

UNIVERSITI TEKNOLOGI MARA

**Smart Box Cold Storage Monitoring
using Raspberry Pi : User Notification**

Mohd Syu'aib Bin Salleh

**Thesis submitted in fulfillment of the requirements
for the Bachelor of Science (Hons) Data
Communications and Networking
Faculty of Computer and Mathematical Sciences**

July 2014

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious and The Most Merciful. Peace and blessing of Allah Almighty to our beloved, final Prophets Muhammad S.A.W and his relatives, all his companions and those who have followed. Alhamdulillah, all praise and thankfulness to Allah S.W.T, The Most Glorious and Omnipotent which is with His will, I was able to complete this proposal report for CSP600 within the time duration given.

First of all, I would like to express my deepest thanks and appreciation to my supervisor, Pn. Siti Arpah Binti Ahmad for her invaluable guidance, understanding, constant encouragement and moral support from the beginning stages until this proposal report was successfully completed. I wish to express my warm and sincere to my beloved parents Haji Salleh Bin Sidek, Hajah Fatimah Binti Ab Ghani, Norashidah Binti Salleh, Siti Rohana Binti Salleh, Siti Rohani Binti Salleh, Mohd Ariff Bin Salleh, Mohammad Affandi Bin Salleh and Mohammad Azahari Bin Salleh, who always support and encourages me through the difficult time while doing this proposal report until successfully completed. A billion thanks from the bottom of my heart to my beloved friend, especially Azyana Binti Yaakub and my beloved lecturers of UITM especially FSKM who are really responsible to give guide, support and assisting me while writing this report.

Lastly, thanks you so much to all those who supporting me in any way during the completions of this proposal report by discussing, sharing or exchanging ideas and everyone who are directly or indirectly involved in writing this report.

Thank you so much.

ABSTRACT

Nowadays, as we acknowledge cold storage is an important division in the supermarket to sustain or maintained all goods. Thus, this project aims to develop a basic prototype for monitoring the cold storage by using the Raspberry Pi as Control Unit. This raspberry pi device will attach to the desired sensor in order to monitor the temperature level in the cold storage. Besides building in certain sensors, this prototype will add the user notification part which is purposely to communicate with the cold storage person in charge to get notified or alert on the cold storage environment. This notification received from the control unit via SMS and Email when the level of temperature are out of range allowed.

TABLE OF CONTENTS

CONTENTS	PAGE
SUPERVISOR’S APPROVAL	ii
DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
CHAPTER 1: INTRODUCTION	1
1.1 BACKGROUND OF STUDY	1
1.2 PROBLEM STATEMENT	2
1.3 PROJECT AIMS AND OBJECTIVE	3
1.4 PROJECT SCOPES	3
1.5 SIGNIFICANCE OF THE PROJECT	4
CHAPTER 2: LITERATURE REVIEW	5
2.1 RASPBERRY PI OPERATING SYSTEMS	
- RASPBIAN	5
2.2 RASPBERRY PI PROGRAMMING	
LANGUAGE – PYTHON	7
2.3 COLD STORAGE ENVIRONMENT ASPECT	8
2.3.1 TEMPERATURE LEVEL	8
2.3.2 HUMIDITY LEVEL	9
2.4 USER NOTIFICATION SYSTEM	11
2.4.1 ADD EMAIL NOTIFICATION	11
2.4.2 ADDING SMS NOTIFICATION	12
2.5 SUMMARY	16

CONTENTS	PAGE
CHAPTER 3: METHODOLOGY	17
3.1 PHASE ONE – ANALYSIS & QUICK DESIGN	18
3.1.1 ANALYSIS	18
3.1.2 QUICK DESIGN	18
3.3 PHASES TWO – PROTOTYPE CYCLES	19
3.4 PHASES THREE – TESTING	21
3.5 PHASES FOUR – DEPLYOMENT	21
CHAPTER 4: DISCUSSION, RESULT AND FINDING	22
4.1 DISCUSSION	22
4.1.1 NECESSARY PACKAGES	
INSTALLATION – PYTHON, GAMMU, SMTP	22
4.1.2 EMAIL & SMS NOTIFICATION	
PROGRAMMING	30
4.2 RESULT	37
4.2.1 SENDING AN EMAIL FROM	
RASPBERRY PI AND CPU TEMPERATURE	
MONITORING	37
4.2.2 EMAIL NOTIFICATION FROM	
TEMPERATURE SENSOR	39
4.2.3 TEST SEND SMS FROM RASPBERRY	
PI USING GSM MODEM	42
4.2.4 SMS NOTIFICATION WHEN	
TEMPERATUREOUT OF RANGE	43
4.3 FINDING	45
4.3.1 PYTHON LANGUAGE SELECTION	46
4.3.2 SMS SERVICE	46
4.3.3 GAMMU	47
4.3.4 FINAL RUN TEST FOR SYSTEM	
CAPABILITY	47