NUTRIENT FACT PROCESSING TOOL

NURBALQIS BINTI YUSOFF

This report is submitted in partial fulfilment of the requirements for the
Bachelor of Computer Science (Artificial Intelligent)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2012

DECLARATION

I hereby declare that this project report entitled

NUTRIENT FACT PROCESSING TOOL

is written by me and is my own effort and that no part has been plagiarized
without citations.

STUDENT : _____   Date : _____
              (NURBALQIS BINTI YUSOFF)

SUPERVISOR : _____   Date : _____
              (DR. NORZIHANI BT. YUSOF)

DEDICATIONS

To my beloved parents, who have been my constant source of inspiration.
Without your love and support this project would not have been made possible.

ACKNOWLEDGEMENT

I would like to thank Dr. Norzihani bt. Yusof for giving assistant to complete this project successfully.

I would also like to thank my beloved parents who have been giving me support and motivation throughout my project.

ABSTRACT

As the world shifted to the modern age, there will be more food packet delivered within nutritional fact for the consumer's convenience. However, consumers tend to eat whatever kind of food without taking note the nutritional fact provided within food packet. This is because nutritional facts provided by food manufacturers was quite complicated and hard to be understood by consumers. This can be one of the reasons why obesity problem triggered in Malaysia as consumer having lack of knowledge about nutritional fact served in food packet consumed.

So providing a solution to this problem, I would like to propose a 'Nutrient Fact Processing Tool' that is very crucial for the packet food consumers. In this tool, there will be an additional feature provided which is the body mass index calculator. This calculator will enable food consumer to consider their body mass index within the content of nutrients appeared on the food packet. So far, there is no effort had been carried out to meet this main objectives which is to provide a tool which capable in processing image of nutritional fact on food packet. By that, packet food consumer will be more alert about their own food consumption.

ABSTRAK

Apabila dunia semakin menganjak ke zaman moden, akan lebih banyak makanan berpaket yang dilengkapi fakta nutrisi dikeluarkan untuk kemudahan pengguna. Walau bagaimanapun, kebanyakan pengguna lebih selesa menikmati makanan berpaket tanpa mengambil kira fakta nutrisi yang disediakan tersebut. Ini berpunca daripada struktur fakta nutrisi itu sendiri yang tidak mesra pengguna dan sukar untuk ditafsirkan oleh pengguna. Ini merupakan salah satu sebab mengapa masalah obesiti muncul di Malaysia yang mana berpunca daripada pengguna makanan berpaket yang tidak mengambil berat akan jumlah nutrisi yang diambil bagi setiap hidangan.

Lantaran masalah tersebut, saya mencadangkan satu 'Pemproses Fakta Nutrisi' yang akan menjadi satu alat penting untuk pengguna makanan berpaket. Di dalam alat ini, akan ada ciri-ciri tambahan iaitu 'Kalkulator Indeks Jisim Tubuh'. Kalkulator ini akan membolehkan pengguna mengira indeks jisim tubuh mereka. Setakat ini, tiada usaha yang dijalankan oleh pihak lain untuk menghasilkan satu alat serupa yang mampu memproses fakta nutrisi pada paket makanan. Diharap dengan usaha saya kali ini, para pengguna akan lebih jelas dan prihatin terhadap fakta nutrisi yang disediakan demi menjamin pengambilan makanan yang sesuai dengan keperluan tubuh semasa.

TABLE OF CONTENTS

CHAPTER III   ANALYSIS

CHAPTER IV   DESIGN

CHAPTER I

INTRODUCTION

As the world advance to the modern age, there will be more food packet delivered within nutritional fact for the consumer's convenience. Nowadays, consumers tend to eat whatever kind of food without take note about the nutritional fact provided within food packet. However, nutritional facts provided by food manufacturer was quite complicated and hard to be understand by consumers. This can be one of the reasons why obesity problem triggered in Malaysia as consumer having lack of knowledge about nutritional fact served in food packet consumed.

So providing a solution to this problem, I would like to propose a nutrient fact processor that is very crucial for the packet food consumers. So far, there is no effort

has been carried out to meet this main objectives which is to provide a tool which capable in processing image of nutritional fact on food packet. This tool will provide a detail about nutrients served within food packet.

1.1 Project Background

Matlab R2007 will be used to design and code Nutrient Fact Processing Tool. This tool will be able to process image of nutritional fact captured on food packet and release details about the nutrient served within food. The main purpose of the Nutrient Fact Processing Tool is to visually expose some of the food's nutritional strengths and weakness. At the end of this indicator is a Completeness Score that ranges from 0 to 100. This score tell how close the food is to filling requirement for all of these essential nutrients.

1.2 Problem Statements

There are few problems about nutritional fact on the current food packet which raises my awareness to design this Nutrient Fact Processing Tool. Firstly, nutritional facts display on every food packet was quite difficult to be read by food consumer. Secondly, food consumer cannot acknowledge how much nutrient taken per serving and how much nutrient need to be consumed on the next me.

1.3 Objectives

From this project, I would like to carry out the following aims which are;

1. To enable packet food consumer acknowledge how much nutrient taken by them per serving and how much nutrient need to be served on the next meal.

2. To enable packet food consumer to acknowledge their current Body Mass Index (BMI) and take precaution to consume packet food based on their BMI.

1.4 Scope

The scope of my project will be focused on the usage of this Nutrient Fact Processing Tool and its business rule, software that will be used in order to build this project.

1.5 Project Significant

In this project, I would like to do research on Nutrient Fact Processing Tool. The primary outcome of this project will be a complete and comprehensive solution for the nutrient intake. This solution will be almost unique because of the fact that my approach to the input gathering is different from almost all sorts of such project. This would lead my solution to ensure its place in the market as a unique product. I will see the system from the point of view nutritionist and food consumer. So, a combination of views and observation will be able to confirm some of the weaknesses in the project.

1.6 Expected Output

This system should be able to process identified images and do intelligent task in order to produce the percentage of nutrition fact by using some algorithm implemented with digital image processing that suit this case. This system will make decision about the input of Body Mass Index (BMI) of a person with the content of nutrition of the food packet.

1.7 Conclusion.

The aim of this project is to design and develop a system a system that could count the percentage of nutrition content to enable people to beware about the food content when deal with fast food and tendency of unethical food intake. In future significance, some improvement can be added to make this such system to be more intelligently, effectively functional and can be implemented in more wide area.

I hope at the end of this project, will be able to help packet food consumer to manage their nutrients intake efficiently. I also hope that, the existence of this tool later on, food consumer will not experience any problem in understanding the nutrient fact in detail.

CHAPTER II

LITERATURE REVIEW AND PROJET METHODOLOGY

2.1 Introduction

In software development, it will go through a several phases of techniques and methodology in order to achieve the goals or the objectives of the project. With different resources, there are several methodology phases that will go through. In this project, Matlab R2007b software and the tools inside the software has been chosen to develop the system. In this chapter, the discussions are about the fact and findings, project methodology, project requirement, and project schedule and milestone.

2.2 Facts and Findings

Fact and findings is references or past researches that have been found in the internet, book and other documentation.

2.2.1 Domain

In every project, it is important to know what domain is it in. For this project, the aim is to develop a system to read the nutrition percentage in food packet based on Body Mass Index (BMI) . The system will be used by everybody especially who concern about their food intake. This system will be compared the value of food nutrition with their Body Mass Index (BMI) thus enable food consumer to limit their food intake. By that, food consumer can manage how many packet of food need to consume based on the result.

2.2.2 Existing System

There a lot of similar system that has been develops for text detection. Considerable of Plate Number Recognizer is based on real-time image processing. In this project, the system is developed based on digital image processing. One of them is Traffic System (Traf- Sys Inc,). It will record the traffic and counting in real time.

Their goal is to help the clients achieve higher profits by using traffic counting systems data along with the other key metrics that have always been analyzed in running a business. This way, their customers can find out how many sales they are getting in relation to the traffic, how much staff needed, how much security staff, etc. Their customers can even use the information to team with sponsors-by knowing exactly how many people go by a kiosk or display.

2.2.3 Technique

In this project, the artificial intelligence technique that is Edge Detection will be used to read the different texture of image. Initially, pattern recognition problems were often solved by linear and quadratic discriminant or the (non-parametric) k-nearest neighbour classifier. In the mid-eighties back-propagation learning algorithm

was introduced for neural networks. Since then, neural network has obtained a widespread used in image processing. The current use of ANNs in image processing exceeds the aforementioned traditional applications. The role of feed-forward ANNs and SOMs has been extended to encompass also low-level image processing tasks such as noise suppression and image enhancement. Hop1eld ANNs were introduced as a tool for finding satisfactory solutions to complex (NP-complete) optimization problems. This makes them an interesting alternative to traditional optimization algorithms for image processing tasks that can be formulated as optimization problems. The different problems addressed in the field of digital image processing can be organised into what have been chosen to call the image processing chain. Below is the following distinction between steps in the image processing chain, see Figure 2.1.
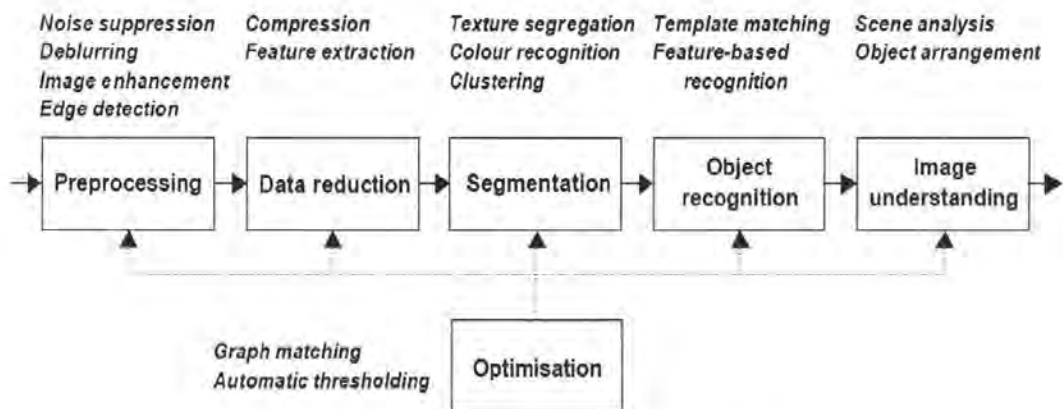
Figure 2.1: Image processing chain

1. Preprocessing/filtering
   - Operations that give as a result a modiled image with the same dimensions as the original image (e.g., contrast enhancement and noise reduction).

2. Data reduction/feature extraction
   - Any operation that extracts signilcant components from an image (window).The number of extracted features is generally smaller than the number of pixels in the input window.

3. Segmentation
   - Any operation that partitions an image into regions those are coherent with respect to some criterion. One example is the segregation of different textures.

4. Object detection and recognition.
   - Determining the position and, possibly, also the orientation and scale of specilc objects in an image, and classifying these objects.

5. Image understanding.
   - Obtaining high level (semantic) knowledge of what an image shows.

6. Optimization.

   – Minimization of a criterion function which may be used for, e.g., graph matching or object delineation. Optimization techniques are not seen as a separate step in the image processing chain but as a set of auxiliary techniques, which support the other steps. Besides the actual task performed by an algorithm, its processing capabilities are partly determined by the abstraction level of the input data. It has been distinguish between the following abstraction levels:

Abstraction Level	Description
Pixel level	The intensities of individual pixels are provided as input to the algorithm.
Local feature level	A set of derived, pixel-based features constitutes the input.
Structure (edge) level	The relative location of one or more perceptual features (e.g., edges, corners, junctions, surfaces, etc.)
Object level	Properties of individual objects.

Object set level	The mutual order and relative location of detected objects.
Scene characteristic	A complete description of the scene possibly including lighting conditions, context and etc.

2.3 Project Methodology

Methodology used for this project is Edge Detection as the project methodology. The following topic will explain more details about the methodology.

2.3.1 Approach

Since using Edge Detection as the project methodology, a method to design and build large programs with a long lifetime. Edge Detection is often part of the development of small scale systems.

This methodology is closer to the way problems appear in life. In terms of object or concept and relations between concepts, it is easy to modelling simplified with object-oriented because this system have objects and relation. This methodology need some diagram to describe the flow of system such as use case diagram, class diagram and sequence diagram.

Object-oriented analysis and design is an approach that models a system as a group of interacting object. Each object represents some entity of interest in system being modelled and is characterized by its class, state and behaviour.

2.3.2 Model

The Nutrient Fact Processing Tool project will be using prototyping model. It is a series of process that develop an information system which gathers information and gives the related output. This model is quite simple or easy to implement and even though there are any changes and correction during developing a system.
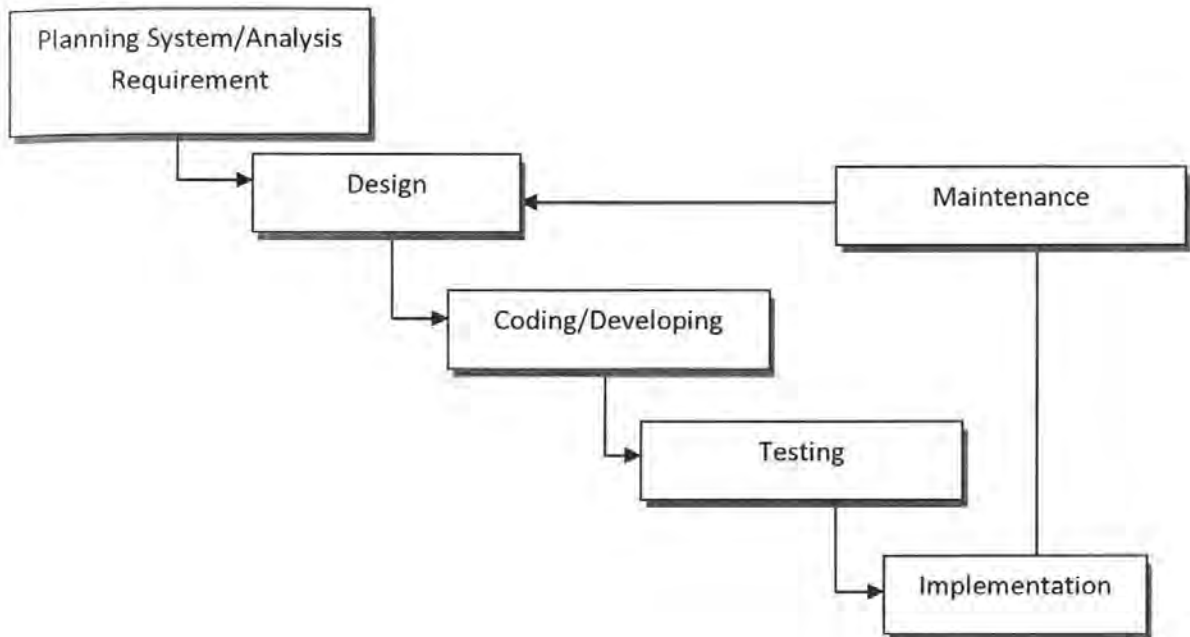
```
┌─────────────────────────┐
│ Planning System/Analysis│
│       Requirement       │
└─────────────────────────┘
            │
            ▼
      ┌──────────┐                          ┌──────────────┐
      │  Design  │◄─────────────────────────│ Maintenance  │
      └──────────┘                          └──────────────┘
            │                                      │
            ▼                                      │
   ┌──────────────────┐                            │
   │ Coding/Developing│                            │
   └──────────────────┘                            │
            │                                      │
            ▼                                      │
      ┌──────────┐                                 │
      │  Testing │                                 │
      └──────────┘                                 │
            │                                      │
            ▼                                      │
      ┌──────────────────┐                         │
      │  Implementation  │◄────────────────────────┘
      └──────────────────┘
```

Figure 2.2: Prototyping Model

The first phase of the project is planning and analysis. Starting with planning, this is the phase which is need brainstorming, configure and understand how the project looks alike to complete the tasks. In this phase, some efforts have been work on to study and solve of the problem statement. As a result, this phase is to achieve objective of system development. Besides, all the data and information that needed in this project has been gathered.