Team 01

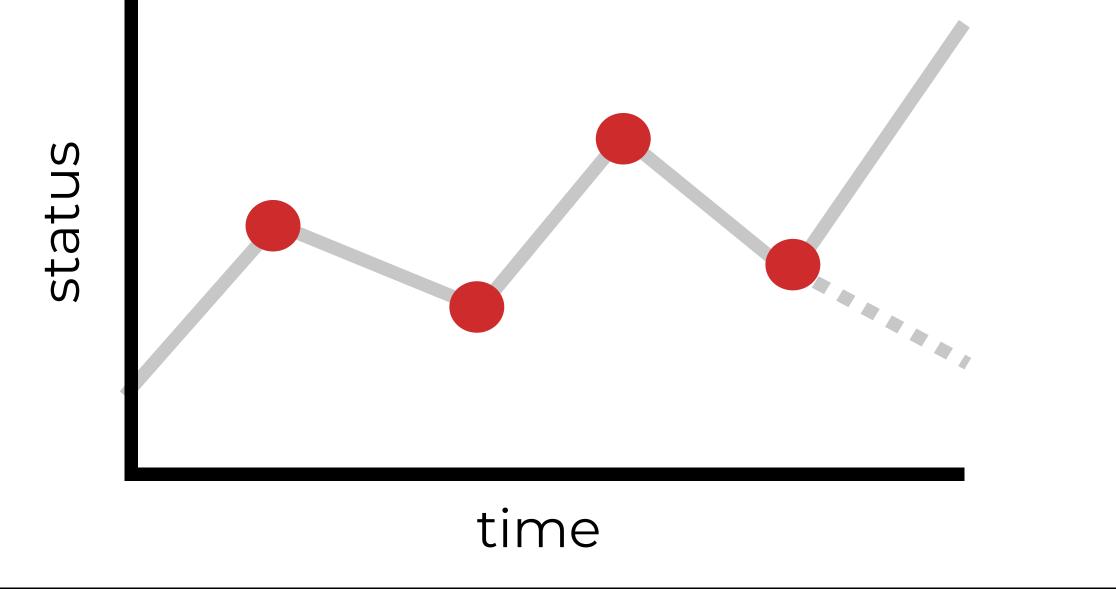
Case-Based Reasoning to Aid in Clinical Decision Support of TBI Ethan Moyer, Gabriella Grym, Tony Okeke, Caroline Vitkovitsky, Ali Youssef, Edward Kim, Dmitriy Petrov, Dick Moberg

Need

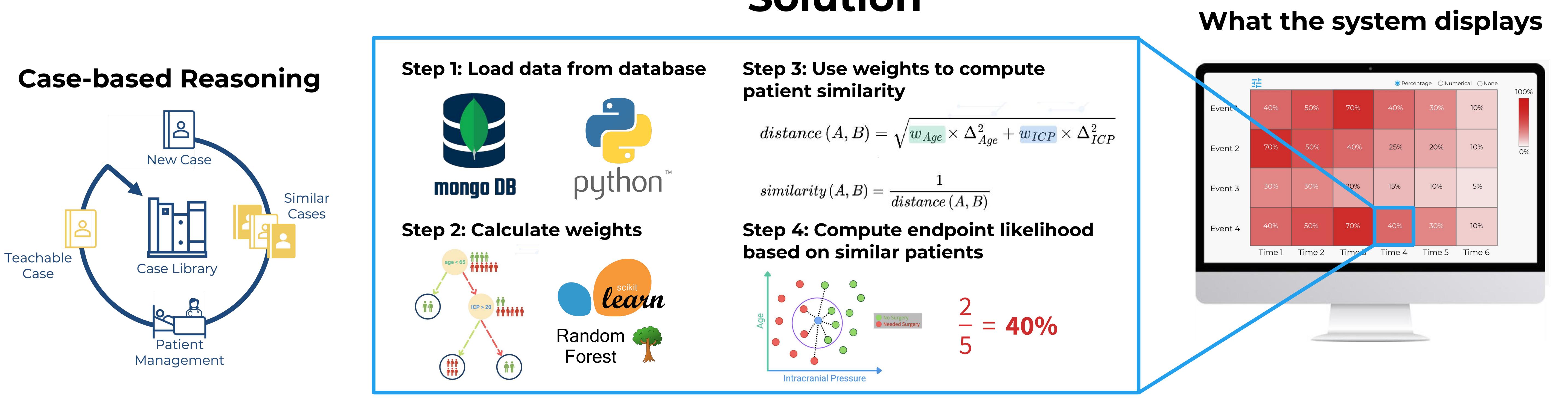
Traumatic brain injury (TBI) is a leading cause of death and disability in the U.S., resulting in an estimated <u>288,000 hospitalizations^[1] per year</u>, sometimes requiring neurocritical care.

'Adverse Events' are events correlated with patient outcome.

 Predicting whether these events will occur can aid <u>neurosurgeons</u> in treatment planning.

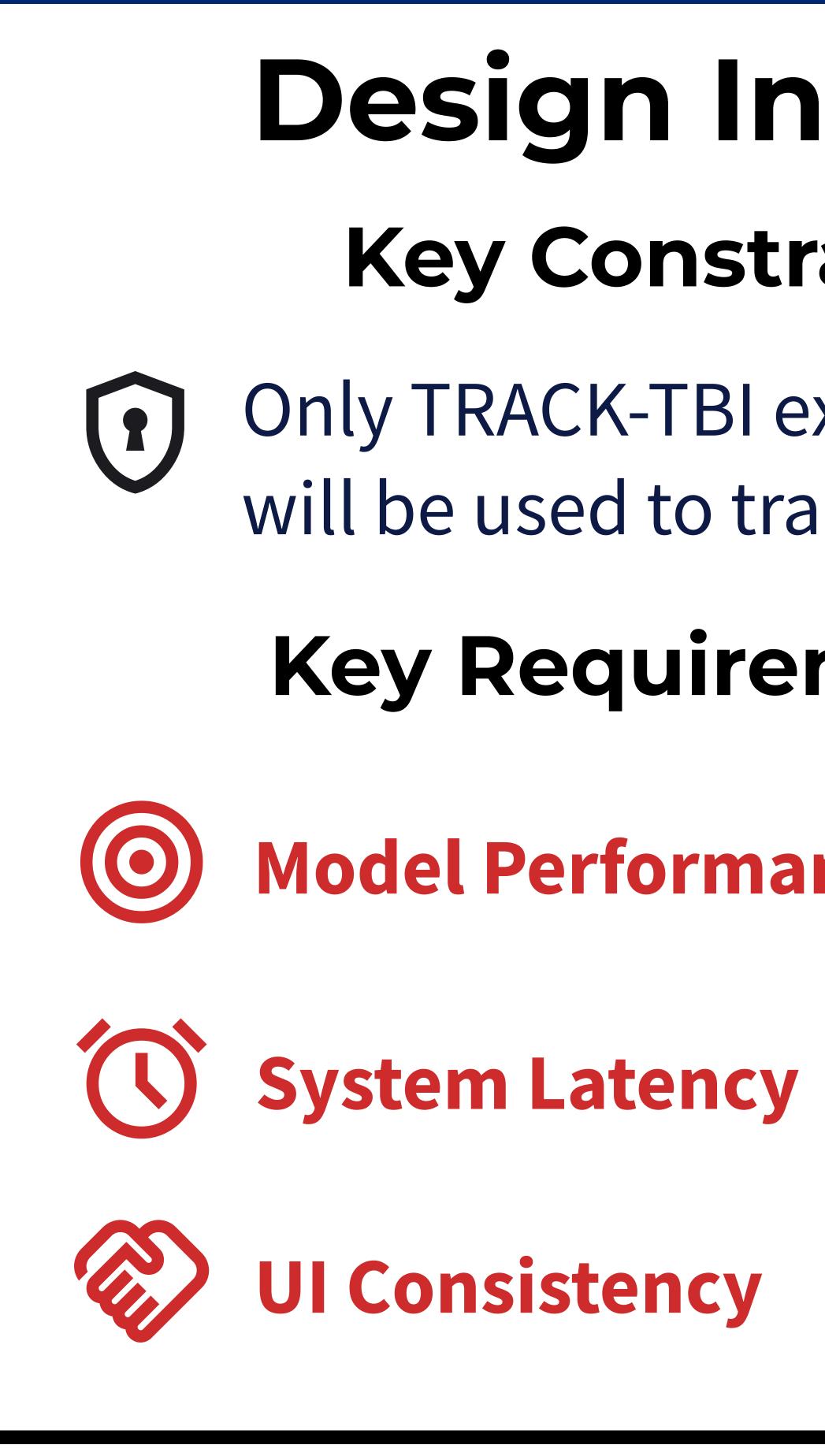






[1] Center for Disease Control and Prevention, TBI: Surveillance Report (2014) [3] Shukla et al., Journal of PLoS One, NIH (Nov 2019)

Objective: To build a robust and reliable clinical decision support system that uses an Al model to quickly predict adverse events so that physicians can prevent secondary brain injury.



Solution

[2] Rosenblatt et. al, Oxford Academic (April 2021) [4] Aguirre et. al, NIH-PubMed Central (Sep 2019)

Design Inputs

Key Constraint

Only TRACK-TBI existing dataset will be used to train the model

Key Requirements

Model Performance >50%^[2]

System Latency

≤ 300 ms^[3]

100%^[4]

Each requirement was tested using the most recent version of the model that contained **374 variables** to predict the occurrence of three intermediate endpoints.

Test

Performance T

Latency Test

UI Reliability T







Verification Testing

	Requirement	Outcome
Test	Model Accuracy	
st	System Latency	
Fest	UI Consistency	

Future Work

Include more clinical adverse events

Develop regulatory strategy

Obtain more clinical feedback on design

This work is supported by Drexel University and Moberg Analytics, with invaluable input from Dmitriy Petrov, MD.