



Faculty of Computer Science and Information Technology

Animal Detection Using PIR sensor for Kenanga College

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Bachelor of Computer Science with Honors

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Animal Detection Using PIR sensor for Kenanga College

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This project is submitted in partial fulfilment of the
requirements for the degree of
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Projek ini merupakan salah satu keperluan
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Abstract

Safety is a matter of safety, well-being or security. Security also ensures that the environment is protected from physical issues. Security is also a very necessary thing that we need to protect against dangerous situations. Security is becoming dangerous today because there are creatures that can bring our safety at risk. Dangerous animals, such as dogs, snakes, etc. There are a range of types of devices and products used to track these wild animals. But most of them are too costly and need specialist training to carry out research methods for stray animal detectors. They can't really be sure which animal is coming in from which direction because there are a lot of easy routes to get to.

Animal detection using a PIR sensor for the Kenanga College is therefore proposed to solve the above-mentioned problem. The proposed system will help college residents track the animals approaching Kenanga College. The animal tracking device sends a signal to the firebase and android application to see the status of the animal entering the college area. In addition, this product is a simple and easy-to-use system for anyone looking for animals to enter the area.

Abstrak

Keselamatan merupakan perihal selamat, kesejahteraan atau keamanan. Keselamatan juga bermaksud keadaan terlindungi daripada masalah fizikal. keselamatan juga merupakan perkara penting yang perlu kita lindungi dari dalam keadaan yang berbahaya. Pada masa kini, keselamatan menjadi tidak selamat kerana ada mahluk-mahluk yang boleh membahayakan keselamatan kita. Sebagai contoh haiwan-haiwan yang berbahaya seperti anjing, ular dan sebagainya. Terdapat banyak jenis sensor dan produk yang mengesan haiwan liar tersebut. Tetapi kebanyakan terlalu mahal dan memerlukan latihan profesional untuk menjalankan instrument untuk memeriksa pengesan haiwan yang berkeliaran. Kita juga tidak dapat memastikan haiwan tersebut akan datang dari arah mana kerana ia banyak laluan yang mudah untuk dimasuki.

Oleh itu, animal detection using PIR sensor for kenanga college dicadangkan untuk menyelesaikan masalah yang disebutkan di atas. Sistem yang dicadangkan akan membantu penghuni college dalam mengesan haiwan yang menghampiri college kenanga tersebut. Dengan adanya sistem pengesan haiwan ia akan menghantar isyarat ke firebase dan aplikasi android untuk melihat status haiwan menghampiri kawasan kolej. Disamping itu, produk ini adalah peranti mudah dan senang digunakan bagi sesiapa sahaja dalam mengesan haiwan yang cuba menghampiri kawasan tersebut.

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CHAPTER 1

INTRODUCTION

1.1 Project Title

Animal Detection Using PIR Sensor for Kenanga College

1.2 Overview

Passive InfraRed sensor (PIR) Sensor is a hardware capable of detecting motion and infrared energy changes and sending signals. A device used to detect motion by infrared radiation. This project will develop PIR sensors for hardware to detect animals through mobile applications ('Encyclopedia'). This research will be carried out in the memory class.

There are concerns about animals running around the Kenanga College without any oversight of safety and protection. Due to this, the college community is concerned on the safety and welfare of the college residents themselves. With many different types of outbreaks happening such as animal-borne rabies virus, it can cause a variety of illnesses that college residents might encounter. Therefore, the usage of PIR can detect the animals approaching the college with an animal detector. It can be able to identify the animal approaching the Kenanga College and the tool will send it as a notification to the application

1.3 Problem Statement

According to the management of Kenanga College, they always received complaints about the case of animals entering the Kenanga College from outside and threatening the residents of the Kenanga College. Furthermore, the parameter of the college itself is poorly guarded with broken fences which enables trespassing animals entering the residential area without detector oversight. The situation has discouraged them from engaging in college activities as they fear of the wandering dangerous animals would interfere with their daily activities. A few studies have been carried out on finding a solution in response to this issue. The duration to complete for Final Year Project 1 is about 82 days. There are 15 tasks to be completed. Expected to be done this Final Year Project 1 is on 12 December 2019 after Final Report (Amendment) have been submitted through the Focus IT FYP System.

1.4 Project Scope

The goal of this project is to detect stray animals that may be dangerous towards the residents, such as dogs, cats, and other threatening animals. PIR sensors are devices connected via the Wemos D1, such as the role of the Sensor pearls to detect and ensure that dangerous animals do not enter the premise of Kenanga College. The PIR sensors are also instruments that are compatible with Wemos D1, Buzzer, LED, and mobile modules.

1.5 Objectives

The following are the project objectives:

- Assist staff and college managers to detect dangerous and stray animals from approaching the college premise using detect motion.

- The system will notify user regarding motion and send signals when dangerous animals are in the proximity that can be detected by the sensor.
- Record information of each activity and generate data of the animals detected in the area of the college.

1.6 Brief Methodologies

The hardware prototype will be developed using Rapid Application Development (RAD) methodology. The functionality of the hardware weighs heavily on the prototype. RAD is a software life cycle model that provides higher yields for faster development. RAD allows developers to work directly with real product production as an integrated model. Therefore, the approach uses a short period for each cycle to maximize development time and efficiency with limited manpower. This methodology has four main phases:

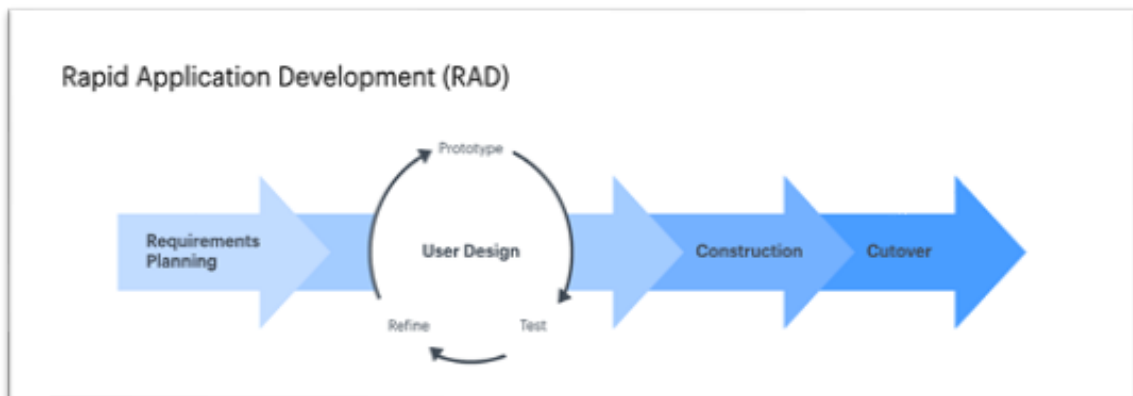


Figure 1.0 Software Life Cycle of Rapid Application Development. Reprinted from 'Lucid Chart'

I. Phase 1: Planning Phase

- Study the current issues that are faced by the management of Kenanga College which are related to dangerous animals entering Kenanga college unattended. Consider the user needs, context, and problem statement.

II. Phase 2: User Design Phase

- The prototype design is implemented, and the sensor testing is ideal for the prototype and the equipment that is used.

III. Phase 3: Construction Phase

- Develop a PIR sensor prototype to identify dangerous animals.
- Code for the PIR sensors that is used in the project by using the platform, Arduino.
- Test the prototype with real animals.

IV. Phase 4: Cutover Phase

















- Fix any error of the prototype.

1.7 Significant of Project

The importance of this project is to prototype the PIR sensor to help the management of Kenanga College to detect dangerous animals around the college premise. The animals can be identified simultaneously with a PIR Sensor. Therefore, the detector will help to protect the residents of Kenanga College residents. They will be allowed to perform daily activities safely. By the completion of this project, a better animal tracking device will be accessible to all college residents by the next semester. Therefore, the sensor device will be used by the management to identify potentially dangerous animals. It will consist of devices such as PIR detectors, Wemos D1 , Buzzer and LED that are used for this prototype.

1.8 Project Schedule

The completion date for Project Year 1 is roughly 82 days. Fifteen tasks must be finished. The Year 1 plan is expected to be completed on 12 December 2019 following the submission of the final report (amendment) through the FOCUSIT FYP. Figure 1.1 shows the lists of tasks, the important dates, and the duration for each task. Figure 1.2 shows the Gantt chart of the progress of the project.

	Final Year Project 1	80 days	Mon 23/9/19	Fri 10/1/20
	Brief Project Proposal	6 days	Mon 23/9/19	Sun 29/9/19
	Project Proposal	17 days	Sun 29/9/19	Sat 19/10/19
	Research on Project	8 days	Sun 29/9/19	Tue 8/10/19
	identifying objectives and project scopes	4 days	Tue 8/10/19	Fri 11/10/19
	Determine methodology	8 days	Sat 12/10/19	Tue 22/10/19
	Chapter 1: Introduction	6 days	Sun 20/10/19	Fri 25/10/19
	Finalise project proposal	6 days	Sun 20/10/19	Fri 25/10/19
	Chapter 2: Literature Review	6 days	Sun 20/10/19	Fri 25/10/19
	Gathering journal and informations on existing system	13 days	Sat 26/10/19	Tue 12/11/19
	Analysis informationa and documentations	8 days	Fri 8/11/19	Tue 19/11/19
	Chapter 3: Requirement Analysis and design	18 days	Sun 17/11/19	Tue 10/12/19
	Collect all requirement	2 days	Sun 17/11/19	Mon 18/11/19
	Create Use Case and activity diagram	5 days	Tue 19/11/19	Mon 25/11/19
	Basic design of system	11 days	Thu 24/10/19	Thu 7/11/19
	Final Year Project 1	7 days	Thu 5/12/19	Fri 13/12/19

✈	Final Year Project 2	161 days	Sat 14/12/19	Fri 24/7/20
✈	Chapter 4 :Implementation & Testing	80 days	Mon 27/1/20	Fri 15/5/20
✈	Coding and implementation	34 days	Mon 27/1/20	Thu 12/3/20
✈	Construct Prototype	10 days	Tue 24/3/20	Mon 6/4/20
✈	Testing and Evaluation	10 days	Tue 7/4/20	Mon 20/4/20
✈	Discussion with Supervisor Amendment	17 days	Tue 21/4/20	Wed 13/5/20
✈	Chapter 4 Report Preparation	5 days	Thu 14/5/20	Wed 20/5/20
✈	Chapter 4 Submission	4 days	Thu 21/5/20	Tue 26/5/20
✈	Chapter 5 : Conclusion and Future works	60 days	Wed 27/5/20	Tue 18/8/20
✈	Result Analysis and Discussion	33 days	Thu 28/5/20	Mon 13/7/20
✈	Chapter 5 Report Preparation	15 days	Fri 29/5/20	Thu 18/6/20
✈	Discussion with Supervisor Amendment	8 days	Tue 7/7/20	Thu 16/7/20
✈	Chapter 5 Submission	5 days	Wed 8/7/20	Tue 14/7/20
✈	Full Thesis Preparation	12 days	Thu 16/7/20	Fri 31/7/20
✈	Full Thesis Submission	1 day	Sat 25/7/20	Sat 25/7/20

Figure 1.1 List of tasks, duration, starting dates and the end dates for each task

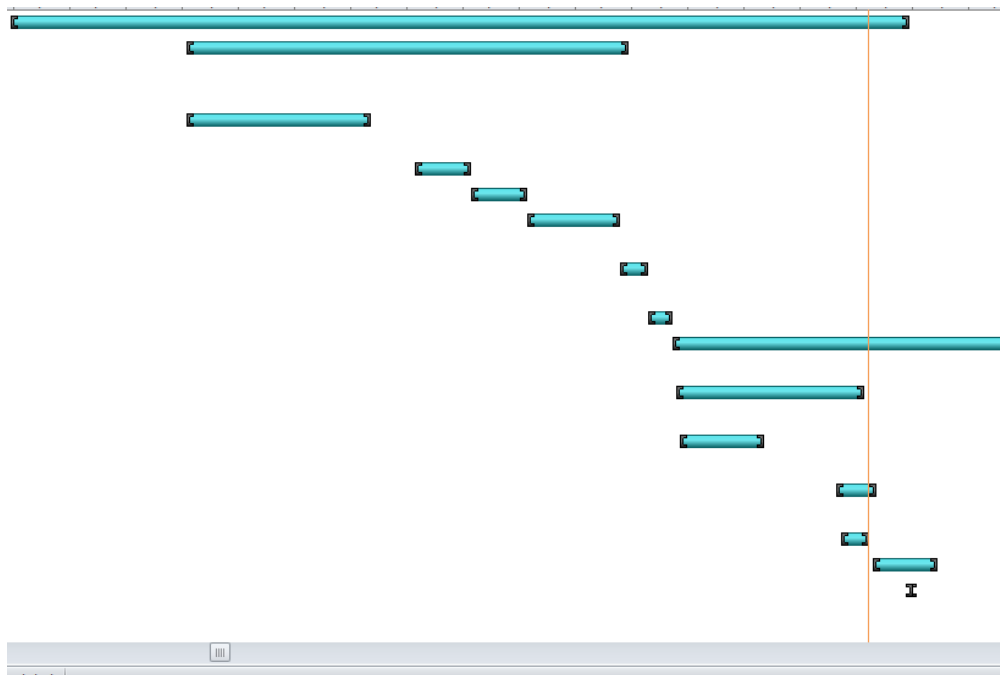


Figure 1.2 Gantt chart of the progress of the project

1.9 Expected Outcome

At the end of this project, an IOT-based Animal detection using a PIR sensor for Kenanga College will be designed and developed. It will help the staff and principal to detect any incoming, potentially dangerous animals into the college area. The PIR sensor could track movements of animals from a calculated distance from the main entrance of the college. The expected outcome of this project:

- The wireless prototype will be used to notify and identify the animals in the Kenanga College.
- The functional prototype will be able to identify animals quickly without any problems.
- Animal alarms are used for good use and can avoid the storage of dangerous animals.

1.10 Project Outline

Chapter 1 is the introduction to this project. In this chapter, it consists of the background of this project, problem statement, objectives, scope, expected outcome, project schedule, and methodology. Background study illustrates about current issue in an overview environment. Expected outcome is what we look forward to in this project. In addition, methodology is a step by step procedure to design prototype. Chapter 2 is an explanation on the existing product. Each product will be analyzed based on their strength and weakness.

Chapter 3 is a described methodology throughout this project. The chosen methodology for this proposed project is Rapid Application Development (RAD). In addition, this chapter also includes steps and technique to produce the prototype. In Chapter 4, the project proposed would be implement and be tested. In addition, it will explain on how to use the

prototype and testing the prototype whether it fulfils user requirement. Chapter 5 will be cover conclusion for the whole project. The experienced gained throughout this project. It will also explore future work to improve the existing prototype.

1.11 Summary

In conclusion, this chapter provides a preface background of this project and explains in depth regarding this proposed project. The proposed project would develop prototypes that will help detect risky animals in the ever-expanding Kenanga College area.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the similarity between the proposed system and existing system will be discussed. To examine the system's strengths, weaknesses and characteristics, a comprehensive analysis will be conducted. For the literature review, there are four existing systems will be compared, which are Animal Detection System in Farm Areas, Animal Detection Using Thermal Images, Animal Presence Detection for Elephants and Bee Frequency Extruding Method, and Wild Animal and Bird Protection Using USN Facilities. All these systems are platform systems involving the detection of animals. A comparison is made between the existing system and the proposed system based on the analysis for the system to adapt the existing strengths and weaknesses. Furthermore, this chapter also discusses the tools and technologies used to develop the proposed system to find suitable tools and technologies for the development of the proposed system.

2.2 Review System

2.2.1 Animal Detection system in Farm Areas

The purpose of livestock tracking system in area is to protect the crop from animal damage without harm. The animal detection system uses PIR and ultrasonic sensors that detect animal presence and send signals to the guard to move the animal by producing sounds and signals, and these signals are transmitted to GSM and immediately alerted the farmers and the forestry department. In addition, PIR sensors are traditional electrical fences for crop protection. However, the drawback of this system such as voltage drops causes failure in efficiency. Next, the RISC-based CMOS microcontroller (a complementary metal oxide semiconductor) uses

separate instruction and data buses that allow simultaneous access to program and data memory even though it is small and low chip size but has the advantage of using other Flash-based manufacturing techniques: 8k; memory data: 368 bytes; EPROM data: 258 bytes. Furthermore, the PIR sensor controls human temperature, passes infrared light at other temperatures and capable to detect up to 5V within 10 m of the sensor and 12 m of power. Furthermore, the risk in the project is a problem with light falling in the animal and causing changes in animal resistance and less resistance (Vikhram *et al.*, 2017).

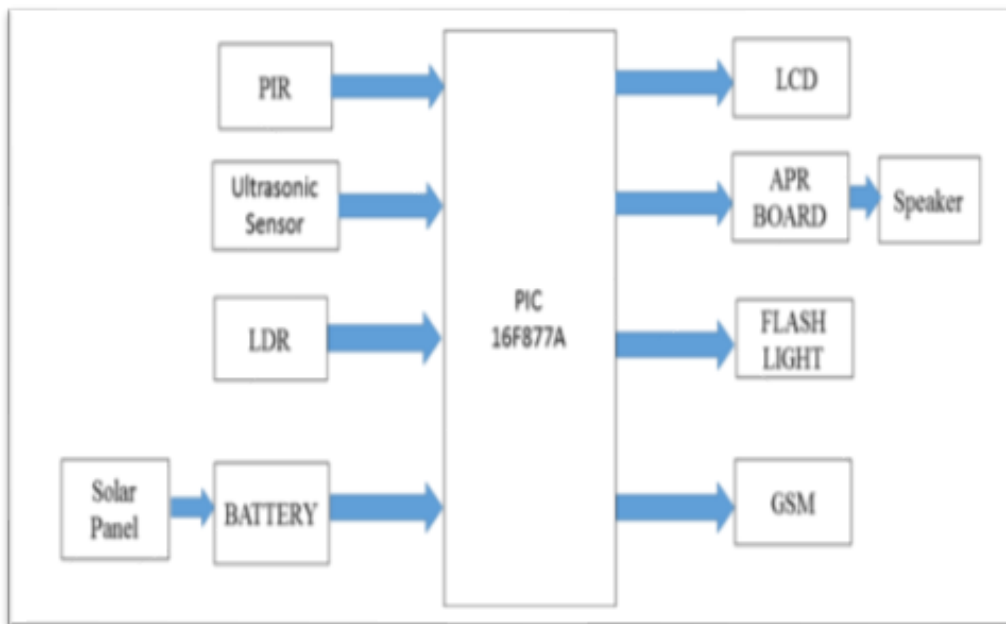


Figure 2.2.1 System architecture of animal detection in farm areas (Vikhram *et al.*, 2017)

Figure 2.2.1 shows animal detection system architecture. There are components that used to detect animal in farms such as PIR, ultrasonic sensor, LDR and APR. The detector is also used to detect animals that pass through the area. Next, in this project, the use of ultrasonic sensors is to measure the animal's distance (Vikhram *et al.*, 2017).