

Master thesis at the Department of Medical Informatics, Biometry and Epidemiology, FAU Erlangen-Nuremberg:

Mixture density networks for the estimation of reference intervals

Reference intervals play an important role in clinical practice in deciding whether the value of a particular analyte measured on a patient can be considered normal or pathologic. Appropriate intervals are usually derived from samples consisting of exclusively healthy study participants, but the range that should be considered healthy may vary by age, especially during early life stages such as puberty. As the recruitment of children for medical studies is subject to strict regulations, clean prospective data is not readily available for this age-group. Therefore, "indirect" estimation approaches that attempt to extract the desired information from available but unlabeled laboratory databases gained importance. These involve amongst others different applications of mixture models that try to separate the distribution of healthy values from one or more pathologic distributions.

The aim of this master thesis is to evaluate the use of artificial neural networks and mixture density networks specifically for this task. This will include investigation of their performance on synthetic data in simulation studies and application to real laboratory data in comparison with previously established methods. The thesis is addressed to all students of the WIAI faculty and Survey Statistics with interest in methods of data analysis in biostatistics/bioinformatics and is supervised externally by Dr. Tobias Hepp at the Department of Medical Informatics, Biometry and Epidemiology at the FAU Erlangen-Nuremberg in cooperation with the Cognitive Systems Group.

For further questions, please contact tbs.hepp@fau.de.

References

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