Title

Predictive Machine Learning for Underwriting Life and Health Insurance

Speaker/Company

Patricia Wang, Gen Re UK

Abstract

The dominant underwriting approach is a mix between rule-based engines and traditional underwriting. Applications are first assessed by automated rule-based engines which typically are capable of processing only simple applications. The remaining applications are reviewed by underwriters or referred to the reinsurers. This research aims to construct predictive machine learning models for complicated applications that cannot be processed by rule-based engines. Techniques such as natural language processing and clustering analysis are used to process free-text data such as descriptions of impairments and occupations. Various feature selection methods such as mutual information and recursive feature elimination are used to improve prediction accuracies. Machine learning algorithms such as XGB and Random Forest are used to predict underwriting decisions. XGB is the best performer with 99.5% accuracy on the training set and 80% accuracy on the testing set. Various tools such as word clouds and feature ranking functions are used to give underwriting insights. The paper concludes with data limitations and further researches.

Biography

Patricia Wang is an actuary based in London at Gen Re. She is a Fellow of both the Actuarial Society of South Africa and the Institute and Faculty of Actuaries having a combined ten years of experience in the South African and London markets. Her experience is primarily in financial reporting, financial modelling and machine learning. Patricia completed her undergraduate studies in actuarial science at UCT and more recently completed an MSc (with distinction) at Imperial College London in data analytics and machine learning. She is specifically interested in using machine learning and data analytic tools to resolve business problems in the life and health insurance sector. In 2019, Patricia served as a committee member of the IFoA Asia Conference. She is fluent in English and Chinese (Mandarin).