Hidden Context Influence on Pattern Recognition

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S u m m a r y

Since the very beginning (i.e. since the middle of 50-ths of the past century) of pattern recognition development as a scientific discipline attempts were made to make artificial pattern recognition methods as effective as the natural one. Hopes about reaching this goal by using various approaches to pattern recognition based on artificial neural networks, on geometrical, statistical, formal linguistic, algebraic or any other type of models and based on them algorithms till now partially only have been satisfied. In many application areas (e.g. in medical diagnosis, in management and business decisions making, etc.) the results of machine-aided pattern recognition by human recognition are verified rather than the reverse. Such situation exists not only because of much lower number of elements in artificial neural networks then this of natural neurons in a human brain or because of too low computer performance rates but also because of imperfection of actual artificial recognition models and methods. One of human mind's property which in the artificial intelligence methods is not taken into consideration is **intuition**. Medical diagnoses made by experienced medical specialists are better than those made by computer-aided diagnostic systems as well as by those made by less experienced medical doctors even if based on apparently similar or the same input diagnostic data. We usually explain this fact by intuition supporting experienced specialist's thinking and by lack of intuition in the two other cases. There are several concepts of the nature of intuition (e.g. presented by the philosophers R. Descartes, H. Bergson, I. Kant). For artificial intelligence (also for pattern recognition) purposes, intuition can be defined as a **decision making subject's ability to use to correct decision making, in certain attending side circumstances, remembered information about influence of similar circumstances on the effects of decisions made in the past**.

Side circumstances mean that information about them into the decision algorithm have not been directly included. Otherwise speaking, they constitute a sort of informational context of decisions made under incompleteness of information. Intuition reduces the information incompleteness level by suggesting taking into account additional information about the circumstances which may modify the decision. E.g., it is easy to recognize rectangles among several other geometrical figures on a plane. However, if squares, rectangles and hexagons only on the plane are shown then intuition (results of some past experiments) may suggest that a set of projections of cuboids is shown. Therefore, an additional (hidden) information may influences the recognition and increase its quality. In nature, past information influence on human behavior is connected with subcortical informational processes in the mind. In computer systems such influence may consist

in hidden for the user, automatic registration of data concerning environmental situation attending current decision making and next, using it to sub-classification or to weighing the elements of learning sets prepared for future pattern recognition acts. In this form, additional information about particular circumstances in which given learning elements have been registered can be provided and in next computer-aided decisions can be used. The concept of "daemons" hidden in computer systems and automatically performing additional operations supporting decision making is not new, it exists in the M. Minsky's concept of frames. It may happen in the above-described case that if the past and current circumstances are different, different decisions will be maid despite full input data similarity. This corresponds to the well known situations of some human decisions by other people being assessed as "irrational", because they by kept in the mind of the decision making subject. (correct or incorrect) information subconsciously have been influenced. The above-described idea of a sort of "artificial intuition" inclusion into pattern recognition methods in a more extended and by examples illustrated form in the paper will be presented.