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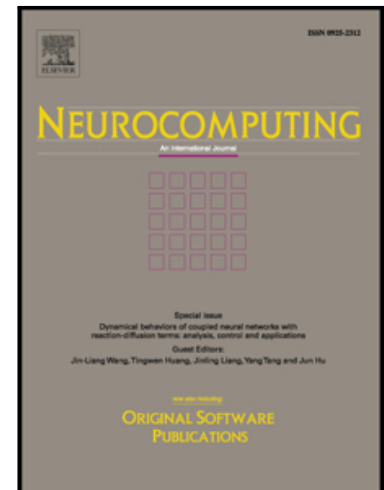
Ruhao Wu , Bo Wang

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Gaussian process regression method for forecasting of mortality rates

Ruhao Wu, Bo Wang*

Department of Mathematics, University of Leicester, Leicester LE1 7RH, UK

Abstract

Gaussian process regression (GPR) has long been shown to be a powerful and effective Bayesian nonparametric approach, and has been applied to a wide range of fields. In this paper we present a new application of Gaussian process regression methods for the modelling and forecasting of human mortality rates. The age-specific mortality rates are treated as time series and are modelled by four conventional Gaussian process regression models. Furthermore, to improve the forecasting accuracy we propose to use a weighted mean function and the spectral mixture covariance function in the GPR model. The numerical experiments show that the combination of the weighted mean function and the spectral mixture covariance function provides the best performance in forecasting long term mortality rates. The performance of the proposed method is also compared with three existing models in the mortality modelling literature, and the results demonstrate that the GPR model with the weighted mean function and the spectral mixture covariance function provides a more robust forecast performance.

Key words: Gaussian process regression, Lee-Carter model, mortality forecasting, spectral mixture, weighted mean function

*Corresponding author. Tel: +44 116 252 2162; Email: bo.wang@le.ac.uk.

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