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Sockets' power consumption monitoring system

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DECLARATION

I **Eritu Pius** Reg No. **BU/UG/2012/2025** hereby declare that this project report is my original work except where explicit citation has been made and it has not been presented to any Institution of higher learning for any academic award.

Sign: ……

Date: …….

APPROVAL

This is to certify that this project report under the title ***"Sockets' power consumption monitoring system "*** has been done under my supervision and is now ready for examination.

Mr. Bwire Felix

Department of Computer Engineering

Sign:…….

Date:……..

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LIST OF ABBREVIATIONS

ISIC	-	International Standard Industrial Classification
COBE	-	Census of Business Establishments
LCD	-	Liquid Crystal Display
CT	-	Current Transducers
DC	-	Direct Current
AC	-	Alternating Current

LIST OF FIGURES

Figure 2.0.1 Step light power monitor 5
Figure 2.0.2 Arduino Uno programming 8
Figure 2.0.3 ATMEGA328 microcontroller 9
Figure 2.0.4 The Allegro Current Sensor 10
Figure 2.0.5 The 16x2 LCD 11
Figure 2.0.6 The Omron single relay 12
Figure 2.0.7 4x3 matrix 12 keypad 12
Figure 2.0.8 Resistors 13
Figure 2.0.9 Potentiometer 14
Figure 2.0.10 Diode 14
Figure 2.0.11 Capacitor 15
Figure 2.0.12 voltage regulator 15
Figure 4.0.1 The system conceptual diagram 21
Figure 4.0.2 Flow chart diagram 22
Figure 5.1 Schematic diagram 23

ABSTRACT

In Uganda especially in the capital city, Kampala, it is a common practice for businesses to share shops or apartments and as a result they share power. Most of the businesses in these apartments use power drawn from the sockets. Of recent with the introduction of YAKA system in Uganda which acts a prepaid billing system and can be installed in any room, many shop and apartment owners have taken it up. In a single shop or apartment you can find around four to six businesses sharing the same YAKA meter and also sharing the power bills but none of them can tell how much of the power each consumes to run their businesses. Since the business owners can't tell how much power is consumed by each individual as they operate their businesses, many of these owners end up having quarrels over power since the power bills are expensive and there is no clear way of billing themselves after the YAKA meter. The development of this system was therefore motivated by the need to solve this problem. The system is able to solve this problem by monitoring the power consumed by each socket as used by each business in the shop. It displays the power consumption of each business on an LCD in terms of units in real time. When the units of any socket are done, the system is able to turn off the socket automatically and leave the rest that still have units to run which eliminates the problem of people paying overdue. For purposes of demonstration, two simple sockets were connected to the system which to represent the sockets in the real world.

DECLARATION i
APPROVAL ii
ACKNOWLEDGEMENT iii
LIST OF ABBREVIATIONS iv
LIST OF FIGURES v
ABSTRACT vi
INTRODUCTION 1
1.1 Background of the study 1
1.2 Problem statement 2
1.3 Objectives 2
1.3.1 Main objective 2
1.3.2 Specific objectives 2
1.4 Significance 3
1.5 Scope 3
CHAPTER TWO 4
LITERATURE REVIEW 4
2.1 Power consumption monitoring 4
2.2 Existing systems 4
2.2.1 Step light / Watts Clever Plug-in Power Meters 4
2.2.2 YAKA 5
2.3 Weaknesses of existing systems 6
2.3.1 Step light/ Watts Clever Plug-in Power meter 6
2.3.2 YAKA 6
2.4 An overview of the socket power consumption monitoring system 7
2.4.1 Technologies used in the system 7
2.4.2 Components used in the Luggage Anti-theft Monitoring System 8
CHAPTER THREE 16
METHODOLOGY 16
3.1 Requirement gathering 16
3.2 Data collection methods 16
3.2.1 Document review 16
3.2.1 Interviews 16

3.2.2 Consultations 16
3.3 Requirement analysis 16
3.4 System design 16
3.4.1 Hardware 17
3.4.2 Software equipment and design tools 17
3.5 System implementation 17
CHAPTER FOUR 19
SYSTEM ANALYSIS AND DESIGN 19
4.1 Requirements analysis 19
4.1.1 Functional Requirements 19
4.1.2 Non-functional requirements 20
4.2 System design and analysis 20
4.2.1 Conceptual diagram 21
4.2.2 System flow chart 22
CHAPTER FIVE 23
TESTING AND IMPLEMENTATION 23
5.1 System testing and validation 23
5.1.1 Testing 23
5.1.2 System Validation 24
CHAPTER SIX 25
DISCUSSIONS AND RECOMMENDATIONS 25
6.1 Summary of the work 25
6.2 Challenges 25
6.3 Recommendations for future work 25
6.4 Limitation of the system 25
6.4 Conclusion 26
REFERENCES 27
APPENDICES 28
CODE DESIGN 28

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The Bureau conducted the Census of Business Establishments from March 2010 to June 2011.The economic activities undertaken by the business establishments were classified according to the International Standard Industrial Classification (ISIC) Revision 4 and the report is structured according to 15 major industry groups. In order to show the spread of businesses, the country was divided into 5 regions, namely Central, Eastern, Northern, Western and Kampala. The capital city, Kampala, was considered a region on its own because it had about 30 percent of the total number of business establishments. To the extent possible an attempt was made to compare the 2010/11 COBE with the 2001/02 COBE. [1]

In Uganda especially in the capital city, Kampala, it is a common practice for businesses to share shops or apartments. For example you might find that a single business apartment is being occupied by around five people and all of these people use power to run their businesses. UMEME has tried to make bill payment more efficient by using the new YAKA but this seems not to serve well in these shops/apartments.

About 110,000 Ugandans are projected to convert to the YAKA prepaid billing system, UMEME has said. The power distribution company head of communications, ***Mr. Henry Rugamba***, said currently, 95, 000people have transformed to the system implying that 15,000 are targeted. “The 95,000 are in the districts of Kampala, and Masaka,” he said. This includes business shops/apartments and arcades this number is still expected to grow. [2]

YAKA has proved to serve well up-to shop/apartment level, which is measuring the amount of power consumed by each room. But in these business shops/apartments many people use the power that runs through the sockets to run their businesses and none of them can tell how much power they are using to run their businesses, and when it comes to paying bills, all the members of that shop/apartment contribute randomly towards settling of bills and this seems inefficient and unfair to those who use the power to run less power consuming businesses.

In our day-to-day activities, most of the power we use is consumed through sockets and not the lights, so many have tried to find a way of monitoring and reducing the consumption of power through the sockets. Many systems have been developed like the power monitoring plugs but most of them do only the monitoring and leave the rest to the user to find how they balance their power consumption.

So this calls for better systems that can allow monitoring power and at the same time ensure that a person uses only power that he has paid for.

1.2 Problem statement

In Uganda there is an increased growth in the business sector and due to the expensive rent, many business people find themselves sharing business shops/apartments and share power bills that seem unfair to others since they all can't tell how much power is consumed by each individual as they operate their businesses. Some have businesses like selling phones, laptops, phone and computer repair, charging among others and none of these people can tell how much power each of them consumes through their sockets. Many of these workers end up having quarrels over power since the power bills are expensive and there is no clear way of billing themselves after the YAKA meter.

This calls for a system that can help monitor the power being consumed by each and every person who has a socket in that shop/apartments so that each socket's power measurement is independent differently.

1.3 Objectives

1.3.1 Main objective

i. To design and implement a Sockets power consumption monitoring system.

1.3.2 Specific objectives

i. To identify the requirements needed to design a wireless Sockets power consumption monitoring system.
ii. To design a Sockets power consumption monitoring system.
iii. To implement a Sockets power consumption monitoring system.
iv. To test and validate the implemented system.

1.4 Significance

The following are the benefits of carrying out the study about the system;

i. Instituting the Socket power consumption monitoring system will ensure that everyone pays for only that power that they use individually in their business and this will eliminate the problem of people paying overdue.

ii. As a student I have improved on my programming and implementing skills which has boosted my hands on experience.

iii. Those who will want to make improvements on the system will highly improve their hardware programming knowledge.

1.5 Scope

Technical scope

The system is bounded to the design and implementation of a Sockets power consumption monitoring system, the LCD display displays the results from the sockets and a keypad is used to give instruction on which action to be performed by the micro controller. This applies to the few sockets connected to the system.

Geographical scope

The study was carried out mainly in the business shops/apartments

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