iCAM-ALERT DOORBELL (iCAD)

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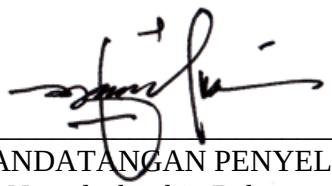

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iCAM-ALERT DOORBELL (iCAD)

NUR NABILAH BINTI NOORAHIM

This report is submitted in partial fulfillment of the requirement for the Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2017

DECLARATION

I hereby declare that this project report entitled

iCAM-ALERT DOORBELL (iCAD)

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

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(NUR NABILAH BINTI NOORAHIM)

SUPERVISOR : _____ DATE: 22/08/2017

(DR.NAZRULAZHAR BIN BAHAMAN)

DEDICATION

I dedicate this thesis to my beloved parents (Mr. Noorahim Abdullah and Mrs. Norpisah Md Aris) who have always loved me unconditionally, my siblings (Noorhayati Noorahim, Noor Afida Noorahim, Nurathirah Noorahim and Nur Khairunnisa Noorahim) for their endless support, all my friends who always there for me and motivates me to set higher target and finally the most importantly to my supervisor Dr. Nazrulazhar Bahaman for his guidance and patience.

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ABSTRACT

In this project, iCam-Alert Doorbell (iCAD) is develop using Raspberry Pi model to serve as an IoT platform to ease the user to receive a notification when the smart doorbell is pressed. iCAD will be developed as there are a few problem arise with the existing classic doorbell such as people always missed to open the door when someone pressed the classic doorbell or when knocking the door. Furhermore, people do not know who is pressing the doorbell or knocking the door so it will be unsafe to open it especially when people are alone. The main objective for iCam-Alert Doorbell are to design simple smart doorbell system with notifacation features through email and Telegram application if the doorbell is pressed. Next, to develop the iCAD prototype that able to demostrate the notification process, live streaming process and photo and video on demand process effectively and smoothly. There are four phases for methadology such as Literature Review, Project Design and Component Selection, Development and Simulation and lastly Testing and Verification. In conclusion, iCAD significant contribution are capable of sending snapshot notifcation alert, live streaming and photo and video on demand upon user request.

ABSTRAK

Dalam projek ini, iCam-Alert Doorbell (iCAD) adalah dibangunkan dengan menggunakan model Raspberry Pi sebagai platform IOT untuk memudahkan pengguna untuk menerima pemberitahuan apabila loceng pintu pintar ditekan. iCAD akan dibangunkan kerana terdapat beberapa masalah timbul apabila menggunakan loceng pintu klasik yang sedia ada seperti orang selalu terlepas untuk membuka pintu apabila seseorang menekan loceng pintu klasik atau apabila mengetuk pintu. Tambahan pula, orang tidak tahu siapa yang menekan loceng pintu atau mengetuk pintu dan menjadi tidak selamat untuk membukanya terutama apabila keseorangan. Objektif utama iCam-Alert Doorbell (iCAD)adalah merekabentuk sistem loceng pintu pintar mudah dengan ciri-ciri pemberitahuan melalui e-mel dan aplikasi Telegram jika loceng pintu ditekan. Seterusnya, untuk membangunkan prototaip iCAD yang dapat melakukan proses pemberitahuan, proses siaran langsung dan proses permintaan gambar dan rakaman video. Terdapat empat fasa untuk melakukan projek ini seperti Kajian Literarasi, Reka Bentuk Projek dan Pemilihan Komponen, Pembangunan Projek dan Simulasi dan akhir sekali melakukan Ujian dan Verifikasi. Kesimpulannya, iCAD mampu hantar gambar pelawat, siaran langsung dan gambar dan video atas permintaan atas permintaan pengguna.

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LIST OF ABBREVIATONS

CLI	- Command-Line Interface
CPU	- Central Processing Unit
FTP	- File Transfer Protocol
GPIO	- General-Purpose Input/Output
GPU	- Graphic Processing Unit
HDMI	- High-Definition Multimedia Interface
iCAD	- iCam-Alert Doorbell
IOT	- Internet Of Things
IT	- Information Technology
LED	- Light-Emitting Diode
NOOBS	- New Out Of Box Software
OS	- Operating System
PC	- Personal Computer
RAM	- Random Access Memory
RDP	- Remote Desktop Protocol
SD Card	- Secure Digital Card
SFTP	- Secure File Transfer Protocol
SMTP	- Simple Mail Transfer Protocol
SoC	- System on Chip
SSH	- Secure Shell
TCP/IP	- Transmission Control Protocol/Internet Protocol
USB	- Universal Serial Bus
V	-Voltage
VGA	- Video Graphics Array
VNC	- Virtual Network Computing
WiFi	- Wireless Fidelity

CHAPTER I

INTRODUCTION

1.1 Introduction

In this project, iCam-Alert Doorbell (iCAD) is develop using Raspberry Pi model to serve as an IoT platform to ease the user to receive a notification when the smart doorbell is pressed. Internet of Things (IoT) is a network of embedded systems (devices) with internet connectivity, which allows them to connect to and interact with other embedded devices, services (machines or appliances) and people on a large scale. This enables the things to be connected or controlled anytime, anyplace with anyone or anything. The main significance of IoT is to make several of tasks become easier for user to control and monitor.

Currently, people always have difficulties in daily life as they always left the guest waiting outside because they always missed the doorbell or when someone is knocking their door. Besides that, the guests maybe not have our phone number to contact when something is important to inform to us. This will lead to even further problem as people always left someone important in front of their door. Therefore, iCAD will help people by inform them through E-Mail and Telegram communication system notification. The smart doorbell, iCam-Alert Doorbell (iCAD) will to send the notifications once the doorbell is pressed. Furthermore, there is Camera Module attached to it so it will take the picture of the visitor and send to user. This prototype can be easily learned as it is user-friendly and effective to use.

1.2 Problem Statement

There are a few problems arise from the existing classic doorbell such as people always missed to open the door when someone pressed the classic doorbell or when knocking the door. In addition, people not know who is pressing the doorbell or knocking the door so it will be unsafe to open it especially when we are alone. Table 1.1 below shows the summary of problem statement.

Table 1.1: Summary of Problem Statement

PS	Problem Statement
PS1	Classic doorbell is not effective to be used nowadays as people always left visitor waiting outside.

1.3 Project Question

Based on the problem statements discussed above, there some project questions that have been identified based on this project such as:

1. **PQ1: What are the possible features to be implemented in iCAD to increase effectiveness?**

   The possible features to be implemented in the iCAD are notification alert (Email, Telegram) with snapshot, live streaming, photo and video on demand and Graphical User Interface application for user to activate the system.

2. **PQ2: How the notification process from iCAD works?**

   The notification process works through WiFi Module and SMTP Library using Python to be sent to the user by E-Mail and Telegram application.

3. **PQ3: How to ensure the notifications were sent accurately to the user?**

   The notification was sent to the correct phone number and email within the time accurately. Table 1.2 below shows the summary of project questions.

Table 1.2: Summary of Project Question

PS	PQ	Project Question
PS1	PQ1	What are the possible features to be implemented in iCAD to increase effectiveness?
	PQ2	How the notification process from iCAD works?
	PQ3	How to ensure the notifications were sent accurately to the user?

1.4 Project Objective

Based on the problem statements and project questions, this project embarks on the following objectives based on this project such as:

1. **PO1: To design simple smart doorbell system with notification features if the doorbell is pressed.**

   The iCAD must be able to send notifications in a few ways such as through email and Telegram application to the user using selected hardware and software to develop the prototype.

2. **PO2: To develop a prototype that able to demonstrate the notification process, live streaming and video on demand process of iCAD effectively and precisely.**

   This project needs to identify suitable techniques and language to use for notification process, live streaming process and photo and video on demand of the iCAD.

3. **PO3: To test and verify the effectiveness of iCAD prototype.**

   To test the prototype able to send the notifications to the correct email and phone number and activate the doorbell using user interface of the system.

The mapping of problem statements, project questions and project objectives are illustrated in Table 1.3.

Table 1.3: Summary of Project Objective

PS	PQ	PO	Project Objective
PS1	PQ1	PO1	To design simple smart doorbell system with alert and notification features.
	PQ2	PO2	To develop a prototype that able to demonstrate the notification process, live streaming and on demand.
	PQ3	PO3	To test and verify the effectiveness of iCAD prototype.

1.5 Scope

iCam-Alert Doorbell (iCAD) can be used by all people since this prototype is a user-friendly and effective to use. This doorbell system is purposely developed to ease the user to receive notification when visitor is pressing the doorbell.
The main modules that will be done in this project are:

1. **Implemented Module**
   There are some module will be implemented in the iCAD system such as Camera Module, WiFi Module and SMTP Library.

2. **Additional Features**
   There are additional features to be added in the doorbell system to increase the effectiveness of iCAD such as snapshot alert, photo and video on demand and live streaming. The additional features will be listed based on the functionality requirements for the smart doorbell.

3. **iCAD Effectiveness Testing**
   The effectiveness of the prototype can be tested by make sure the user receive the notifications through correct phone number and email. The effectiveness can be tasted based on the features of the smart doorbell.

1.6 Project Contribution

There are some main project contributions to the user such as the prototype such as receive notifications, live streaming and photo or video on demand. Table 1.4 below shows the summary of project contributions.

Table 1.4: Summary of Project Contribution

PC	Project Contribution
PC1	iCAD help user to be able to receive notification attached with visitor's face through Telegram and Email.
PC2	iCAD can record video and take photo on demand upon the user request via Telegram command.
PC3	iCAD can provide live streaming process by using the user interface of smart doorbell.

1.7 Expected Output

1. A user-friendly smart doorbell prototype that able to send alert notification using Telegram and an email to the user by attaching the picture of the visitor successfully when the button is pressed.

2. A smart doorbell that able to request photo or video on demand through Telegram application commands.

3. The user interface can display live streaming from the camera module at the smart doorbell.