DAT – ICU

ACTERREA #Team1
- *Predict hemodynamic instability* -

20th january 2018

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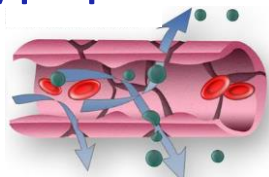Kayath SAIMSEE
Matthieu RESCHE-RIGON
Romain PIRRACCHIO
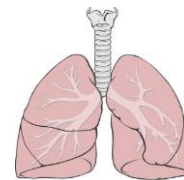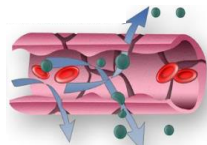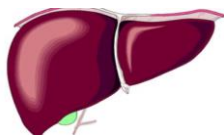
- **Objectives**

  – to predict "hemodynamic instability" (HI) (i.e. introduction of vasopressors)

  – with data from the first 2 hours after ICU admission

  – for the next 12 hours

Methods

- **Super Learner** *Van der laan et al., Stat appl genet mol biol, 2007*
  - Meta-algorithm using a combination of both parametric and non-parametric algorithms or models
    - Generalized linear model (glm) ± interaction
    - Stepwise glm
    - Bayesian glm
    - Generalized additive models
    - Gradient boosting
    - Random forrest

Methods

- Population based model

- Assessed the overall performances of models by compute **AUC**

- **Cohort population**
  - Adults (> 15 years old)
  - No vasopressors at admission

Results


```
                    ┌──────────────────┐
                    │ 46520            │
                    │ MIMIC data base  │
                    └────────┬─────────┘
                             │          ┌────────────────────────────┐
                             ├──────────│ 24074 age < 15 years old   │
                             │          │ and/or                     │
                             │          │ no baseline characteristics│
                             │          └────────────────────────────┘
                    ┌────────┴─────────┐
                    │ 22446            │
                    └────────┬─────────┘
                             │          ┌────────────────────────────┐
                             ├──────────│ 17484 with vasopressors at │
                             │          │ admission                  │
                             │          └────────────────────────────┘
                    ┌────────┴─────────┐
                    │ 4962             │
                    └────────┬─────────┘
                             │          ┌────────────────────────────┐
                             ├──────────│ 1068 no vitals available   │
                             │          │ during the first 2 hours   │
                             │          │ after admission            │
                             │          └────────────────────────────┘
                    ┌────────┴─────────┐
                    │ 3894             │
                    └────────┬─────────┘
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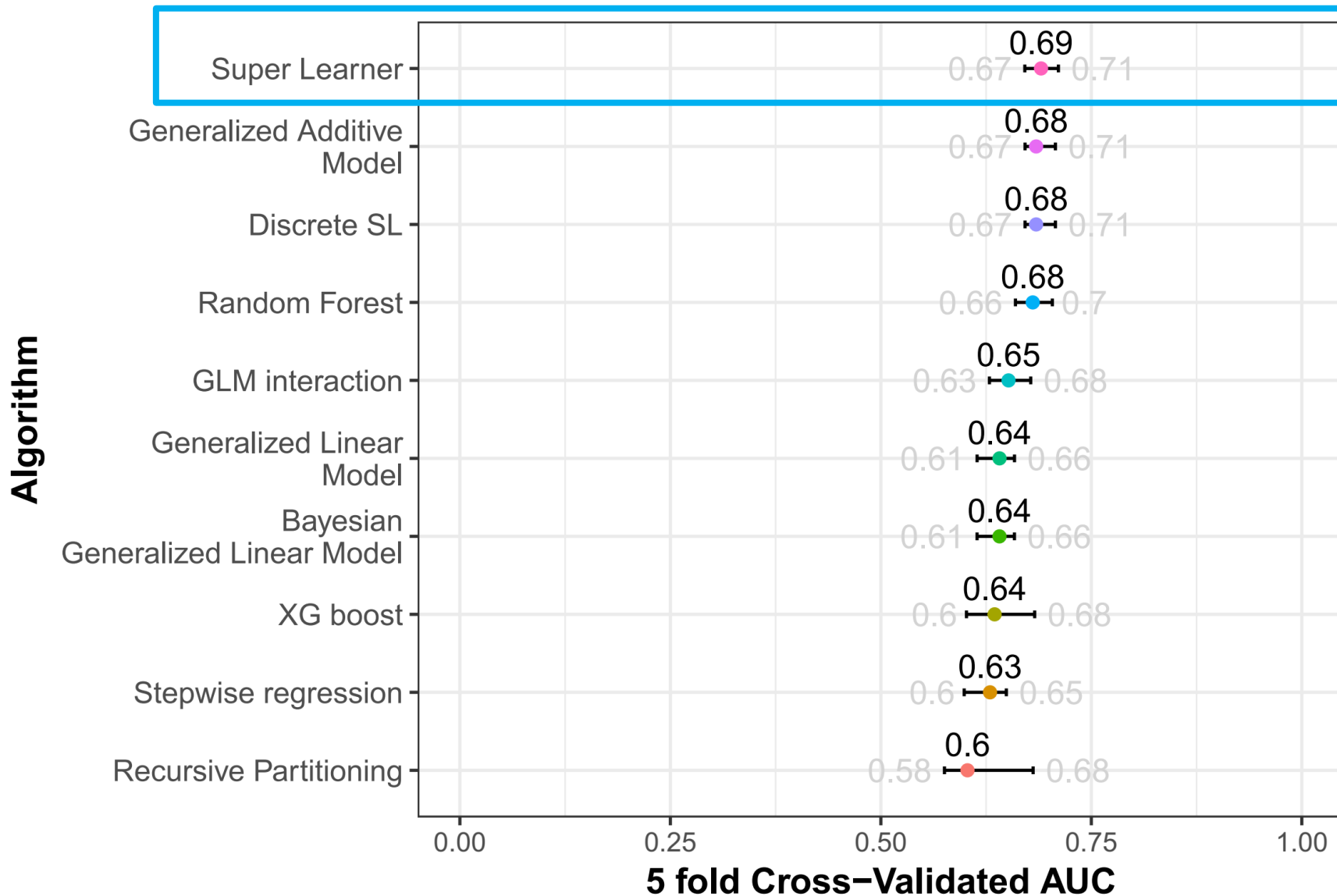
1869 Hemodynamic instability

2025 No hemodynamic instability
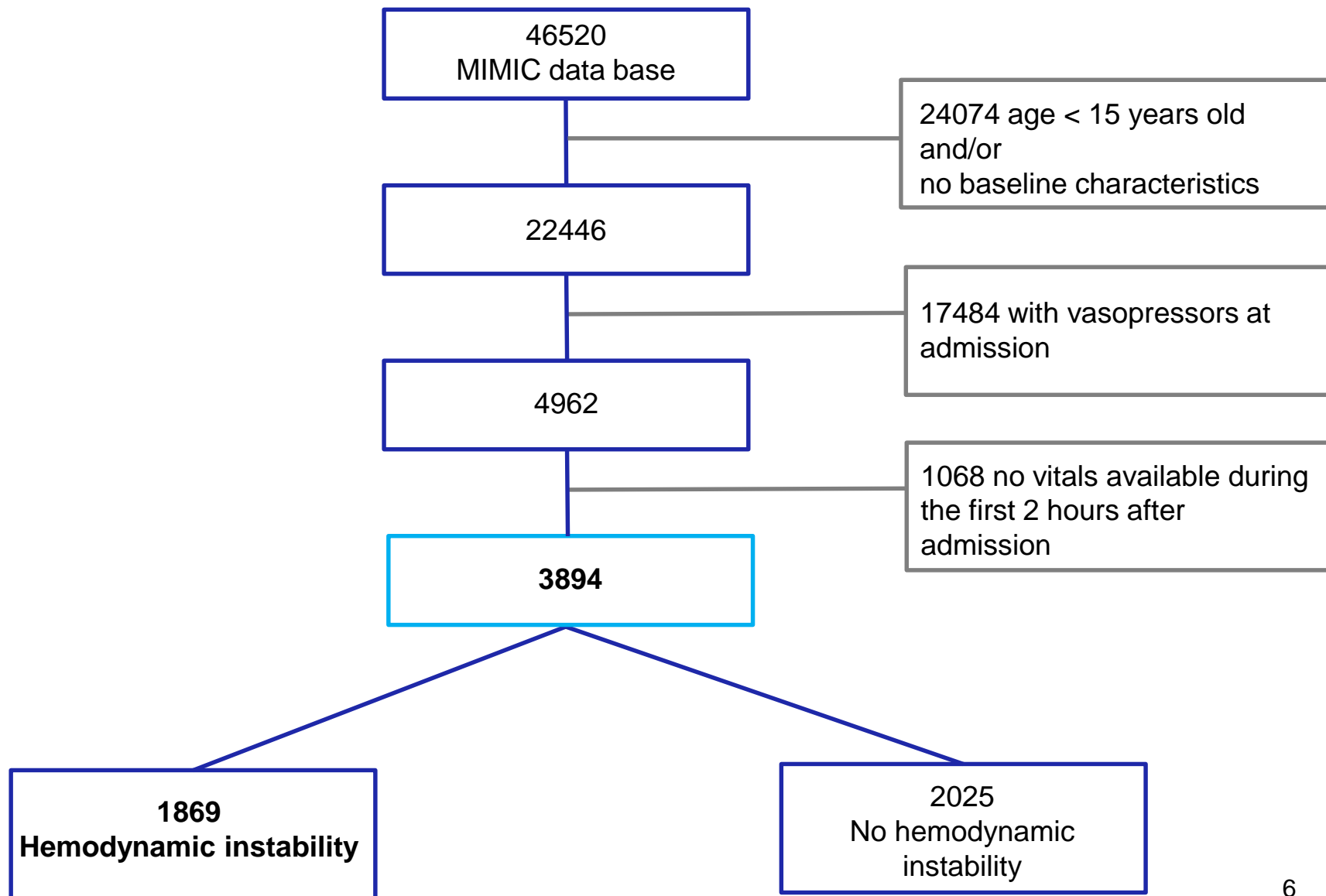
Results

Discussion

- Performance to predict HI with Super Learner AUC 0.69 [0.67 - 0.71]

- Perspectives
  - Assess different combinations of parameters
  - To define a more optimal model of prediction
  - Based on the area under the curve
  - Compare to individual based learning (on-line learning)