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Unraveling temporal processes using probabilistic graphical models

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Stellingen behorende bij het proefschrift
“Unraveling Temporal Processes using Probabilistic Graphical
Models”

Te verdedigen op dinsdag 11 februari om 15.00 uur te Leiden

door

Marcos Luiz de Paula Bueno

1. Adding local structure to the observable space of hidden Markov models leads to a more compact representation of latent states, together with a better model fit (Chapter 3).
2. Hypotheses on temporal processes such as treatment dynamics can be generated in a semi-automatic way by combining model inspection with quantities derived from structured hidden Markov models (Chapter 4).
3. Health event data might be represented by models with latent states, which might lead to the fact that multiple latent states be associated to the same event. In spite of this, states associated to the same event describe different patient groups (Chapter 5).
4. The initial psychotic symptoms of patients with psychotic depression are predictive to patient response for anti-depressants but not for a combination of anti-depressants and anti-psychotics (Chapter 4).
5. The challenging problem of learning insightful models from small datasets can be dealt with by means of partitioned dynamic Bayesian networks, as well as with structured hidden Markov models (Chapters 4 and 6).
6. One can often find plenty of arguments against simple models in theory, however such models sometimes work incredibly well in practice, which makes the motto ‘less is more’ a double-edged sword.
7. The analysis of complex temporal processes might benefit from tools such as latent variable modeling and process splitting, e.g., by patient or by time interval. These tools tell different stories and are apparently more common in some research communities than in others.
8. Interdisciplinary research is powerful, yet difficult to be done as people need to leave their comfort zone making them more vulnerable to criticism.
9. Health care data and clinical trial data seem to dwell in different planets.
10. The devil is in the detail, and so is research.
11. Gevulde koeken, cappuccino and Dutch cheese make life easier for a PhD student in The Netherlands. Occasionally, taart and sunlight show up and are helpful as well.