Intelligent systems to optimization the load, storage and efficient distribution of renewable energies

Abstract

Renewable energies have been a world alternative for several decades, however, historically these were little used, to the extent of being replaced by energy from non-renewable systems such as fossil fuels and nuclear. However, in recent years they have taken more and more use after the natural consequences of the non-renewable energies to the environment. It is for the foregoing that some countries have initiated government plans and programs to fully employ renewable energy according to their strategic capabilities. In this sense, the intelligent systems are a tool to be able to generate alternatives for the optimization of said energies and to be able to store and distribute efficiently.

Keywords: renewable energies, intelligent systems, optimization

Introduction

Context of intelligent systems and renewable energies

Concept of renewable energies

Renewable energies are those that are produced continuously and are inexhaustible on a human scale; they are renewed continuously, unlike fossil fuels, of which there are certain reserves, exhaustible in a more or less determined period. The main forms of renewable energy that exist are biomass, hydraulics, wind, solar, geothermal and marine energies. Renewable energies come, directly or indirectly, from the energy of the Sun; the geothermal energy and the tides are an exception.1

It is one that is obtained from natural sources that are considered inexhaustible, due to the immense amount of energy they contain, and because they are capable of regeneration by natural means. One of the sources commonly adopted as renewable energy generators is solar. However, there are other sources that indirectly take advantage of the warming generated by this energy, such as hydro and wind. But, there are those caused by geophysical phenomena such as geothermal and tides.2

Concept of intelligent systems

One of the solution alternatives to collaborate with the optimization in the use of renewable energies is through Intelligent Computing, which deals with solving everyday problems of the human being, which imply understanding, knowledge, experience, interpretation and ability to reasoning,3 through disciplines such as:

a. Data mining, which consists of a process of scrutiny of information contained in large volumes of data in order to analyze their characteristics for decision-making. Among the solutions offered by data mining, we have: diagnostic problems, classification, search for associations, definition of typologies, detection of temporal cycles, prediction.4

b. Genetic algorithms that are search algorithms inspired by natural selection processes, based on Darwin’s theory of evolution, in which an analogy is established between the set of solutions of a problem and the set of individuals of a natural population. They are mainly applied in optimization problems.5

c. Artificial neural networks, is a system of parallel processors connected to each other in the form of a directed graph. Schematically, each processing element (neurons) of the network is represented as a node. These connections establish a hierarchical structure that, trying to emulate the physiology of the brain, looks for new processing models to solve concrete problems of the real world.6 The problems that most often resolve neural networks are adaptive learning, Auto organization, Fault tolerance, Real-time operation, Easy insertion in existing technology.

Context of the application of intelligent systems with renewable energies

Some applications of intelligent systems in renewable energies are presented below:

i. Diffuse logic: This article describes the operation of wind systems, in which different areas of behavior are specified, where the roll angle and wind turbine are regulated, through two diffuse controllers.7

ii. Intelligent networks. This Korean project, based on elements of the smart grid system, indicates its costs and benefits, analyzes the smart grid initiative and includes the case study of the smart grid test bank. It presents the possibilities of transferring and implementing these strategies in the cities of Latin America and the Caribbean and examines the experiences underway in the region.8

iii. Smart electrical networks. In the case of Mexico, there is a recent program based on renewable energy generation projects, based on information systems and operational management. This has had the consequence of optimizing the operation of power plants, reducing costs and contaminants.9

Conclusion

This article of general reflection on the collaboration of intelligent systems in the generation, accumulation, distribution and optimization of renewable energies, presents a range of opportunities to initiate research, including to promote the renewable energy, and to seek better and economic generation of energy.
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Conflict of interest

Author declares there is no conflict of interest.

References