A Decision Support System on Surgical Treatments for Rotator Cuff Tears

Motivation:
• Ineffective physical therapy increases the time and cost of treatment and pain for patients

Objective:
• Develop a decision support system to predict the probability of eventually needing surgery by effectively analyzing the available patients’ information at an early stage
• Help doctors make decisions on surgical treatments

Challenges:
• Electronic medical record: high-dimensional and heterogeneous data with large amount of mixed-type missing values
• Effective and efficient analysis of the dataset: how to assess the likelihood of patient needing a surgical treatment?

**Variable selection:** LASSO

**Missing value imputation:** developing a new version of \( k \)-nearest neighbor hot deck imputation to handle mixed-type missing values and heterogeneous data

**Decision making:** integrating computer decision with doctors’ expertise by developing logistic regression model with two probability-based decision limits

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