

Monitoring platform for the consumption of electricity in a home

D. Pérez Lara; D.J. Lancheros Cuesta; G. Marulanda García; M. Bueno López

Abstract-

Purpose

Nowadays, an extra consumption of electric energy in the Colombian houses is generated due to electric or electronic elements plugged into the electric network. This fact produces a cost overrun in the user's electricity bills. To reduce this extra cost, and also with a plus of reducing greenhouse gas emission, a monitoring system for the consumption of electric energy in a household will be designed and implemented to make electricity users realize how much money and energy is being wasted due to the unnecessary electric elements plugged into the network. This paper aims to show a monitoring system that allows the client to supervise the consumption of some appliances inside his/her home, remotely. It is also considered the HMI to be able to log in, choose the intervals of data and generate reports and graphics. The monitoring system is based on the integration of several technologies that are already used and implemented in houses and buildings, such as: measuring and treatment of data electronically using microcontrollers, Wi-Fi technology and dynamic graphic interface (website).

Design/methodology/approach

The methodology consists of several tasks, starting from documentation of the variables, instrumentation and methods for getting to the solution; the first part of the methodology focuses on selecting the electric and/or electronic elements to be monitored, so the instrumentation is able to monitor. Then, the power stage was implemented in this stage to measure signals from the sensors while sensing the electric nodes are adjusted, so does the transmission and reception. In the third stage, the design information system was implemented; this is where the received data from the sensors are stored and managed for further organization and visualization. Activities included the following: Analysis of the model of use cases: Identification of actors and actions that are involved in the system. Server selection: Study of the different server to manage the database. Design of the database: The variables, tables, fields, profiles are determined for managing the information. Connection between sensors and database: Correct data transmission and managing to the database from the sensors. Finally, the system is validated in a rural house for a month.

Findings

The monitoring system satisfies the main objective of making a tracing of the behavior of some appliances inside a house, showing graphically the instant current generated while connected, the cumulated energy consumed and the cost in Colombian pesos of the energy consumed so far, in real time.

Research limitations/implications

The monitoring system requires the correct functioning of the sensors connected to each household appliance in the home.

Practical implications

The main approach in the monitoring platform is the real-time measurement of energy consumption by nodes (in each appliance) that allows the user to control the money. The innovative impact of the project will be based on the use of hardware and information systems in the measurement of electrical consumption.

Social implications

This research has a direct impact on the economic aspects of the low-income population by allowing them to manage their energy consumption through the proposed system.

Originality/value

The main approach in the monitoring platform is the real-time measurement of energy consumption by nodes (in each appliance) that allows the user to control the money.

Index Terms- Advanced web applications; Energy consumption; Monitoring system; Smart sensor

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