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DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
THE UNIVERSITY OF HONG KONG

Departmental Seminar

Professor X. Sheldon LIN

Department of Statistical Sciences
The University of Toronto
Canada

will give a talk
entitled

A MIXTURE OF EXPERTS REGRESSION MODEL FOR RATEMAKING AND RESERVING IN GENERAL INSURANCE

Abstract

Understanding the effect of policyholders' risk profile on the number and the amount of claims, as well as the impact of the dependence among different types of claims, is critical to insurance ratemaking and IBNR-type reserving. To accurately quantify the aforementioned features, it is essential to develop a regression model which is flexible, interpretable and statistically tractable for those purposes.

In this presentation, I will discuss a highly flexible nonlinear regression model we have recently developed, which we call the logit-weighted reduced mixture of experts (LRMoE) models, for multivariate claim frequencies or severities distributions. The LRMoE model is interpretable as it has two components: Gating functions to classify policyholders into various latent sub-classes and Expert functions to govern the distributional properties of the claims. Because of its flexibility the model can fit any type of claim data accurately and hence minimizes the issue of model selection.

Model implementation is illustrated in two ways using a real automobile insurance data set from a major European insurance company. We first fit the multivariate claim frequencies from the dataset using a counting expert function. Apart from showing excellent fitting results, we are able to interpret the fitted model in an insurance perspective and to visualize the relationship between policyholders' information and their risk level. We demonstrate how the fitted model may be useful for insurance ratemaking. The second illustration deals with insurance loss severity data that often exhibits heavy-tail behavior, complex distributional characteristics such as multimodality and peculiar links between policyholders' risk profile and claim amounts. Using a Transformed Gamma as the expert function, our model is applied to fit the severity and reporting delay components of the dataset. In addition to obtaining excellent goodness-of-fit, the proposed model is also shown to be useful and crucial for an adequate prediction of the IBNR reserves through an out-of-sample testing.

This project is joint work with Andrei Badescu and Tsz Chai (Samson) Fung.

on

Tuesday, November 5, 2019

(Refreshments will be served from 10:45 a.m. outside Room 301 Run Run Shaw Building)

11:00 a.m. – 12:00 noon

at

Room 301, Run Run Shaw Building

Visitors Please Note that the University has limited parking space. If you are driving please call the Department at 3917 2466 for parking arrangement.

All interested are welcome