Chapter XI

Modern Organizations and Decision-Making Processes:
A Heuristic Approach

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ABSTRACT

This chapter explains a hybrid-decision support system (HDSS) in which a heuristic-data mining procedure (a complement of a statistic-data mining) is embedded into the original information system. For the better understanding of these concepts, these tools are presented as hybrid agents interacting in a financial environment. Structures and some important types of decisions that decision makers can adopt in a financial organization (e.g., a commercial bank) and how the suitable information is incorporated in a HDSS, are also discussed.
INTRODUCTION

Thinking is usually mentioned as the main characteristic of the intelligence of human minds, and in a certain way, of computer programs, too. From a heuristic point of view, the complex architecture of the mind when thinking uses different types of processes (such as abduction, deduction, and induction), to solve problems and to make decisions.

The main goal of this chapter is to explain a hybrid-decision support system (HDSS) in which a heuristic-data mining procedure is embedded into a common information system (DSS). For the better understanding of these concepts, these tools are presented as hybrid agents interaction in a financial environment (e.g., a commercial bank).

This chapter is organized as follows. Section 2 explains a “decision” from a heuristic point of view. Section 3 discusses a hybrid-decision support system (HDSS). Section 4 gives an illustration of decisions in a financial organization (e.g., a commercial bank), and Section 5 contains some concluding remarks and future work proposals.

WHAT IS A DECISION?

It is difficult in economic literature to find answers to direct questions such as “What is a decision in general?” Let us start with the definition found in Webster’s Dictionary. There we find that a decision, among other meanings, is “a conclusion reached or given.” Related to the specific meaning mentioned here, we can ask, “If a decision is a conclusion, which are the premises of this inference?”

Suppes (1961) detailed on the types of premises of these decision-related processes. He explained that in a decision situation, a person or group of persons (i.e., the decision makers) is faced with several alternative courses of actions but with incomplete information about the true state of affairs and the consequences of each possible action. The problem is how to choose an action that is optimal or rational, relative to the information available and according with some definite criteria of optimality or rationality. In Suppes’ explanation, we have the main ingredients of what is called, in general terms, “decision theory.”

Because making decisions generally occurs in a context of uncertainty, the individual must choose between several alternatives. The possible decisions may have a variety of consequences, and ordinarily the consequences are not simply determined by the decision made but also affected by the present state of things. It is supposed that the individual or group of individuals has a utility function on the possible consequences and that the decision maker has a probability function (i.e., subjective probabilities) on the possible state of the environment that expresses his or her beliefs about the true state of things. According to the expected utility hypothesis, a decision maker tries to select, with a rational choice, a possible alternative that maximized the expected utility. However, there is evidence of paradoxical behavior that do not maximize the expected utilities.

These are the main ingredients of a decision process or inference. Let us review briefly the concept of utility function related to consequences. Utility function is a numerical representation of some individual tastes and preferences. In modern times, after Pareto, utilities are considered as ordinal index of preferences (Silberberg, 1978). People are assumed to be able to rank all commodity bundles, without regarding the
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