



Invitation to PhD defense

Wednesday May 23rd 2012 at 13:00

Auditorium A2-70.03, Thorvaldsensvej 40, Frederiksberg C

Title

MEDICOMETRICS

PhD Thesis by

Morten Arendt Rasmussen · 2012

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Abstract

In biological, medical and pharmacological science cause and effect is seldom of binary nature. In order to fully understand these systems a multivariate approach is needed.

The aim of the present work was to develop new multivariate methods for handling of data from clinical trials and patient cohorts with special emphasis on graphical presentation of results. Presented here are stages of the analysis process in a generic form, with focus on obstacles and benefits related to the methods applied.

It is shown, that variation related to different sources can be handled effectively by orthogonalization techniques. For instance irrelevant patient specific variation can be removed prior to modeling. The idea of compressing data into latent component models is shown to unravel intuitive biological patterns. These patterns are furthermore shown to be less uncertain than the raw data. Usage of pattern recognition techniques, such as PCA and PLS, in connection with visualization, is demonstrated as a general framework useful for better data understanding. This leads to biologically intuitive visualizations, where the complexity is much easier to grasp compared to presentation in tables.

It is concluded that novel data analytical techniques, developed in collaboration between physicians, biologists, pharmacologists and data analysts potentially can bring even more new knowledge and that the current data analytical state of the art, is rather conservative and leaves substantial room for improvements.