MATHEMATICAL METHODS, MODELS AND INFORMATION TECHNOLOGIES IN ECONOMY

THE CLASSIFICATION OF OBJECTS BY A CONSULTING COMPANY WITH TAKING INTO ACCOUNT THE ASYMMETRY OF INFORMATION

Bachalo I.B.
Postgraduate Student in Department of Economic Cybernetics,
Ivan Franko National University of Lviv

This study aims at the development of a mathematical method for taking into account the information asymmetry by a consulting company, based on the use of classifiers in conjunction with the techniques of dealing with sparse data. A practical application of their work on the example of fraud detection in the insurance company was demonstrated.

Consulting companies, which deal with data analysis and mathematical modeling, can face the task of classification economic entities. The purpose of solving such type of problem arises because of the need for risk management in conditions of asymmetric information. However, in the situation when data is highly imbalanced, i.e. the proportions of the distribution of classes in the data is too large, the accuracy of a prediction algorithm on a minority class will be very low. This situation can lead to a failure of a consulting advice and thus a consulting project, which may affect the reputation of a consulting company.

The article shows the different evaluation metrics to measure classification`s algorithm productivity on imbalanced data and illustrates their usage on the simple example. Because of the most standard algorithms expect that class distribution will be balanced, they cannot provide good classification result on sparse data.

The author suggests using algorithms which help to deal with imbalanced learning problem by undersampling majority class or oversampling minority class. The ensemble-based algorithms for handling between-class imbalance are observed in the paper and the technique of synthetic generation of minority class in combination with a supervised method of removing majority class is proposed. All algorithms are tested on the real data one of the Ukrainian insurance company.