Evaluating Machine Learning Techniques for Early PTSD prognosis after Trauma using synthetic data.

Winter Research Report

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PTSD Trajectories

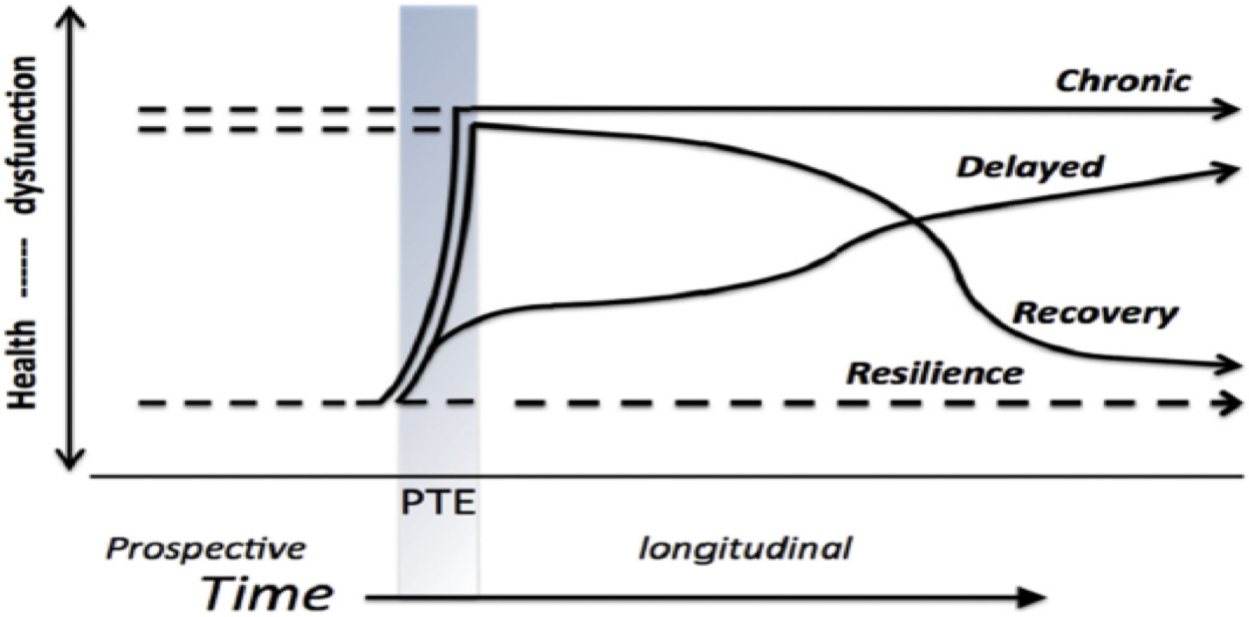

Fig. 1. Commonly observed prospective and longitudinal trajectories of response to potential trauma. Adapted from "Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events?" by B. A. Bonanno, 2004, American Psychologist, 59(1), 20-28.

Figure 1: Proposed PTSD Trajectories

Bonanno (2004)

Thesis Plan Diagram Part 1

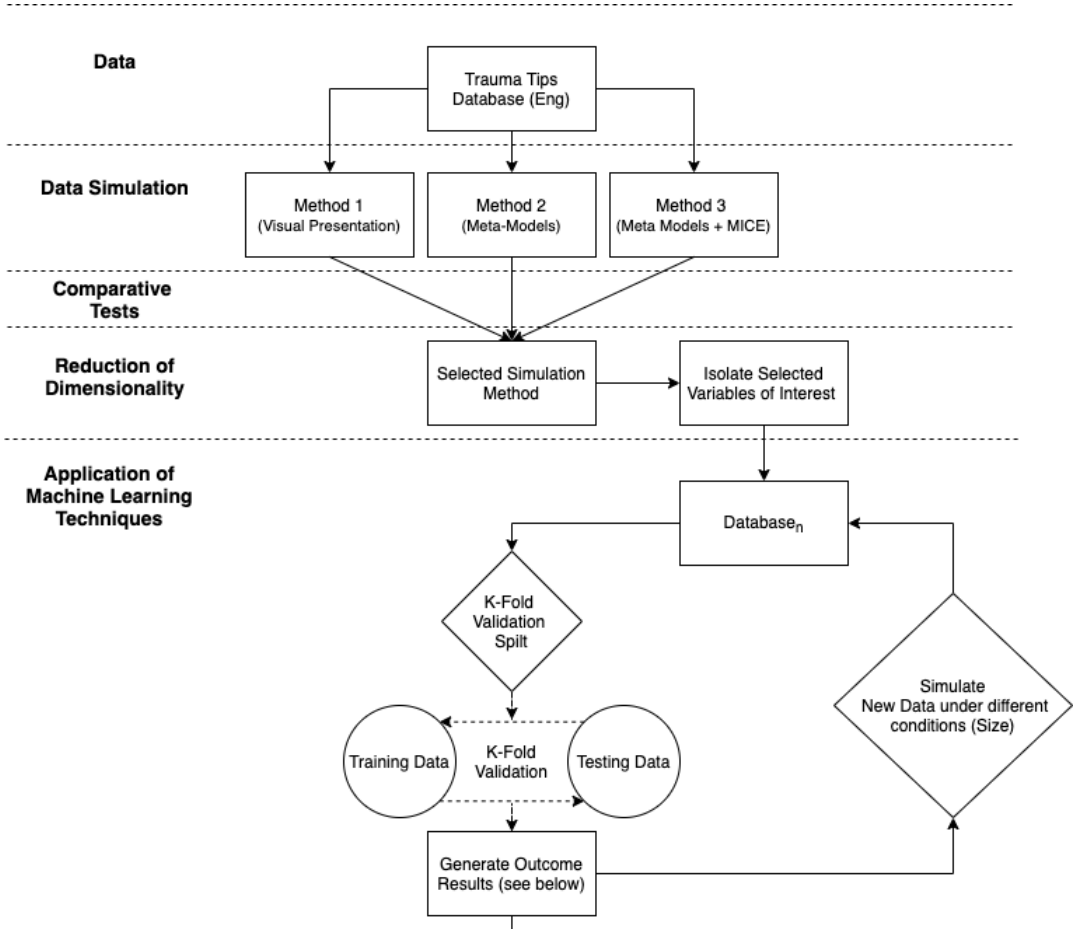

Figure 2: Thesis Analytical Plan Part 1

Variables of Interest Diagram

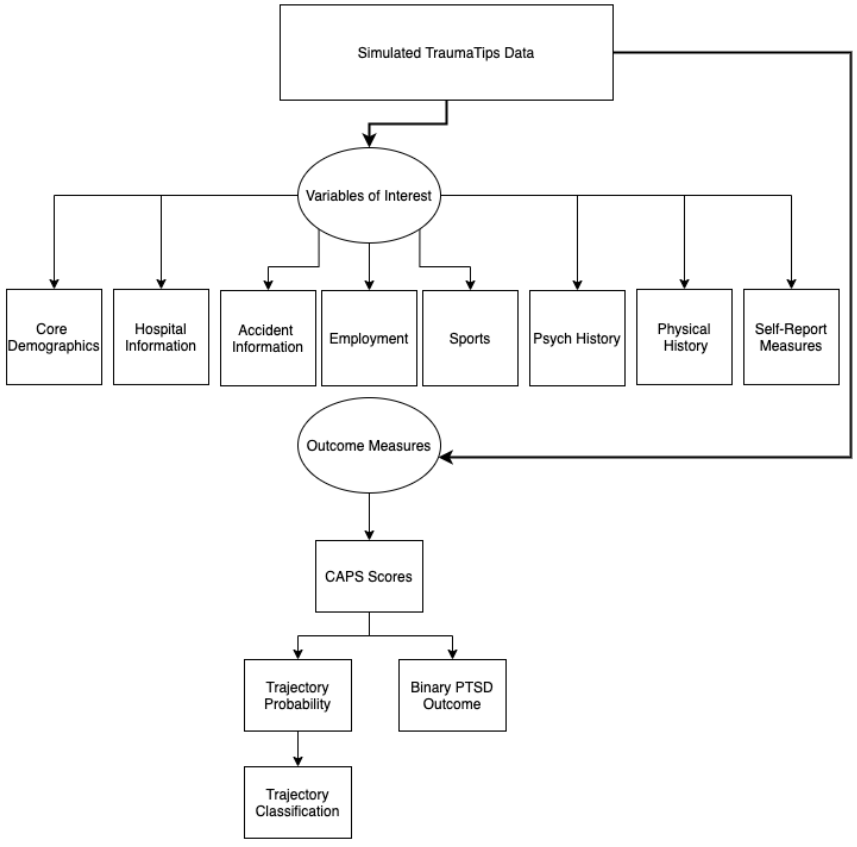

Figure 3: Selected Variables of Interest

Machine Learning Techniques

Table 1: Machine Learning Techniques

Technique	Outcome Type	R Package
Support Vector Machines (SVMs)	Classification	e1071
Support Vector Regression (SVR)	Regression	e1071
Multivariate Regression	Regression	stats
Logistic Regression	Classification	stats
K-nearest neighbour (KNN)	Classification	class
Decision Tree	Classification and Regression	tree
Random Forests	Classification and Regression	randomForest, ranger
XGBoosted Trees	Classification and Regression	xgboost
Neural Networks	Classification and Regression	neuralnet

Thesis Plan Diagram Part 2

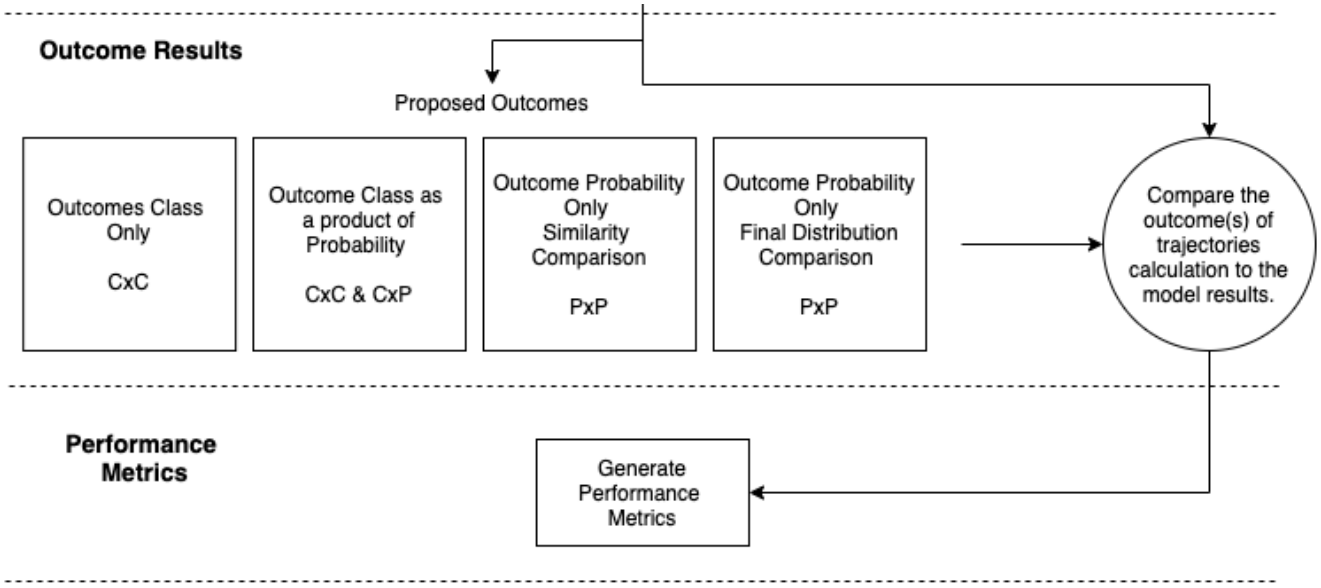

Figure 4: Thesis Analytical Plan Part 2

Outcome Measures

Table 2: Outcome Measures

Outcome Measure	Outcome Type	Measure	Advantage	Disadvantage
Outcome Class Only	Multinomial	CxC	Easily understood and comparable	No understanding of margin or likelihood of correctness
Outcome Class as a product of Probability	Numeric (Probability)	CxC, PxP	Easily understood, clinical application	PxP is hard to compare effectively
Outcome Probability only	Numeric (Probability)	PxP	Methodological Advantageous	Hard to compare, limited clinical application
Outcome Probability, final distribution comparison	Totaled Numeric Calculation (Probability/Total Distribution)	PxP	Methodological Advantageous, Positive to understand global trends	limited clinical application, limited individual level accuracy calculation (only global)

References I

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20.