequate, and may be beneficial in the prevention and treatment of certain diseases”. By knowing this, I aim to create the technical resources to assist them in obtaining the knowledge of why they should undergo a healthy diet.

According to Health Education Research, “There is ample evidence that printed, computer-tailored nutrition education is a more effective tool for motivating people to change to healthier diets than general nutrition education”. The conclusion of their tests implied people would be more likely to return to the computer medium than any other. Combined with the work of Philip Lew, Luis Olsina and Li Zhang, “Web applications (WebApps), a combination of information content, functionality and services are fast becoming the most predominant form of software implementation and delivery”. As such, the hybrid mobile should follow minimum operation standards for the development of the software design and UX to improve “the user experience as a whole”.

John, in his writings, explicit states that “Circadian and diurnal rhythms affect food intake, and earlier research has suggested that meal sizes increase, where the after-meals intervals and satiety ratios decrease over the day”. It was found that “when individual subjects ate a larger than the mean proportion of their total intake during the morning, they ate significantly less over the entire day. Conversely, when these same subjects ate a high proportion of their total intake during the evening, they ate significantly more over the entire day”. This would indicate every necessary daily breakdown of the diet (Breakfast, lunch and dinner) are important areas of the diet which would be maintained properly.

Overall, all the features of having a good diet planner combined with a way to track the diet daily does not exist or is not user friendly for people on the go, whether it is to work or to go for exercise. Therefore, I decided to create a user-friendly mobile application for such users known as Nutrient and Diet Manager Application.

## Project Description

Nutrient and Diet Manager Application (NDMA) is an application designed to assist the user in managing their dietary through a simplistic yet intuitive UI allowing them to log their diets in the application into the system and getting advice from the recommender system. This is for those whom want assistance in achieve a specific body shape and their diet is not ripe for the schedule, the office worker whom is doing 60-80 hours and needs to optimise their health or the casual user whom just is looking for generic advice.

The main aspect of the application, which is the ability to log the user diet and getting advice on how to manage it, will be completed through the usage of a smooth, robust, intuitive and easy UI for the user. To ensure this, the application complexity will focus on the UX as the main priority. Most applications, when dealing with information on macronutrients etc, expects the user to know this information themselves and requests it for usage. Ordinary people would not know this accurately. Therefore, the system should be assistance the user through allowing for approximate values and visual elements to show what they look like.

From the beginning of the process of the development of the application, the main business requirements will be outlined using various reviewed iterations of prototypes, which will be set through the collaboration of people of different background alongside myself for ideas regarding the application. This would include people from professional background to the casual user. After each stage of the development of the application, I would return to the same user about the prototype built to get their review, use the review to modify, repeat until both parties are satisfied with the efforts.

The methodology of feature driven development, agile and prototyping will be employed for the duration of the application development. Once the prototypes have been completed and reviewed through tests and evaluation, they will integrate into the system gracefully.

Include a diagram

## Project Aims and Objectives

The aim of developing NaDMA is to allow the average user to ensure they are getting enough macronutrients they need to live a comfortable and healthy lifestyle. This would be through a UI designed for a simple yet intuitive UX for the users to grasp easily.

There are a few objectives to the aim. At the start, the requirements must be gathered for the application. Subsections incorporate user requirements, business requirements and technical requirements. User requirements involve getting the users’ story, their reason for potential using the application and what they expect from it. This would mean spending between 5-6 hours taking to different people about the application area combined with following up on ensuring it is what they are looking for. Once that is completed, a draft of all the business requirements is produced. This would display the mandatory requirements, optional requirements and out-of-scope requirements. This itself would take about an hour itself to complete.

The technical requirements would be investigated last. This would involve the research of similar solutions to the area I am tackling, the available modern technologies and tools, other projects completed and other areas I would need to research, such as datasets needed etc. This would take approximate 10-12 hours as both the tools and methods need to match the business requirements as basic specification.

After the gathering the requirements, the next objective would be the prototyping process. The first would be the planning of the prototype. An analysis of the different software methodologies is required to understand which match the project itself. This could be a singular methodology or a combination of multiple methodologies. This needs to be completed within 2 – 3 hours itself. Once selected, focus would shift to the overview of the system. The plan for how the application is envisioned is plotted and documented, from the specification technology used to the design pattern and system architecture we are working with. This would take between 2 – 6 hours. Following this would be the full stack prototypes. From use cases, low-fide prototypes etc, of the front-end all the way to ERD, class diagrams of the backend. Flow charts would be included to demonstrate the middleware behaviour (unless a more appropriate method is found proven to be more reliable). This would take at least 10 hours to cover all the aspects of the system.

Once the design has been reviewed and approved, a proper prototype using the specification details will be implemented. This is to ensure the areas work properly, the technology behave as expected and the user agrees with both the design and the UX. If there are any issues with the prototype, the documentation can be reviewed and modified to suit what is mutually agreed on. At least 10 hours would be spent to complete this task.

Following this objective, the decision-making on the testing and evaluation would be made, such as the different software required and the different methodologies. This would take about 2 hours as they must work with the chosen technology, making the scope narrow. Risks with the system design must be understood at this time and catered into the schedule.

The final objective is the system implementation. This must be reviewed in intervals to ensure it matches the requirements and design document. This would take between 2-3 months minimum. It would also need both integrated testing in ongoing phases. After each part and the end of the development phase(s), both manual testing and evaluation from peers would be obtained. This part should be about 30 mins in total per person. Once every objective has been met, the aim should be completed.

## 1.4 Project Requirements:

### User Requirements

As part of the project, several people whom are potential users were spoken to for gathering requirements. A use case of three personalities were drafted up from the user requirements whom, based off their feedback, were the mutually distinct in their requirements of the application. They are as follows:

**User 1: Enda Deane**

Background information

User 1 is a 22-year-old white male student who is currently undergoing a college degree in computer science. Aspiring to be a game engineer, 1 has been a vegetarian for eight years and switching due to a dislike in taste in processed products. Some of the personal interests involve either individual or social activities associated with art and games.

Expectations from the application

Enda’s reason for using the application would ensure the diet is followed through correctly. This would involve the application understanding the diet and filtering out the unnecessary options in a visual aesthetic, graphical and simple user experience. When he is logging his diet or inputting his personal details, it should be easy to complete and access. Among Enda’s expectations are accurate information displaying only vegetarian options.

Backstory and reasons for using the application

Enda would often need assistance and reminders to ensure the diet is optimised for his needs. However, it would be a waste of his time if he is bombarded with meat products inside the application or the application is completely inaccurate.

Due to his disabilities, the application must be polished and smooth, yet easy and adjustable to cater to his needs. Since he is in college, the context must sweet and short. Enda has requested for a colour scheme as part of the feedback.

**User 2: Susan Smith Jackson**

Background information

Susan Smith Jackson (Sue) is a 48-year-old white female student who is a recognised author of a book called “From a moth to a butterfly”. Currently a mentor and coacher of people who work with disabilities, Sue’s experience in the area is vast. Sue also has kids with disabilities and worked with adults of various disabilities. Her interests lie in the fields of family, meditation and harmony.

Expectations from the application

Sue has advised on serveral functionality that would allow people with disabilities or carers to efficiently use the application. One is access to the camera to scan in the diets rather than inputting it manually combined with the variety of diet choices. Another is importing a system that allows blind people to use the application. The usability of the application must be simple yet intuitive. Some favourable, optional choice are the ability to download the logged diet and display social events with people of the same interests.

Backstory and reasons for using the application

Sues’ reasoning for the application is both personally and universally. Had she gotten access to this application during the time she has worked with adults with disabilities, it would had cut down on both the short term and long term on managing the diet, especially if it came with a scanner. Many careers in this position would find it difficult to manage manually logging the diet and care for the disabled.

She is also aware of people who are blind that be interested in this application if they could use it. Since their interests varies different options should be available to them. She also jointly takes care of a son whom she knows would really benefit from this application if designed to his needs. Ideally getting a soft copy of the logs would be nice.

**User 2: Noel Reilly**

Background information

Noel Reilly (Noel) is a 51-year-old white male whom does part time caretaking at the local GAA club and is primary minder of his kids. He has a personalised omnivore diet, which assists him in his fitness and sporty areas of interest. His previous experiences involve being of club for group of kids with disabilities. Noel has been diagnosed with diabetes and interested in methods to prevent that happening to his family.

Expectations from the application

Noel wants to have full control in being able to set his own schedule for the diet of choice, which would assist him greatly in his life goals in the area. The one thing that helps is a way to motivate himself through challenges and awards, which he also wants full control over. The application should provide a description of the products he is consuming, including their meaning.

Backstory and reasoning for using the application

For twenty years, Noel has been into fitness and proper dieting. This resulted from previously being on a shocking diet leading to the diagnose of diabetes. Since the diagnose, he has going through intervals to understand what the correct way is to diet properly, such as consummation of products and their ingredient list meaning.

Continuing this journey, Noel wants to ensure he is continually motivated. As a result, he may want to change his diet to cater to the goals, which he expects the application to cater to.

### Business Requirements

After phase of gathering the user requirements, the collection of the business requirements are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Business Feature Requirements** | **Description** | **Priority** | **Scope Area** |
| User login | Allow user to login through username and password | High | Mandatory |
| User Register Account | Allow the user to register for the system | High | Mandatory |
| User logout | Allow the user to leave the application gracefully | High | Mandatory |
| View profile | Allow the user to see their details | High | Mandatory |
| Modify Account | Allow the user to update their details | High | Mandatory |
| Import / Login / Register using an external application | Allow the user to login using details from social media and / or Fitness / Nutrition Apps, such as Facebook or Fitbit | Low | Out-of-scope |
| Simple Navigation UI | Allow the user to access the different parts of the application smoothly | High | Mandatory |
| Diet Logging System | Allow the user to log their diet into the application through various ways. | High | Mandatory |
| Download logged diet schedule | Allow the capability for the user to download the diet that has been logged. | Medium | Optional |
| Simple, intuitive Graphical UI | Simple UI to allow the user to log their diet into the application, using buttons and Imagery as opposed to heavy textual information.  This would resort to the user using a search bar to filter out the specific dish they had (such as pepperoni pizza as example).  Once this has been selected, the user would view the default options of food and ingredients are used before having the option to accept, accept and modify or return to search. This would allow the user to input either homemade dishes or take-aways.  This would incorporate the ability to set the fields from previous inputs (reusing dishes) | High | Mandatory |
| Template for diet | Allow the user to decide their daily diet as to their needs, such as breakfast, lunch and dinner or brunch, dinner and supper as examples | High | Mandatory |
| Scanner for recipe input | Using the camera to scan the barcode to get the ingredients | Medium | Optional |
| Advisor / Recommender System | System to advise the user based off their inputs | High | Mandatory |
| Optimal UI / UX Experience of the advisor system | Use graphs and imagery to assist in advising the user | Medium | Optional |
| Daily trends | Display the user their daily input and advise on what to do | High | Mandatory |
| Display Weekly trends | Display the weekly versions of the daily input and advise on what to do | High | Mandatory |
| Display Monthly trends | Display the monthly versions of the daily input and advise on what to do | Medium | Optional |
| Display Yearly trends | Display the yearly versions of the daily input and advise on what to do | Low | Out-of-scope |
| Breakdown of the nutritional input | Display in lay terms what the user are eating and how it impacts their body | High | Mandatory |
| Cater to user goals and macronutrients nutrition deficiencies | Implement different categorical solutions depending on both the goal of the user (ie lose weight) and their nutrition deficiencies (ie celiac) | High | Mandatory |
| Suggest alternatives for diet | Provide graphical solutions in areas where diet could improve | Medium | Optional |
| Colour Scheme | A colouring scheme to alert the user how their diet is | Low | Out-of-scope |
| Effective Diet Scheduler Advise | Advise on how to diet effectively, from the periods of when you eat to how much you eat at each interval | Low | Out-of-scope |
| Notification / Alert System | Notify the user to use the application, whether it is to log their breakfast or to check their dietary analysis | Medium | Optional |
| Product Label Description UI | Provide a breakdown of how to effectively read the ingredient list of products bought from the shops using Graphical UI | Low | Out-of-scope |
| Food Pyramid Interactive UI | Allow the user to find out key details about proven healthy diets, such as vegetarian, using an interactive food pyramid. This would incorporate a breakdown of what to eat regularly and examples of each (ie vegetables) | Low | Out-of-scope |
| Disclaimer within application | Ensure the user understands the application has not been reviewed for ethical standards and therefore cannot be taken seriously | High | Mandatory |
| Temporary storage and usage | Enable the user to access the features without the need for the internet | Low | Out-of-scope |
| Challenge and Reward System | Enable the user to either have computer generated with a goal in mind or allow the user to create one themselves. This would be catered with the advisor system to ensure the user reaches their end goal regarding their nutritional and dietary needs. | Low | Out-of-scope |
| Assistive Technology Systems | This would enable people with various disabilities to be able to use the application, such as the blind people etc. Methods, such as importing the needed system or deriving from them, would be used here | low | Out-of-scope |

The requirements labelled “Mandortaory” are necessary to complete within the timeframe scope of the application dating from the 16th September to 2nd April. The “Optional” fields are extensions that may be completed within the scope provided there is time to accommodate them. The “Out-of-scope” fields are areas in which we know are impossible to do given the timeframe and so are outside the scope of the application.

### **Risks**

A security risk associated is the application, due to not being a security application, will not be as safe as other applications. If time allows it, an encryption library could be imported. The medical risk is someone might take the application as in production (ready-made). So, a disclaimer would have to be imputed to prevent this.

If a technical requirement is missing, an appropriate substitution will have to be found quickly while temporary technology would have to be used. The works on the application will use git server control to track its progress, so the data will be backed up as necessary.

The last risks are unforeseen events occur, such as sickness or family matters etc. Should any of the two happen, appropriate measures will follow suit, such as getting in contact with the authorities of the school of computing etc. A schedule was created to minimise the possibility of this hindering the project overall development.

## Thesis Roadmap

One sentence explaining what each of the following chapters is about.

**Chapter 2 – Literature review**

Literature Review Chapter will delve into the research in the area relating to the common person nutrition and diet knowledge, industry technology in the area, student take on the area and technologies which are viable for my approach. If other research outside these criteria are found, they will be included too.

**Prototype design**

The chapter describes the choices for the application. This includes a high-level abstraction of the architecture for the application and the methodology required. After completing this, design prototypes such as uses cases and class diagrams will also be drafted

**Prototype Development**

The description of how the system design choices were implemented as part of the prototyping process combined with some unexpected encounters that were met.

**Testing and evaluation**

The draft of decision taking that involves the draft up of key ideas and plans to ensure the application behave as we design it to do.

**Issues and Future Work**

A discussion of areas where it could possibly go wrong with the application and other possible work which could be implemented outside the current scope of the application lifecycle.