End-to-End Pipeline Overview

MIMIC-IV
(2008-2019)

eICU-CRD
(2014-2015)

n= 7,086 dev (4,960/1,418/708)
+4,717 external

33 SHAP-selected features (of 40)
demographics · SOFA · KDIGO stage
labs · urine output · interactions

Causal IPW adjustment
propensity-score weighting,
overlap-trimmed [0.1, 0.9]

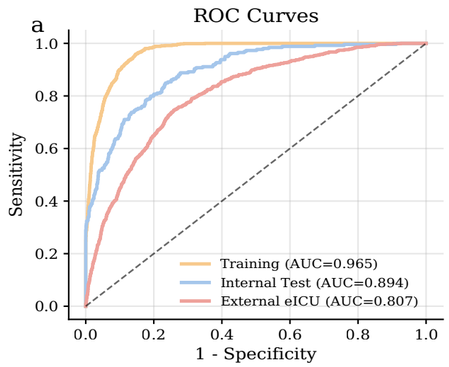
KDIGO Stage 3 AKI
≥ 18y · mechanical
ventilation or vasopressor
support before
stage-3 excl. prior RRT
chronic ESRD

CAUSAL-WEIGHTED STACKING + VALIDATION

LR meta-learner
C= 0.5, class-
balanced
τ = 0.59

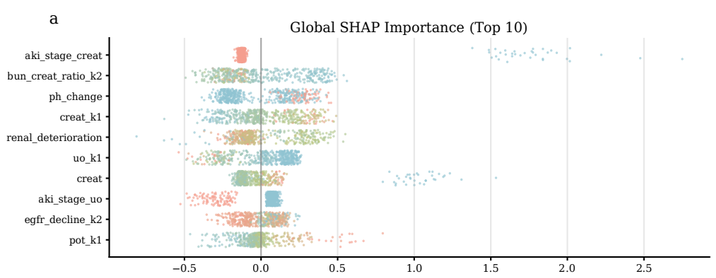
LightGBM· XGBoost· RandomForest
CatBoost·ExtraTrees

validated on



0.894 / 0.807
internal / external
AUC
(0.871–0.912) /
(0.790–0.821)

INTERPRETABLE, ACTIONABLE OUTPUT



0.724 / 0.486
internal / external AP

Bedside CDSS prototype
40% of high-risk patients have a
feasible short-term recourse

AKI = Acute Kidney Injury · RRT = Renal Replacement Therapy · IPW = Inverse Probability Weighting ·
SHAP = SHapley Additive exPlanations · CDSS = Clinical Decision Support System