

Physician Experience Design (PXD): More usable machine learning prediction for clinical decision making

Lu Wang, Mark Chignell, Yillun Zhang
Andrew Pinto, Fahad Razak, Kathleen Sheehan, Amol Verma



UNIVERSITY OF TORONTO

Engineering

UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING
Centre for Healthcare Engineering

Background

Delirium is a highly prevalent, preventable and treatable neurocognitive disorder, which is difficult to identify and predict.

Machine Learning (ML) predictions are subject to error, so physicians need information about the quality and uncertainty of prediction being provided to them.

User Experience Design (UXD) can tailor ML output to what physicians need in their clinical decision making.

Methodology

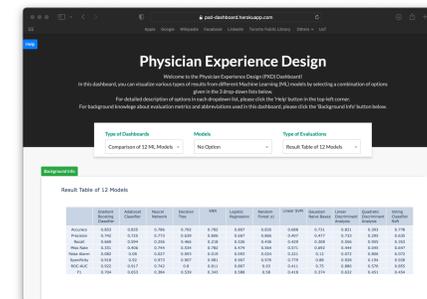
Utilizes data from GEMINI, Canada's largest hospital data and analytics study, including 4,000 cases with ~ 25% of cases labeled as having delirium.

12 ML algorithms used to predict delirium status of each admission.

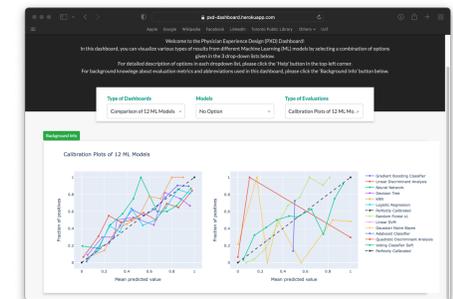
Explainable Artificial Intelligence (XAI) framework for physician experience design (PXD) to improve the uptake of ML models by improving the transparency of model results.

Results

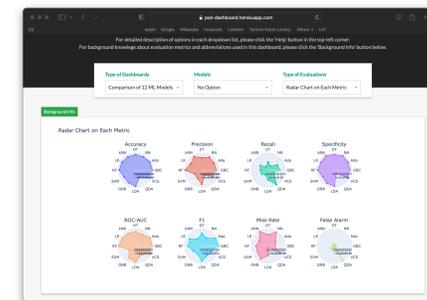
Dashboard that presents ML delirium identification results interactively based on physician selections and inputs.



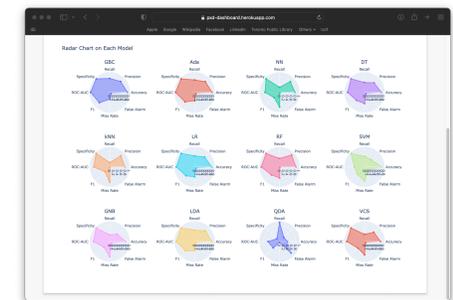
Results table of 12 ML models



Calibration comparison



Radar chart on each ML model



Radar chart on each metric

<https://pxd-dashboard.herokuapp.com/>

Centre Affiliates



Lu Wang
PhD Student



Mark Chignell
Professor



Yillun Zhang
MSc Student