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SMART HOME APPLICATION

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Declaration

I declare that this work has not been submitted to any other University for the award of a degree in Bachelor of Science in Informatics and that it is original and does not exist in any library whatsoever. Therefore, the work should not be copied duplicated, reproduced or presented without my knowledge and authorization

Abstract

Electricity is one of the greatest inventions by human beings. It has surely brought our lives from darkness and to the light. Year by year, production of electricity is growing exponentially. This is because demand is increasing at almost the same rate. More electricity dependent devices are being manufactured day in day out. Population is growing and the world is on the fast lane to the digital era. All these cause an increase in the demand for this scarce resource.

We are responsible for how we use electricity. We can control the demand for this scarce resource if only we monitor and reduce our wastage of electricity.

Currently, it is very cumbersome to monitor and regulate the amount of electricity one uses. It involves constant trips to the meter box to check how the electricity consumption is going. Unmonitored use can lead to wastage and since electricity is a scarce resource which is expensive, the user is eventually faced with unexpected high electricity bills. The smart home application seeks to avoid this by providing a platform for monitoring and regulation of electricity consumption.

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Introduction

1.1 Background

The energy sector in Kenya is largely dominated by petroleum and electricity, with wood fuel providing the basic energy needs for rural communities. Access to electricity in the country is not the best despite the government's ambitious plans to increase electricity connectivity from the current 55% to 95% or universal electricity supply by 2020 (Lily Kuo, January 2017)

Kenya enjoys a mix of various sources of electricity generation with the most common being Hydroelectric power plants. The government just recently opened the largest geo-thermal electricity plant in Africa and there are even plans to build a nuclear plant in the country as demand increases, then supply should as well increase.

In a world of limited energy sources, it is essential the country learns how to conserve electricity. That is why in 2013, KPLC decided to distribute 3.3 million energy saving bulbs at a cost of Sh1.3 billion for free to its customers. This was meant to reduce domestic customers' power consumption by 130 megawatts during peak hours (Macharia Kamau, June 2013)

Energy conservation does not only reduce the cost of living but also helps conserve the environment. Although Kenya mostly uses renewable sources of energy such as hydro and wind energy, most places in the world are heavily dependent on fossil fuels for electricity generation such as coal or oil. Burning of these fossil fuels lead to the build up of carbon in the atmosphere and consequently leading to global warming. Electricity conservation reduces energy consumption which reduces energy demand and thus the supply also minimizes. This will reduce electricity generation and thus less fossil fuels will be burnt.

1.2 Problem Statement

A lot of energy goes to waste when we use electricity without monitoring our consumption. Awareness should be increased on the benefits of conserving electricity since the user is the one to benefit most from electricity conservation by reduced electricity bills hence a lower cost of living. This surplus capital can then be invested in something productive. The state will also benefit immensely from improved electricity conservation efforts. Electricity generation plants will have extra electricity to distribute elsewhere and the overall cost of electricity might even go down

Currently, Kenyans are not used to the idea of monitoring their electricity consumption in their homes. Applications such as Sense which provide a platform for keeping an eye on how each electrical device in the house consumes electricity are very foreign concepts. The only energy conservation that Kenyans know is using compact fluorescent lamp (CFL). These bulbs are quite effective in reducing electricity consumption since they use up to 75% less energy than a traditional light bulb (Michael Schenker, 2015)

The future does not look so bright if we do not change our habits. Conserving energy is not just about saving on your electricity costs. The Organization for Economic Co-operation and Development (OECD) warns that, given the current trends, energy-related emissions will increase by 70 percent by 2050. This can accelerate the negative consequences of climate change, including higher temperatures and a rise in the frequency of extreme weather events

1.3 Aims of Project

The purpose of this project is to develop a system that allows monitoring of electricity usage in the house. After installation of the application on the home's meter box, the application monitors how much electricity is being used and furthermore, the user can set a limit of the electricity units they would like to use for the day. When this limit is reached, the application sends the user an alert notifying them that the limit entered has been reached.

1.4 Objectives

1.4.1 Main Objectives

To develop a system that allows users to view how much electricity they are using. It also allows the users to set some bounds on the amount of electricity they would like to use in a day and the system notifies them when they reach they reach this limit.

1.4.2 Specific Objectives

- I. To research on the current methods for energy conservation and investigate their effectiveness.
- II. To study the challenges that face the current electricity conservation and monitoring systems.
- III. To examine Kenyans habits on electricity consumption and conservation.
- IV. To test and implement the developed system.

1.5 Research Questions

- I. What are the current methods in use for energy conservation and how effective are they?
- II. What are the challenges facing the current electricity conservation and monitoring systems?
- III. What are the habits of Kenyans on electricity consumption and conservation?
- IV. How to test and implement the developed application?

1.6 Justification

Development of the Smart home application will have numerous benefits to both the individual consumers and the environment.

The consumers will benefit by reduced electricity bills since the application allows them to minimize the amount of electricity that they use. This will consequently lead to lower costs of living due to reduced budget on bills. The consumer can invest this extra money that they would have paid bills with into something else more productive.

If the system can be adopted in a large scale sense, then electricity demand will reduce since less energy is going to waste and more is being saved. The supply will automatically increase due to the unchanging economic principles of demand and supply. This will lead to the reduction of the unit price of electricity. The electricity providers can then connect more homes throughout the country because there will be more electricity to share. There will also be a reduced need for new and expensive energy infrastructure because the current framework can support both the new and already present consumers.

The environment is also a major beneficiary of electricity conservation. Energy conservation leads to reduced emission of greenhouse gases that are released during generation of electricity by fossil fuels.

Although most of the benefits of the Smart Home system are long term, they will have trickle down effect on the economy and nature.

1.7 Scope and Limitations

The Smart home system will be limited to users with electricity and internet connection. The technology will also be expensive to purchase since it requires buying of hardware and installation by an electrician.

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