Chapter 2.9
EIS for Consumers Classification and Support Decision Making in a Power Utility Database

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ABSTRACT

The increasing of the storage system capacity and the reduction of the access time have allowed the development of new technologies which have afforded solutions for the automatic treatment of great databases. In this chapter a methodology to create Enterprise Information Systems which are capable of using all information available about customers is proposed. As example of utilization of this methodology, an Enterprise Information System for classification of customer problems is proposed. This EIS implements several technologies. Data Warehousing and Data Mining are two technologies which can analyze automatically corporative databases. Integration of these two technologies is proposed by the present work together with a rule based expert system to classify the utility consumption through the information stored in corporative databases.

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INTRODUCTION

Enterprise Information Systems (EIS) are applications that provide high quality services by means

of a treatment of great volumes of information. Frequently, these processes include artificial intelligence methods or any knowledge-discovery technology.

Enterprise Information Systems can integrate any technology that helps in the information treatment, in this way turn into Integrated Systems consisting of several modules that work jointly to solve a certain problem.

The great quantity of methodologies and technologies that have appeared for EIS development, have allowed the proliferation in many markets. This situation has provoked the diversification of the EIS, depending on the goal that they search for and on how EIS comes close to it.

In this paper, an Enterprise Information System that integrates knowledge to help the human experts in the making decision, called Decision Support System (DSS) is proposed. This kind of systems is very useful for the utilities distribution companies. This kind of companies has several similar characteristics. For example, the consumption in water, power or gas utility is hardly controlled. The company installs measure equipments to register the client consumption and, in some case, it adds control equipments to avoid the overloads. Normally, these equipments are property of utility company and its manipulation without company authorization is illegal.

In order to show the proposed DSS generic methodology, an example of its application is showed in the case of a power utility. This DSS example try to help in the non-technical loss classification process.

Mainly, the utilities present two classes of incidents:

- Technical losses. These losses are produced in distribution stage. In the power distribution companies, they correspond with energy losses:
  - Wire warming (Joule Effect).
  - Distribution facility blemishes.
  - Natural reasons.
- Non-technical losses. This type of incidents represents, faults and/or manipulations on the installation that induce the total or partial absence or modification of the consumption on the company side. If the company cannot control the consumption correctly it is not possible to invoice the utility and, therefore, an economic loss is produced.

Nowadays, companies have predictive systems of technical losses that work with a very low mistake percentage; because normally they are based on physical and climatic calculations. On the contrary, the non technical losses are very difficult to detect and control. Normally, the more common non-technical are:

- Anomalies. They are characterized itself by breakdowns or mistakes by the company installation technical personnel or by deterioration of the client facilities.
- Frauds. They are inadequate manipulations realized by the clients in their installation, with the objective to modify for their own profit the energy that is registered on the meter.

In most of the references (see 'Overview and fraud detection' section), this detection type is realized treating the client's consumption and more characteristics, such the economic sector and the geographic location. Nevertheless, on the corporate databases there exists a lot of information that includes:

- Client information.
- Contract information.
- Client facilities technical specifications.
- Results and commentaries realized by the company inspectors and technicians.

According to the company, it is possible that more information exists.