

RP7 - Treatment decision for melanoma patients: Identification of similar patients at the PoC

Research question

- In the treatment of melanoma patients, **unusual constellations** repeatedly occur, which make treatment decisions more difficult.
- The aim of this project is to find similar patients ("**statistical patient twins**") from the previous melanoma patients database of the Department of Dermatology, who have been treated in the past at the Department of Dermatology of Essen University Hospital and for whom the survival time is also available via the clinical tumour register.
- At the PoC, doctors can then compare how similar patients have been treated in the past and what the outcome was.

Solution approach

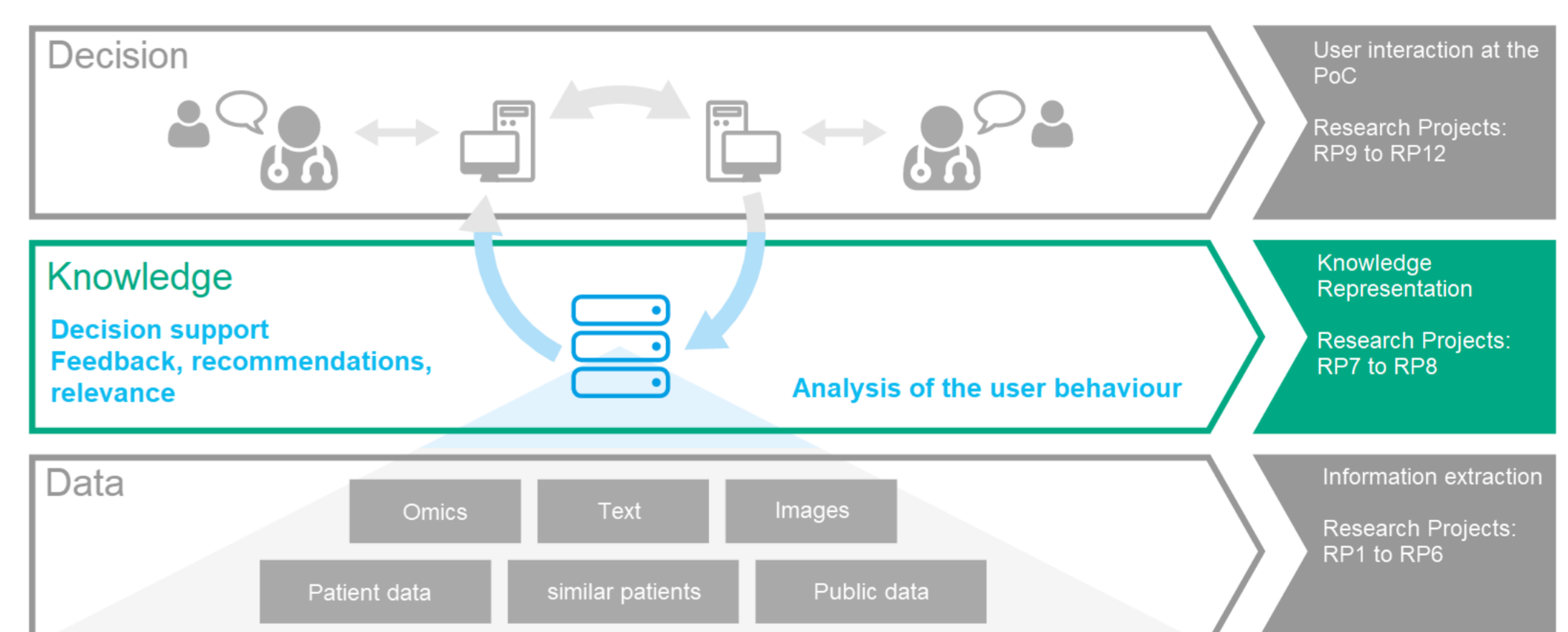
- Current patients: age, sex, histology, tumor stage (TNM), LDH, comorbidities, ECOG
- Database of melanoma patients [1]: regression model, which predicts the probability of survival (ÜW) based on established prognostic factors
- $\text{ÜW} = f\{T, N, M, LDH, \text{Comorb}, ECOG\}$
- Determination of the ÜW for current patient ÜW_i
- Identification of patients in the database with the same ÜW_i
- Within this group: Determination of patients with almost identical covariate values
- Stratification of this patients on the basis of the treatments performed
- Comparison of ÜW within the Strata
- Exploration: Convolutional Neural Networks, Nearest Neighbor Analysis

State of the art

- Conventional **regression methods** based on patient cohort data
- Classical Nearest Neighbor Analyses (**Nearest Neighbor Analyses**)
- More recent procedures: **Convolutional Neural Networks** [1,2], also in combination with **graph-based models** [3] to include ontologies.

Integration

- Modelling of patient similarity based on the position on the treatment pathway (FP1)
- Predictive modeling for patient similarity based on an openEHR model (FP8)
- Analysis of clinical image data including other clinical data (FP4)



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