

Insurance mathematics - AI tools in health insurance

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Insurance mathematics is the analysis and development of methods and models, typically connected to probability theory and statistics, with the aim to answer questions originating from insurance. In insurance, the customer pays a premium upfront and the insurance company promises to pay economic compensation for certain events later. Therefore, prediction is a key issue in insurance mathematics. The rapid development of statistical methodology for prediction based on machine learning leads to exciting research questions.

AI tools in health insurance

Health insurance is usually modeled by considering multiple health states between which an insured individual makes transitions at random times. An individual's health history can therefore be coded in terms of health states and transition times. Stochastic models for multi-state health insurance can be used to model and predict the evolution of health insurance contracts. The project concerns different aspects of inference and prediction for data-driven individual based health models using AI tools. The techniques to be used span from more classical machine learning techniques such as (gradient) boosting to techniques based on large language models. The suggested project aims to explore, and analyze with mathematics, the use of AI tools in health insurance. Aspects that may be of interest concern discrimination and fairness with a particular focus on health insurance. The project can, to some extent, be customized to fit the PhD-candidate, based on the candidate's background.

The availability of this project depends on the outcome of a research grant application whose decision is pending.