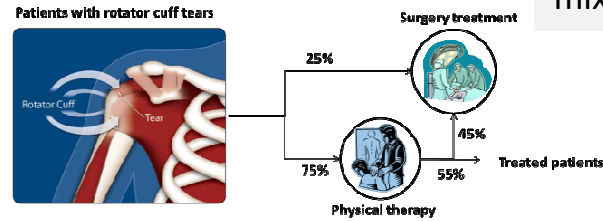


A Decision Support System on Surgical Treatments for Rotator Cuff Tears

Motivation:

- Ineffective physical therapy increases the time and cost of treatment and pain for patients

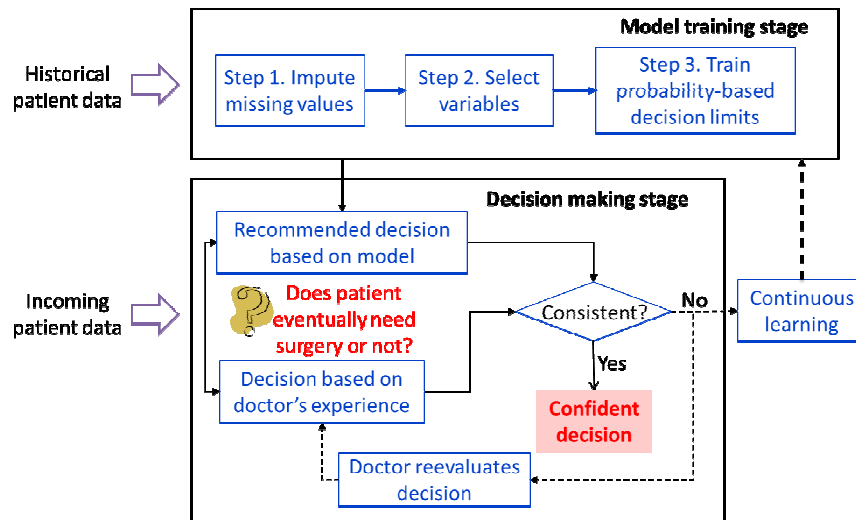


Objective:

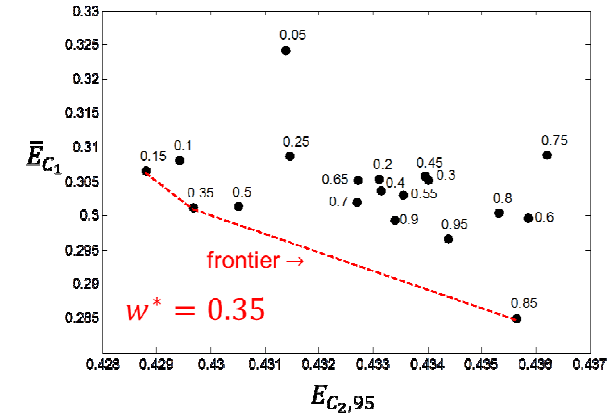
- Develop a decision support system to predict the probability of eventually needing surgery by effectively analyzing the available patients' information at an early stage
- Help doctors make decisions on surgical treatments

Challenges:

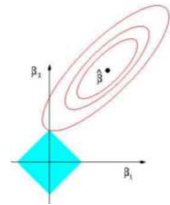
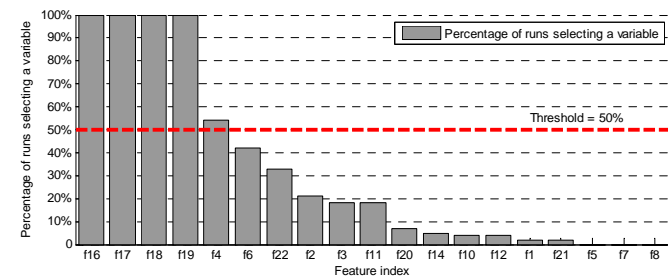
- Electronic medical record: high-dimensional and heterogeneous data with large amount of mixed-type missing values
- Effective and efficient analysis of the dataset: how to assess the likelihood of patient needing a surgical treatment?



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



Variable selection: LASSO



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

	Decision Support System	MedSport Clinic
Surgery	11.8%	25%
Physical Therapy	39.2%	41.25% = 75% × 55%
False surgery	2.8%	Not available
Missed surgery	18.6% REDUCED!	33.75% = 75% × 45%
Uncertain	27.6%	Doctor's performance