Title

New Method for Discrimination Free Pricing and Real-world Impacts

Speaker/Company

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Abstract

In applications of predictive modeling, such as insurance pricing, indirect or proxy discrimination is an issue of major concern. Namely, there exists the possibility that protected policyholder characteristics are implicitly inferred from non-protected ones by predictive models, and are thus having an undesirable (or illegal) impact on prices. A technical solution to this problem relies on building a best-estimate model using all policyholder characteristics (including protected ones) and then averaging out the protected characteristics for calculating individual prices. However, such approaches require full knowledge of policyholders' protected characteristics, which may in itself be problematic. Here, we address this issue by using a multi-task neural network architecture for claim predictions, which can be trained using only partial information on protected characteristics, and it produces prices that are free from proxy discrimination. To test this model, we use two datasets: a synthetic health insurance portfolio, as well as an extensive non-life motor pricing dataset, containing two protected covariates. We demonstrate the use of the proposed model and we find that its predictive accuracy is similar to a conventional feedforward neural network (on full information). However, this multi-task network has clearly superior performance in the case of partially missing policyholder information.

Biography

Ron is an experienced actuary and risk manager, currently Chief Actuary at Old Mutual Insure, responsible for oversight of all actuarial activities inthe OMI Group. Before this he was Managing Head of Insurance Actuarial at SA Taxi and Associate Director at QED Actuaries and Consultants, Africa's largest independent actuarial consulting firm. Prior to this, he led the Enterprise Risk Management and Actuarial Functions for the AIG group within Africa.

Ron is a Fellow of the Institute and Faculty of Actuaries (IFoA) and the Actuarial Society of South Africa (ASSA), holds practicing certificates in Short Term Insurance and Life Insurance from ASSA, and a Masters of Philosophy in Actuarial Science, with distinction, from the University of Cape Town. Ron chairs the Actuarial Society of South Africa's Climate Change Practising Committee and is a member of the ASTIN Board.