A hybrid expert system for classic car recognition and originality evaluation

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Abstract

Apart from the condition of the car, one of the main problems when buying a classic car (or when estimating its value) is recognizing its originality.

Many times, non-original parts and accessories have been installed, what is not normally very difficult to find out. But sometimes items from other versions of the same model can be found in a certain specimen, what is not that easy to recognize.

We have developed in the past Rule Based Expert Systems (RBES) and AI tools for decision taking in different fields (medicine, transportation engineering,...), both using algebraic inference engines and logic programming.

The key idea of this work is to develop a computer package that guides the user along a sequence of questions, in order to find out the model and/or version of the car and to detect non-original elements.

One important fact is that the available information can be incomplete (for instance, all the available information about the vehicle can be a set of photographs). Moreover, the user of the system can be sometimes unable to answer all questions, even with all the required information.

We have decided to use a hybrid approach, because:

- on one hand there are "conclusive items" that are easier to handle using rules in the style of classic RBES,

- on the other hand, when the vehicle has a mixture of characteristics from different models/versions, it is easier to compare them with the predefined ones (stored in row matrix, sequence, list format,...) in order to identify the "closest" model/version.

A computer algebra system offers all the necessary tools for implementing such an approach. The article is illustrated with a small system (implemented in the computer algebra system *Maple*, that takes advantage of its *Logic* package), devoted to the Porsche 928.

Keywords
Expert Systems; Pattern Matching; Classic Cars; Computer Algebra Systems