# Workflows for Data Mining in Integrated multi-modal Data of Intracranial Aneurysms using KNIME

Roelof Risselada[1], Christoph M. Friedrich[2,*], Christian Ebeling[2], Roman Klinger[2], Anna Bauer-Mehren[3], Manuel Pastor[3], Maria Cruz Villa[4], Jose M. Pozo[4], Alejandro F. Frangi[4], and Martin Hofmann-Apitius[2]

1. Erasmus MC; Medical Informatics; PO Box 2040, 3000 CA Rotterdam; the Netherlands
2. Fraunhofer Institute for Algorithms and Scientific Computing (SCAI); Department of Bioinformatics; Schloss Birlinghoven; D-53754 Sankt Augustin; Germany
3. Research Unit on Biomedical Informatics (GRIB), IMIM/UPF; C/Dr. Aiguader, 88; 08003 Barcelona; Spain
4. Research Group of Computational Imaging and Simulation Technologies in Biomedicine (CISTIB), Universitat Pompeu Fabra, Pg Circumval·lació, 8, 08003 Barcelona; Spain
* Contact author: friedrich@scai.fraunhofer.de

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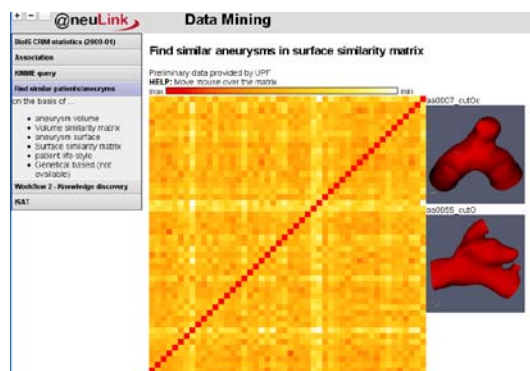
Intracranial aneurysms are bulbous expansions of the intracranial vessels that may rupture and lead to subarachnoid haemorrhage, a bleeding in the space lining the brain. This can result in severe disability or death of the affected person. The prediction of the individual rupture risk of a patient based on information from images, haemodynamic simulations, clinical parameters and genetic markers is one of the aims of the European Integrated Project @neurIST. The project developed an architecture [1] which allows the integration of multi-modal data from clinical information systems. Data mining capabilities have been developed in a Knowledge Discovery application suite called @neuLink [2]. Maintenance, re-use of mining strategies and user presentation of data flows is difficult in monolithic mining scripts. To cope with this problem, @neuLink integrates the Konstanz Information Miner (KNIME) [3] as a workflow engine and provides aggregated data mining results based on R scripts and Weka [4]. The advantage of this solution is a better understanding of the workflow, re-usability of data mining strategies and an increased maintainability.

One example sub-workflow is the application of clustering algorithms to find similar aneurysms. This is based on Zernike moments [5] extracted from images of aneurysms. The resulting similarity matrix is depicted in the screenshot.

Several @neurIST partners developed and implemented rupture risk and treatment outcome models as sub-workflows, which are currently being integrated in consensual models.

Acknowledgements

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