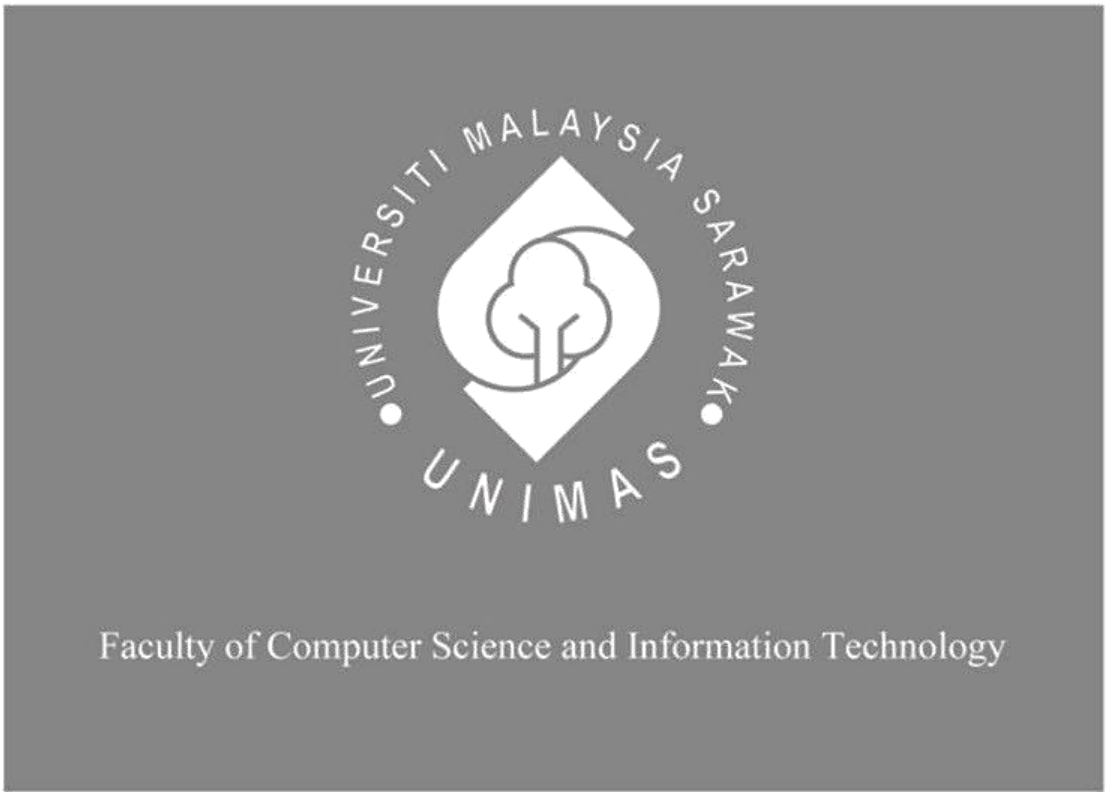

ANIMAL TRAP CONTROL FOR AGRICULTURE

ANGELYN BIJA ANAK JAMBA

Bachelor of Computer Science with Honors
(Network Computing)
2019

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ANGELYN BIJA ANAK JAMBA

This project is submitted in partial fulfilment of the
Requirements for the degree of
Bachelor of Computer Science with Honors
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Faculty of Computer Science and Information Technology
UNIVERSITI MALAYSIA SARAWAK
2019

KAWALAN PERANGKAP HAIWAN UNTUK PERTANIAN

ANGELYN BIJA ANAK JAMBA

Projek ini merupakan salah satu keperluan untuk
Ijazah Sarjana Muda Sains Komputer dan Teknologi Maklumat
(Pengkomputeran Rangkaian)

Fakulti Sains Komputer dan Teknologi Maklumat
UNIVERSITI MALAYSIA SARAWAK
2019

DECLARATION

I hereby declare that this project and its content are my original work except for that information which have been cited and quoted are extracted from other sources with the provided reference.

(ANGELYN BIJA ANAK JAMBA) 20 MAY 2019

UNIVERSITI MALAYSIA SARAWAK

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ABSTRACT

Animal especially pest always attack and cause damage in agriculture farm if uncontrolled. These animal also danger to the safety of the farmer and worker. A traditional trap is less efficient to control it. Therefore, an Animal Trap Control for Agriculture is proposed to be used in the agriculture field which covers a large geographical area. It is used by farmer and worker that have animal problem and want to get rid of pest. This trap is implement by trapping a small size animal without killing it. This animal trap is different from the traditional trap that available on the market. It has its own additional function which does not require user to check the trap regularly which is time consuming as it can send the notification to user's mobile devices through email. Besides, the user can monitor the animal in a real time video from the camera. This trap is using motion sensor to detect the animal when it is entering the trap. The user also can prepare themselves on how to handle the animal earlier as they know what type of the animal is inside when they get the captured picture of the animal on their mobile device earlier.

ABSTRAK

Haiwan terutamanya perosak sentiasa menyerang dan menyebabkan kerosakan di ladang pertanian jika tiada kawalan. Haiwan ini juga berbahaya kepada keselamatan petani dan pekerja. Perangkap tradisional kurang berkesan untuk mengawalnya. Oleh itu, Kawalan Perangkap Haiwan untuk Pertanian dicadangkan untuk digunakan dalam bidang pertanian yang merangkumi kawasan geografi yang luas. Ia khas digunakan oleh petani dan pekerja yang mempunyai masalah haiwan dan ingin menyingkirkan perosak. Perangkap ini dibina untuk memerangkap haiwan yang kecil tanpa membunuhnya. Perangkap haiwan ini berbeza daripada perangkap tradisional yang terdapat di pasaran. Ia mempunyai fungsi tambahan yang mana pengguna tidak perlu memeriksa perangkap dengan kerap yang mengambil banyak masa kerana ia dapat menghantar pemberitahuan kepada peranti mudah alih pengguna melalui email. Selain itu, pengguna boleh mengawasi haiwan tersebut melalui video masa nyata daripada camera tersebut. Perangkap ini menggunakan sensor gerakan untuk mengesan haiwan tersebut apabila haiwan tersebut masuk ke dalam perangkap. Pengguna juga boleh mempersiapkan diri untuk mengendalikan haiwan kerana mereka tahu jenis haiwan di dalam perangkap apabila mereka mendapat gambar binatang itu pada peranti mudah alih mereka terlebih dahulu.

CHAPTER 1: INTRODUCTION

1.1 Introduction

The uses of Internet of Things (IOT) are all over the place. It is a complete intelligent network that capable to be a distribute information and response to the condition surrounding (Somayya Madakam, 2015). Entering the era of Internet of Things (IOT), the use of computer hardware that allow end user programming are present. Microcontroller is one of it. It is a small computer that uses many different types of processor (Computing At School (CAS), 2012).

There is a lot of thing that can being done using IOT to improve our life and help the society. Agriculture is one of the field that need IOT innovation. Animal trap control can be done to improve the quality of the product and help the worker in agriculture field.

There is a lot of traditional trap available in the market that had been invented. For example, a wire-mesh cage trap which is in a large size to allow the animals more likely to enter the trap. The trap is triggered by the animal stepping onto a treadle mostly when it trying to access the bait at the back of the trap and cause the sprung loaded door close.

The implementation of this Animal Trap Control for Agriculture is to produce a trap that able to trap, captured picture and alert user through their mobile device.

1.2 Problem Statement

In agriculture field, animal like rat, squirrel, rabbit, mole, skunk, and snake always attack and cause damage to their farm with no control. This animal also danger to the safety of the farmer and worker. This pest often hides and live in a high place on the tree and any other habitat that can being enter to seek for food and shelter to survive.

Traditional animal trap often leaves for days which cause animal die and cause the unpleasant smell everywhere especially for the killing trap type. There is a lot of the carcasses nearby the trap and lead to the present of the other danger animal like snake. So, this animal trap control is implement as a trap that catch the animal without killing them. People can catch them alive and throw them far away from the farm or send the animal to use for research, study and pet.

Besides, the common trap need to monitor often as it is catching an alive animal. The farmer need to climb up the tree and walk around in many different places checking the traps to ensure that the animal is not dead in the trap, decompose and leaves a stinking smell.

Moreover, when the user checks and take the trap, while release the animal out from the trap, it is so dangerous and can cause injury from the animal attack as they do not know what animal that they deal with and do not have a proper preparation to deal with that specific animal before they taking the trap away. There is also some trap that we could not see what is inside which is made from opaque material and only has a few small ventilation holes. It could very dangerous while opening the trap to release the animal away.

In hence, an animal trap should have a real-time notification and captured picture of the trapped animal to send to the user when the animal getting caught. So, the user can save their time and energy without climbing and checking all the trap in a large geographical area frequently, more alert on how dangerous the animal caught inside the trap and can make a proper preparation on how to deal with the specific animal that has been trapped as the user

know the type of the animal trapped before they pick it up. It is more secure if they know what animal is inside the trap earlier.

1.3 Objective

The objectives of this project are:

- To implement an animal trap that can help user to trap the animal in farm.
- To send a real-time alert message to the user when the animal had been caught.
- To send captured picture of the animal that had been caught to the user.

1.4 Methodology

Methodology is used as a guideline to complete development of a project. To achieve the objective, the methodology used in this is Rapid Application Development (RAD) as this methodology can be used in a minimal time. The duration for developing this project is short which is only within three months. Figure 1.1 illustrate the methodology used.

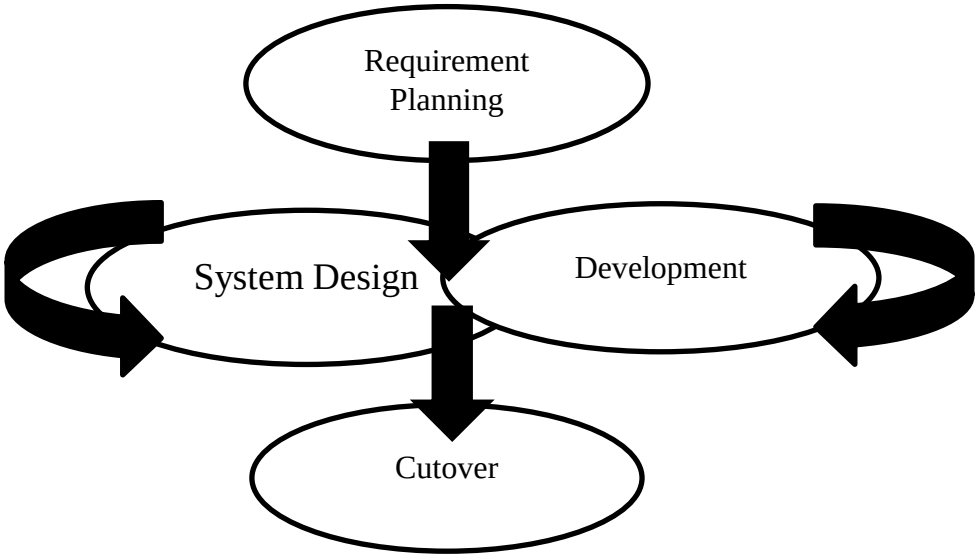

Figure 1.1 Rapid Application Development (RAD) methodology diagram.

Based on figure 1.1 Rapid Application Development (RAD) methodology diagram, this methodology consists of four phases; requirement planning, system design, development and cutover.

In requirement planning phase, it is important to know the background and the overview of the project during the planning process by gathering information from the users. The gathered information can be used to list out the problem statement and objectives of this project. Besides, it also used to define the scope and the expected outcome. Moreover, all the requirement is gathered and the existing trap in the market are being compared in this phase.

The next phase is the design phase that involves the features and function that explained specifically. It will be describe using illustration through diagram and picture for a better understanding. Then, the project prototype is developing according to the design planned. This prototype will be refined, built and demonstrated until the desired prototype is acquired. There is a need to develop and gain feedback from the final year project supervisor. This step will be repeated regularly as the project progressed.

Next would be the deployment of the project which is in the development phase. The proposed project will be constructed and developed. Developing the project by coding, application and testing will take place in this phase.

In cutover phase, the testing and training process will take place. A fully functional outcome of the project will be produced in the end.

1.5 Scope

This project is designed to increase the efficiency to trap the animal in agriculture field. The scope of this project include the users of this project which is the farmer and worker of agriculture field that have animal problem. Next, this product will be used to trap animal in farm such as paddy field, palm oil and other agriculture places. Animal that can be trapped are animal that have a small size such as rat, squirrel, rabbit, skunk, beaver, snake and others.

1.6 Significance of Project

This project would solve a real world problem and improve the existing trap. Firstly, the user at farm can save their time from checking all the trap in a large geographical area frequently. Secondly, the user will be more alert about their safety to open the trap while releasing the animal and can prepare themselves to handle that specific type of animal as they know the animal type inside the trap earlier. Furthermore, the manual task now can be done in a less time-consuming way with the utilization of sensors or any similar devices. This project can help improve the productivity, efficiency and business opportunity for investor and innovator out there.

1.7 Project Schedule

This project began on 22 September 2018 and expected to complete on 20 May 2019. The detail of the project schedule can be referred in the figure 1.2 and figure 1.3 below.

Task Name	Duration	Start	Finish
PROJECT PROPOSAL	**21 days**	**Sat 22/9/18**	**Fri 19/10/18**
Identify Supervisor	2 days	Sat 22/9/18	Sun 23/9/18
Indentify Title	1 day	Mon 24/9/18	Mon 24/9/18
Prepare the brief proposal	5 days	Tue 25/9/18	Sat 29/9/18
Approved and comment brief proposal by Supervisor	6 days	Sun 30/9/18	Fri 5/10/18
Full Project Proposal Report	11 days	Sat 6/10/18	Fri 19/10/18
CHAPTER 1 : INTRODUCTION	**6 days**	**Sat 20/10/18**	**Fri 26/10/18**
Identify and construct the introduction, problem statement, and objectives.	1 day	Sat 20/10/18	Sat 20/10/18
Identify and construct the methodology, scope and significance of the project.	1 day	Sun 21/10/18	Sun 21/10/18
Construct the project schedule, expected outcome and project outline.	2 days	Mon 22/10/18	Tue 23/10/18
Refine and finalize chapter 1.	2 days	Wed 24/10/18	Thu 25/10/18
Submit chapter 1.	1 day	Fri 26/10/18	Fri 26/10/18
CHAPTER 2 : LITERATURE REVIEW	**16 days**	**Sat 27/10/18**	**Fri 16/11/18**
Read and gather information on existing project.	6 days	Sat 27/10/18	Fri 2/11/18
Make the comparison between existing project with the purposed project.	7 days	Sat 3/11/18	Sat 10/11/18
Refine and finalize chapter 2.	5 days	Sun 11/11/18	Thu 15/11/18
Submit chapter 2.	1 day	Fri 16/11/18	Fri 16/11/18
CHAPTER 3 : REQUIREMENT ANALYSIS	**17 days**	**Sat 17/11/18**	**Sat 8/12/18**
Discuss methodology and identify the requirement needed.	5 days	Sat 17/11/18	Thu 22/11/18
Identify and construct the system design of the purpose project.	9 days	Fri 23/11/18	Wed 5/12/18
Refine and finalize chapter 3.	2 days	Thu 6/12/18	Fri 7/12/18
Submit chapter 3.	1 day	Sat 8/12/18	Sat 8/12/18
SUBMISSION OF FINAL REPORT FINAL YEAR PROJECT 1	**12 days**	**Sun 9/12/18**	**Sat 22/12/18**
Compile all chapter, refine and finalize the final report.	6 days	Sun 9/12/18	Fri 14/12/18
Submit the softcopy of final report.	1 day	Sat 15/12/18	Sat 15/12/18
Prepare slide for Final Year Project Symposium	4 days	Sun 16/12/18	Wed 19/12/18
Final Year Project Symposium	2 days	Thu 20/12/18	Fri 21/12/18
REVISE STRUCTURE OF FINAL YEAR PROJECT REPORT	**15 days**	**Mon 28/1/19**	**Fri 15/2/19**
Make a full final year project ganth chatt.	4 days	Mon 28/1/19	Thu 31/1/19
Refine and finalize report.	10 days	Fri 1/2/19	Thu 14/2/19
Submit Final Year Project Report after revise.	1 day	Fri 15/2/19	Fri 15/2/19
CHAPTER 4: IMPLEMENTATION AND TESTING	**26 days**	**Sat 16/2/19**	**Fri 22/3/19**
Do the software installation.	3 days	Sat 16/2/19	Tue 19/2/19
Make the configuration of the software.	4 days	Wed 20/2/19	Sat 23/2/19
Set up the hardware.	11 days	Sun 24/2/19	Fri 8/3/19
Develop the coding for the hardware.	7 days	Sat 9/3/19	Sat 16/3/19
Test the functional requirement.	4 days	Sun 17/3/19	Wed 20/3/19
Refine and finalize chapter 4.	1 day	Thu 21/3/19	Thu 21/3/19
Submit chapter 4.	1 day	Fri 22/3/19	Fri 22/3/19
CHAPTER 5: CONCLUSION AND FUTURE WORK	**11 days**	**Sat 23/3/19**	**Fri 5/4/19**
List the achievement of the project.	3 days	Sat 23/3/19	Tue 26/3/19
Identify the limitation of the project.	3 days	Wed 27/3/19	Fri 29/3/19
Identify the future work of the projet.	3 days	Sat 30/3/19	Tue 2/4/19
Make the conclusion of chapter 5.	1 day	Wed 3/4/19	Wed 3/4/19
Refine and finalize chapter 5.	1 day	Thu 4/4/19	Thu 4/4/19
Submit chapter 5.	1 day	Fri 5/4/19	Fri 5/4/19
SUBMISSION OF FINAL REPORT FINAL YEAR PROJECT 2	**32 days**	**Sat 6/4/19**	**Mon 20/5/19**
Compile all chapter, refine and finalize the final report.	7 days	Sat 6/4/19	Sun 14/4/19
Submit the softcopy of final report.	1 day	Mon 15/4/19	Mon 15/4/19
Prepare slide for Final Year Project Symposium.	12 days	Tue 16/4/19	Wed 1/5/19
Final Year Project Symposium.	2 days	Thu 2/5/19	Fri 3/5/19
Modify the final year project.	12 days	Sat 4/5/19	Sun 19/5/19
Submit the final report of final year project.	1 day	Mon 20/5/19	Mon 20/5/19

Figure 1.2 Project Schedule Description for Final Year Project, 2018/2019.

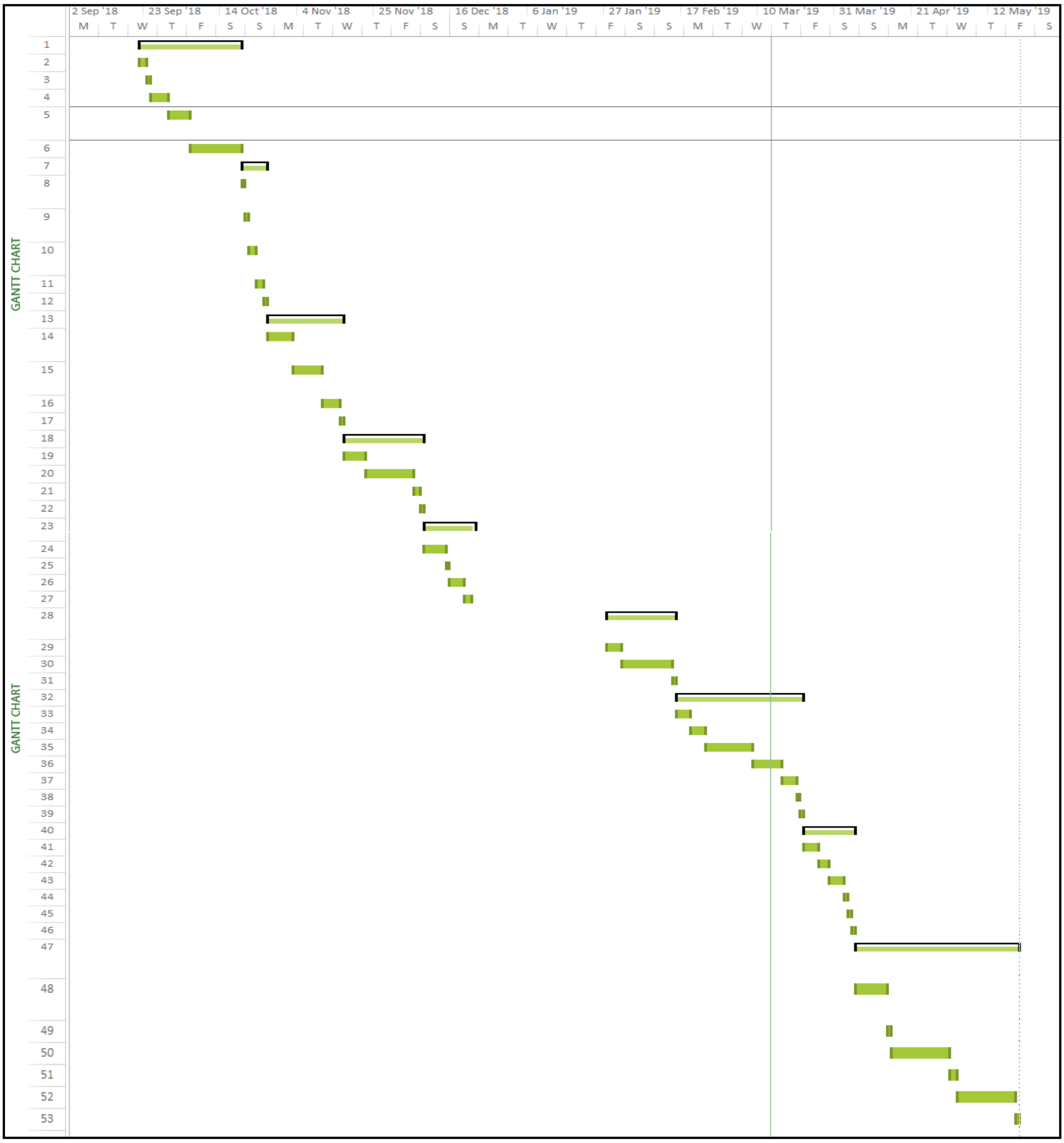

Figure 1.3 Project Schedule Timeline for Final Year Project, 2018/2019.

1.8 Expected Outcome

The main outcome of this project is an animal trap that built with microcontroller to help people to trap animal and pest without killing and leave the carcasses of the animal. This trap will be able to send a real-time alert message to the user via mobile device when the animal had been caught inside the trap to save time consuming for the user in that large geographical area. Besides, it also alerts the user by sending the captured picture of the animal inside the trap. This trap also can be monitor through a real time video from the camera of its server.

This project should have the feature such as send alert to the user's mobile device and taking picture to send to the user's mobile through email when the sensor detects the animal inside the trap.

1.9 Project Outline

Chapter 2: Literature Review

Chapter 2 discuss about the review done on existing animal traps similar to the purposed project. Generally, the study is done based on articles, journals and conference papers. Limitations of existing systems and the improvement is being analysed. The valuable information based on the review will be retrieved and implemented in the purposed project.

Chapter 3: Requirement Analysis and Design

Chapter 3 depicts the methodology that is used for development in the proposed project. The Rapid Application Development (RAD) methodology will be used to develop this project. This chapter also includes the planning requirement and user design of the purposed project.

Chapter 4: Implementation and Testing

Chapter 4 explain on the purposed project that will be implemented. Beside, this chapter also explain about the testing is done in the purposed project whereby the features and its function are evaluated to improved performance and accuracy.

Chapter 5: Conclusion and Future Work

Chapter 5 show the conclusion and summary of the purposed project. This chapter finished up by summarizes all the work that had been done throughout the entire process of implementation of the purposed project. The lesson learns though the task given.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter will discuss about the existing animal trap for small size animal such as mole, rodent, rabbit, rat, snake and squirrel used in agriculture field that has the same features and functionalities with the proposed project. The review of these trap will be on the design and features, advantages and the disadvantages of the existing animal trap. There are three existing mouse traps that have been chosen which is A24 Trap, Kania 2000 Trap and Wired Maze Animal Cage Trap.

2.2 Overview of Objective

The main objective of the project is to design and develop a smart animal trap for agriculture that does not kill the animal cruelly, has the safety alert and time saving for used in a big geographical area of farm. Other objective include:

- To implement a smart animal trap that can help user to trap the animal in farm.
- To send a real-time alert message to the user when the animal had been caught.
- To send captured picture of the animal that had been caught to the user.

In this day of a modern world, a lot of new ideas, design and future that had been upgraded to help worker and farmer to control the animal or pest in the agriculture field. This is to ensure there is no damage cause by these animal, to ensure the safety of the worker, to make sure the cleanliness of the farm and to ensure the efficiency of the worker in doing their responsibilities and task.