

**DESIGN AND IMPLEMENTATION OF A RESTAURANT  
AUTOMATED FOOD ORDERING SYSTEM (RAFOS)**

**ELUWA ANITA CHIDERA  
13/SCI01/006**

**JUNE, 2017**

**DESIGN AND IMPLEMENTATION OF RESTAURANT AUTOMATED  
FOOD ORDERING SYSTEM (RAFOS)**

**ELUWA ANITA CHIDERA**

**13/SCI01/006**

**A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF  
MATHEMATICAL AND PHYSICAL SCIENCES, COLLEGE OF  
SCIENCES, AFE BABALOLA  
UNIVERSITY, ADO-EKITI. IN PARTIAL FULFILLMENT FOR THE  
AWARD OF BACHELOR OF SCIENCE (B.Sc.) DEGREE IN  
COMPUTER SCIENCE**

**JUNE, 2017**

## **CERTIFICATION**

This is to certify that this project work was carried out by ELUWA ANITA CHIDERA of the department of Mathematical and Physical Sciences, B.Sc. Computer Science Degree Programme, and this work has not been presented elsewhere for the award of a degree or any other purpose.

.....

STUDENT

ELUWA ANITA CHIDERA

.....

DATE

.....

PROJECT SUPERVISOR

DR. OLUWASEYI A. ADEYEMO

.....

DATE

.....

HEAD OF DEPARTMENT

PROF G.M.M OBI

.....

DATE

## **DEDICATION**

I dedicate this project to God Almighty for his infinite mercies upon me, for HIS guidance towards me this past years and for helping me overcome all obstacles during me phases.

I also dedicate this work to my beautiful mother and strong father for their endless support towards me and going extra miles just to see me happy, for their prayers, kind words of encouragement, which kept me going all along.

## **ACKNOWLEDGEMENTS**

I thank the LORD for keeping me alive to see this day, for carrying this project efficiently and effectively, for his blessings all through my stay in ABUAD, for crowning all me efforts with success and for many more achievements HE will grant me.

I cannot but express my gratitude to my Project Supervisor, Dr. Oluwaseyi Adeyemo for being the backbone of this project; for his selflessness; going the extra mile to see this project a success, for being my guardian all through my stay in ABUAD; his kinds words of encouragement; and lastly for his support.

I also acknowledge Prof G.M.M. Obi, Dr. Opani Aweh, Mrs Gbemisola Babalola, Mrs Olatunji, and all my lecturers for their efforts in making me a great student of this department and their unending advices.

I appreciate my parents Sir Emeka and Nkechi Eluwa for being the best parents, for their support financially, morally and in all ramifications. I love you Dad and Mom and may God bless you and keep you.

I wish to specially thank my siblings Daniel and Tochukwu Eluwa who believed in me, looked up to and supported me during the research of this project work.

Finally, I celebrate my best friend Olawale Oloyede, Asiafa Tracy and all my friends Adetayo Bolanle, Ardo Babayo Khadija, Ozoemena Lotanna, Mohammed Maryam, Osanyitunyi Justina Okpeseyi Oyinkansola and others too numerous to mention for making my stay in ABUAD a blissful one.

## **TABLE OF CONTENTS**

CONTENTS	PAGES
TITLE PAGE.....	I
CERTIFICATION.....	III

DEDICATION.....	IV
ACKNOWLEDGEMENT.....	V
TABLE OF CONTENTS.....	VI
LIST OF FIGURES.....	XI
LIST OF TABLES.....	XIV
ABSTRACT.....	XV

## **CHAPTER ONE: INTRODUCTION**

1.1 BACKGROUND OF THE STUDY.....	1
1.2 STATEMENT OF THE PROBLEM.....	2
1.3 AIM AND OBJECTIVES OF THE STUDY.....	2
1.4 METHODOLOGY.....	3
1.5 SCOPE OF THE PROJECT.....	3
1.6 FUNCTIONALITY OF THE SYSTEM.....	4
1.7 CONTRIBUTIONS TO KNOWLEDGE.....	4
1.8 DEFINITION OF TERMS.....	5
1.9 ARRANGEMENT OF PROJECT.....	6

## **CHAPTER TWO: LITERATURE REVIEW**

2.1 INTRODUCTION.....	7
2.2 RESTAURANTS.....	9

2.2.1 WHAT IS A RESTAURANT.....	9
2.2.2 RESTAURANTS IN ASIA.....	9
2.2.3 RESTAURANTS IN EUROPE.....	10
2.2.4 RESTAURANTS IN AMERICA.....	10
2.2.5 RESTAURANTS IN AFRICA.....	10
2.2.6 RESTAURANTS IN NIGERIA.....	11
2.2.7 RESTAURANTS IN ABUAD.....	11
2.3 REVIEW OF RELEVANT WORKS ON FOOD ORDERING SYSTEMS.....	12
2.3.1 A CUSTOMIZABLE WIRELESS FOOD ORDERING SYSTEM WITH REAL- TIME CUSTOMER FEEDBACK.....	12
2.3.2 A PROPOSED SYSTEM FOR TOUCHPAD BASED FOOD ORDERING SYSTEM USING ANDROID APPLICATION.....	14
2.3.3 DESIGN AND IMPLEMENTATION OF ONLINE FOOD ORDERING SYSTEM.....	14
2.3.4 ONLINE FOOD ORDERING SYSTEM FOR RESTAURANTS.....	16
2.3.5 WIRELESS CUSTOMIZABLE FOOD RECOMMENDATION SYSTEM USING APRIORI AND K-MEANS ALGORITHM.....	16
2.3.6 DESIGN AND IMPLEMENTATION OF ORDERING SYSTEM FOR RESTAURANTS.....	17
2.3.7 SOFTWARE DEVELOPMENT ASPECTS OF A MOBILE FOOD ORDERING SYSTEM.....	18

2.3.8 IMPLEMENTING CUSTOMIZABLE ONLINE FOOD ORDERING SYSTEM USING WEB BASED APPLICATION.....	20
2.4 AUTOMATED SYSTEMS.....	22
2.4.1 AUTOMATIC RESTAURANT ORDER SYSTEM USING ZIGBEE.....	22
2.4.2 RESTAURANT AUTOMATION.....	24
2.4.3 AUTOMATED FOOD ORDERING SYSTEM WITH REAL-TIME CUSTOMER FEEDBACK.....	24
2.4.4 RESTAURANT AUTOMATION.....	28
2.5 DIGITAL SYSTEMS.....	29
2.5.1 DIGITAL ORDERING SYSTEM FOR RESTAURANT USING ANDROID.....	29
2.5.2 DESIGN AND IMPLEMENTATION OF DIGITAL DINING IN RESTAURANTS USING ANDROID.....	31
2.5.3 DIGITAL DINING SYSTEM USING ANDROID.....	32
2.5.4 DIGITAL TABLE BOOKING AND FOOD ORDERING SYSTEM USING ANDROID APPLICATION.....	34
2.6 MENU AND MANAGEMENT SYSTEMS.....	36
2.6.1 RESTAURANT MENU AND MANAGEMENT SYSTEM.....	36
2.6.2 DESIGN IMPLEMENTATION AND EVALUATION OF A MENU MANAGEMNT SYSTEM FOR RESTAURANTS.....	38
2.6.3 IMPLEMENTATION OF SMART RESTAURANT WITH E-MENU CARD.....	40
2.6.4 APPLICATION ON ORDER MANAGEMENT SYSTEM IN RESTAURANTS...	40



## **CHAPTER THREE: SYSTEM ANALYSIS AND DESIGN**

3.1 SYSTEM ANALYSIS AND DESIGN.....	44
3.2 LOGICAL ANALYSIS OF THE EXISTING SYSTEM.....	44
3.3 LOGICAL ANALYSIS OF IMPLEMENTED SYSTEM.....	45
3.4 COMPONENTS OF THE IMPLEMENTED SYSTEM.....	48
3.4.1 USER INTERFACE.....	48
3.4.2 ADMINISTRATOR INTERFACE.....	50
3.5 ARCHITECTURAL CONTEXT DIAGRAM .....	52
3.6 CONTEXT DIAGRAM OF THE IMPLEMENTED SYSTEM.....	53
3.7 ACTIVITY DIAGRAM OF THE IMPLEMENTED SYSTEM.....	53
3.8 USE CASE DIAGRAM.....	53
3.9 INPUT- PROCESS - OUTPUT - STORAGE DIAGRAM.....	53

## **CHAPTER FOUR: SYSTEM IMPLEMENTATION AND TESTING**

4.1 INTRODUCTION.....	60
4.2 GRAPHICAL USER INTERFACE DESIGN.....	60
4.3 ADMINISTRATOR INTERFACE DESIGN.....	61
4.4 SYSTEM TESTING.....	73
4.5 SYSTEM SECURITY.....	73
4.6 SYSTEM IMPLEMENTATION STRATEGY.....	76
4.6.1 DIRECT CHANGE STRATEGY.....	76
4.6.2 PHASE CHANGE STRATEGY.....	76

4.7 TRAINING.....	76
4.8 SYSTEM MAINTENANCE.....	76
4.9 SYSTEM SPECIFICATION.....	77
4.9.1 HARDWARE SPECIFICATION.....	77
4.9.2 SOFTWARE SPECIFICATION.....	77
 <b>CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION</b>	
5.1 SUMMARY.....	79
5.2 CONCLUSION.....	80
5.3 RECOMMENDATIONS.....	80
REFERENCES.....	81
APPENDIX A.....	84
APPENDIX B.....	87
APPENDIX C.....	93

## LIST OF FIGURES

<b>FIGURES</b>	<b>TITLES</b>	<b>PAGES</b>
2.1	THE SYSTEM ARCHITECTURE OF CWOS-RTF WITH INTERNET ACCESS	13
2.2	SYSTEM ARCHITECTURE FOR TOUCH-BASED FOOD ORDERING	15
2.3	SYSTEM ARCHITECTURE OF CUSTOMIZABLE ORDERING	19

	SYSTEM	
2.4	SYSTEM ARCHITECTURE OF WEB-BASED APPLICATION	21
2.5	BASIC BLOCK DIAGRAM OF AUTOMATED RESTAURANT USING ZIGBEE MODULE	23
2.6	STATE MACHINE OF HOW THE CENTRAL COMPUTER OPERATES	25
2.7	SYSTEM ARCHITECTURE OF AOS-RTF WITH INTERNET ACCESS	27
2.8	A THREE-TIER ARCHITECTURE	30
2.9	SYSTEM ARCHITECTURE OF DIGITAL DINING RESTAURANTS	33
2.10	ARCHITECTURE OF DIGITAL DINING SYSTEM	35
2.11	ARCHITECTURE OF DIGITAL TABLE BOOKING SYSTEM	37
2.12	COMPONENT DIAGRAM OF MENU MANAGEMENT SYSTEM	39
2.13	SYSTEM BLOCK DIAGRAM	42
3.1	LOGICAL ANALYSIS OF THE EXISTING SYSTEM	46
3.2	A SNAPSHOT OF THE 100 NAIRA TICKET USED IN CAFETERIA 2	47

3.3	A SNAPSHOT OF THE 200 NAIRA TICKET USED IN CAFETERIA 2	47
3.4	OVERALL ARCHITECTURE OF THE IMPLEMENTED SYSTEM THAT SHOWS HOW IT WORKS	49
3.5	COMPONENTS AND SUB-COMPONENTS OF THE IMPLEMENTED SYSTEM	51
3.6	ARCHITECTURAL CONTEXT DIAGRAM	54
3.7	CONTEXT DIAGRAM	55
3.8	ACTIVITY DIAGRAM	56
3.9	USE CASE DIAGRAM	57
3.10	INPUT-PROCESS-STORAGE OUTPUT DIAGRAM	58
3.11	SEQUENCE DIAGRAM	59
4.1	SHOWS THE INDEX PAGE OF THE MOBILE APPLICATION	62
4.2	SHOWS THE LOG IN INTERFACE FOR THE CUSTOMER	63
4.3	DISPLAYS A CONFIRMATORY MESSAGE OF A SUCCESSFUL REGISTRATION OF THE CUSTOMER	64
4.4	DISPLAYS THE ITEM CATEGORIES	65
4.5	SHOWS THE SAMPLE OF THE PRICE ALLOCATED TO EACH ITEM	66
4.6	SHOWS THE CHECKOUT TO THE PAYMENT FORM	67

4.7	SHOWS THE PAYMENT PROCESSES	68
4.8	ISSUES A TAG NUMBER TO THE CUSTOMER FOR HIS ORDER	69
4.9	SHOWS THE HOME PAGE OF THE ADMINISTRATOR	70
4.10	THE LOG IN PAGE FOR THE ADMINISTRATOR	71
4.11	LOCATION OF THE FOOD CATEGORY	72
4.12	CUSTOMER'S DETAILS WHO HAVE ORDERED AN ITEM	74
4.13	LIST OF SALES AND ORDERS	75

## **LIST OF TABLES**

<b>TABLES</b>	<b>TITLES</b>	<b>PAGES</b>
2.1	COMPARISON OF SOME SELECTED DESIGNS WITH THE PROPOSED SYSTEM	43

## **ABSTRACT**

Restaurant automation today is very vital for a successful restaurant to function because it has eliminated the inefficiencies of the manual-based restaurants such as: long queues, bill calculation, and improper restaurant management. Therefore, a Restaurant Automated Food Ordering System (RAFOS) is designed to solve these inefficiencies.

The methodology used is the Software Analysis and Design Methodology (SADM). The programming language tools used were Visual Basic. (VB.NET), JAVA programming languages, XML, ASP.NET and MsSQL database as front end and backend respectively. The

other resources used in this project are: Android Studio Development Kit, MsSQL, logical designs and a communication protocol (SOAP).

The system was designed such that users can make their food ordering using the mobile application on the tablet PC that sends the order directly to the central system in the kitchen, where the central system receives all orders and processes it immediately. Furthermore, the wireless application on android devices provide a means of convenience, improving efficiency and accuracy for restaurants by saving time, reducing human errors and real-time customer feedback. This system can be further extended to register and link multiple restaurants to enhance the dining experience of customers.