

Modelling Disease Misclassification using hidden Markov models.

supervised by

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Understanding the dynamic nature of a disease process can be vital in early detection, diagnosis and progression. Early disease detection can improve medical treatment with there being a larger possibility of curing the patient, delaying the disease progression and/or enhancing the patients quality of life [3].

Often disease states and transitions between them can be used to model disease progression however in some cases there can be some misclassification of disease state due to true events not being directly observable or from measurement procedure [1].

Transitional models are often used to model disease progression where interest lies within the disease states and transition rates. To examine potential misclassification, the use of hidden Markov model can be used [1].

Hidden Markov models are a family of versatile statistical models that have been used in a variety of applications from speech recognition through to financial fraud, with their use within healthcare modelling growing. The hidden Markov model is a probabilistic model consisting of a hidden process and an observed stochastic process. The models are a form of mixture models but are more general where the hidden states are assumed to have a Markovian structure [2].

This research proposes the development and investigation of different hidden Markov models for misclassification of diseases, particularly to take into account multiple disease outcomes measured on a patient and the interactions within these.

REFERENCES

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