CHAPTER 3: METHODOLOGY

3.0 INTRODUCTION

This chapter describes the methods and the methodology that have been used to implement in this thesis. The primary data sources and data collected will describe how the methods being used and how they were structured. This chapter also explains about how the data that are found are being coded and theoretical understanding approaches which in terms of their methodology. This chapter will help and provides an idea towards the objective of this thesis by discussing the research began how it proceeded and how the data were being coded. There will also describe the major stages that must be taken and the approach to that problem occur that will be reported in this thesis.

3.1 SYSTEM DEVELOPMENT

System development is a standard process or flow of the methodology to structure all steps necessary to analyze, design, implement and test the system. It is important when we want to develop the system.

System Development Life Cycle (SDLC) can be known as the process of creating or altering systems, and the models and methodologies that people use to develop systems. SDLC is a system approach to problem solving and is made up of several phases, each comprised of multiple steps. [9] There are various SDLC methodologies have been developed to guide the processes involved. In general, an SDLC methodology follows the following steps:

1. The existing system is evaluated. Deficiencies are identified. This can be done by interviewing users of the system and consulting with support personnel.
2. The new system requirements are defined. In particular, the deficiencies in the existing system must be addressed with specific proposals for improvement.

3. The proposed system is designed. Plans are laid out concerning the physical construction, hardware, operating systems, programming, communications and security issues.

4. The new system is developed. The new components and programs must be obtained and installed. Users of the system must be trained in its use, and all aspects of performance must be tested. If necessary, adjustments must be made at this stage.

5. The system is put into use. This can be done in various ways. The new system can phased in, according to application or location, and the old system gradually replaced. In some cases, it may be more cost-effective to shut down the old system and implement the new system all at once.

6. Once the new system is up and running for a while, it should be exhaustively evaluated. Users of the system should be kept up-to-date concerning the latest modifications and procedures.

3.2 DEVELOPMENT PHASE

3.2.1 Planning phase

At this stage, the first task, is to identify the algorithm that would be implement in edge detection on object. The task is to find an algorithm to approximately the edge that discontinuity on an object. This system also make the edges of the object in a particular image can be join with the gap joining algorithm to recreate back the complete image. The focuses in this stage will be:
1. Find the algorithm in edge detection techniques such as:
   a) Sobel or Canny detector

2. Tools to develop the interface of the system depending on the input below:
   a) Color image or grayscale image (type of image)
   b) JPEG, PNG, TIFF, BITMAP (format image)

3. Identify the tools to develop the system

4. Plan the steps to implement the function in development progress

5. Report

The resulting of the planning phase will be reported for the system that being applied. The output will be the resulting on image that being alters from the algorithm approach, the objective may achieve the target image if the edge can be detected. Therefore the planning purpose is crucial part to implement.

3.2.2 Analysis phase

This phase required the knowledge on planning phase to be structured and discuss. Therefore, a detail research for all the problems are important to be understand, especially the flow of the algorithm of the programming must be structured well based on the objective of the application. At this stage there are
some important things that must be highlighted to continue the phases until it well structured. There are needed for me to research the algorithm or coding in programming on how the edges of the object will be detected, this determination require me to do lot of research based on other researches that implement the algorithm on joining gaps between edges of the object. Besides, there are some important things such as, the resulting from this phase is to ensure that the coding is well functional based on the requirement purpose that have been recommended.

3.2.3 Design phase

The primary objective of the design phase is to create a design that satisfies the agreed application requirements. In the design phase the SDLC process continues to move from the “what” questions of the analysis phase to the “how” questions.[10] In this phase, the application that chosen from analysis phase will be constructed and codified. Then, the application that being develop from the logical phase are transformed into computing vision, which is by implement the technology details with the specified tools to develop in physical phase. The application needs a prototype or output from the system to be implemented, therefore the requirement to develop the application need a detailed function or coding for the techniques to be codified into it.

3.2.4 Implementation phase

In this phase there will be described about how the designs are translated into code. This phase will include the information which is the algorithm will be
coded and tested. The implementation part also needs a programming tool like MATLAB R2007a to create the graphical user interface for the prototype of application to run the output of the algorithm. Requirement for this implementation will include:

1) Interface:

There are required to create a button or toolbox in MATLAB environment to guide a user to do some function to the techniques approach that will be apply to the original image and built the output of the new image.

2) Coding:

The program will need a function to generate the algorithm that will be applied to the target image. This coding is necessary to build the program to run successfully. This is the harder part that I face, that must be implement, if error occur while compilation is doing, the program must be corrected and there must have some adjustment to be done especially the coding part which the function of algorithm is calling for the purpose to detect the edges of the object.

3) Prototype:

Here, the prototype of the program is to show the initial part to the user, to introduce about the image that will be examine as the image that need to be implement edges segmentation techniques. For beginning, there is having the existing application but have a certain purpose for the function of the algorithm which is to make an image enhancement for a particular image.
3.2.5 Testing phase

In this phase, the system will test. Normally, programs are written as a series of individual modules, this subject to separate and detailed test. The system is then tested as a complete system. [10] While the error can be detect in this stage, it is a good way to know how this project will be done successfully and the application also can be improved. This program will be tested first to the programmer to ensure their coding run successfully. System will be test gradually to improve the maintenance of the system, maintenance is related to the testing phase because of this project is not a big system but this is the application that needs an interaction between users with the system. This phase will resulting the input image that are loaded will applied an algorithm in which the edge detection techniques implemented, therefore it can recreate back the complete output of the object an image.

3.3 METHODS IMPLEMENTATION

The methods that being used to develop a program or application on image processing will have an important data that must be collected and analyzed first. This data gather is the information that will used for built and develop a tools that help user or anybody that have an interesting to do an experimental on various type of image. Therefore, the important data that being captured need a best technique to gather all the data needed.

3.3.1 Current program/application

The current algorithm and techniques that already implemented in the application will be the guidance for me to do an observation how the edges segmentation are being applied. While the current application does a various
techniques in measuring the edge, there might some part of the techniques are related to this project, others will be knowledge for me to understand how image processing are works. Therefore, there are necessary for me to do a research towards this application which can give me a comparison on which algorithm that have advantage and disadvantage to be applied in this project.

3.3.2 Internet/Journal/Book

The information about the algorithm and techniques can be found through the book, but the information that can get from the internet much more large and spacious. There are various researches about the current techniques on image processing that can be found from the journal in the internet.

3.3.3 Discussion with supervisor

In order to ensure that this project in a right track, I make an appointment with my supervisor through email to meet her oftenly. There is important to discuss with the supervisor before I can make a decision to choose which techniques is suitable to be implemented.

3.4 CONCLUSION

This chapter will summarize all the technique that must be implemented from the first phase to the end of the phase with System Development Life Cycle(SDLC) as a reference to guide the flow of the process working continuously. This chapter also described the method that has been use such as, internet, book, and discussion with supervisor, for the current application that already implemented by other researches will be guidance for me to improve the application.