



Risk Assessment

Actuarial and Statistical Models

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Inquiry Recommendations

- Barefoot vs Estelle 1983 (A.P.A.)
- Kirkman 1991
- Clunis 1994



Advantages

- Transparency
- Objectivity
- Clear Rationale
- Accuracy



Legitimate Concerns

- Exclusion of Idiographic Information
- Responsibility
- Statistical Assumptions

Developing a System

- Identification of Predictors
- Structure the Information
- Training Set - Obtain a large sample
- Identify the optimal model
- Prospective study
- Feasibility study
- Apply the model



Statistical Models

- Linear-Logistic Models
- Bayesian Methods
- Neural Network Models
- Information Theoretic Models

Some Statistical Assumptions

- Distributions
- Multicollinearity
- Sample Size
- Baselines



Statistical Approaches

- Classification
- Prediction
- Measurement

Linear Prediction Models

$$Y = \beta x_1 + \beta x_2 + \beta x_3 + \dots + \beta x_n$$

$$p = \frac{1}{1 + \exp(\beta x)}$$

Classification Models

$$p(j|x_i) = \left(\frac{p(x_i|j)}{p(x_i|1) + p(x_i|2) + \dots + p(x_i|k)} \right)$$

$$p(j|x_i) = \left(\frac{\pi_i p(x_i|j)}{\pi_i p(x_i|1) + \pi_i p(x_i|2) + \dots + \pi_i p(x_i|k)} \right)$$

$$p(j|x_i) = \left(\frac{\zeta_i \pi_i p(x_i|j)}{\zeta_i \pi_i p(x_i|1) + \zeta_i \pi_i p(x_i|2) + \dots + \zeta_i \pi_i p(x_i|k)} \right)$$

Psychometric Models

- Couch RA in Measurement Terms
- Model the Behaviours Leading to Risk
- Define the Domain
- Estimate Measurement Error

Cumulative Model of Risk

- Deterministic Models
- Probabilistic Models
- Extended Dynamic Models

Deterministic Cumulative Model



Probabilistic Cumulative Model



Idiographic Information

- Essential place in RA
- Structuring Idiographic Representations
- Clinician Weighting (Cost Benefit)
- Clinician Over-ride