

A decision tree for selecting an enterprise activity code

submitted by The Co-operators

In an insurance company the underwriters check whether the rates of products sold by agents to enterprises are correct. The underwriter must identify the enterprise activity code because this code is the most important pricing variable for determining the rate in third party liability insurance and a very important variable for determining the rate in property insurance. Any lack of accuracy in identifying the activity or occupation may lead to a large error in the rate. These observations were made as the team submitting this problem was trying to assess the credibility of the rates.

For the time being the company uses a hierarchical structure (a rooted tree) that allows one to reach the activity code through a path starting at the root. This structure needs to be greatly improved. For instance the first-level children (the “IBC groups”) are defined in such a fuzzy way that the underwriter has to look at the grandchildren (the children of those children) in order to classify a risk. Also the hierarchical structure is such that one has to go through several levels in order to select the activity code.

The company has recorded the choices made in the past but has only access to partial characterizations of its clients’ activities. The company may also use the activity descriptions produced by the A.M. Best company but these descriptions consist of texts that are fairly long. One would need to use high-quality text mining techniques in order to extract from these texts a useful hierarchical structure.

Our team’s goal is to design a method facilitating the selection of the activity code. The selection should be carried out thanks to answers given to crisp questions, which would depend upon answers given to previous questions. In other words, we wish to design a decision tree in which each node corresponds to a binary (“yes” or “no”) question. This decision tree should incorporate the knowledge that we have gained while using the current hierarchical structure.

Supplementary information

1. During the workshop an expert (or experts) with a background that is not necessarily a quantitative one will attend the presentation of the team work and evaluate it.
2. Every day at least one person with a research or innovation background will attend the workshop to help the team understand the problem and propose a solution.