

Time for ICU Discharge

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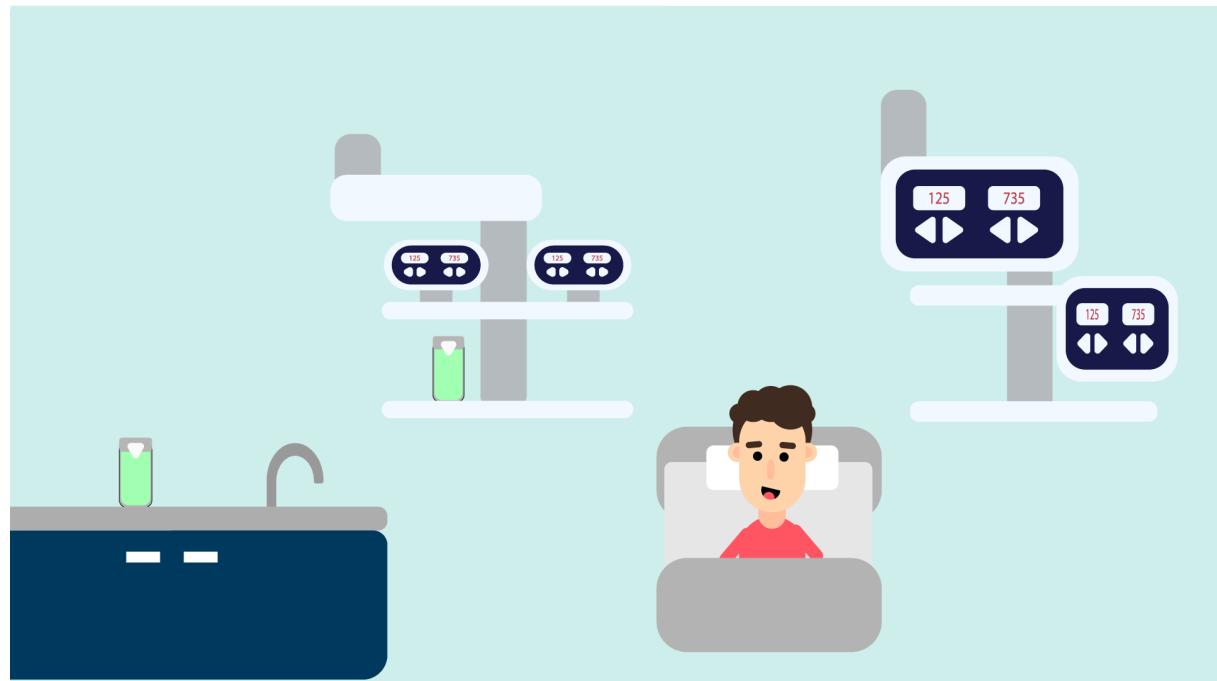


Introduction



Logistics in an ICU is an important issue due to the high number of admission requests and the scarce number of available beds.

Having an accurate estimator of the time for discharge for the patients admitted would be of huge importance for unit management.



Objective

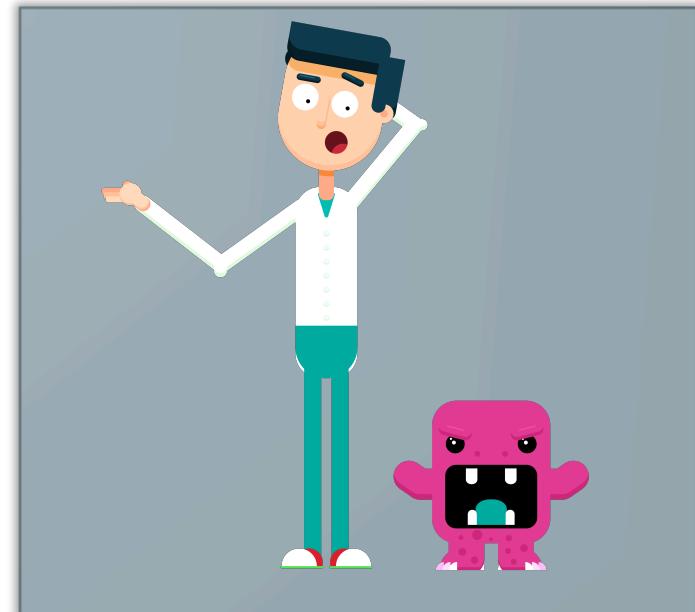


To create a prognosis estimator of the time for ICU discharge

Inclusion Criteria

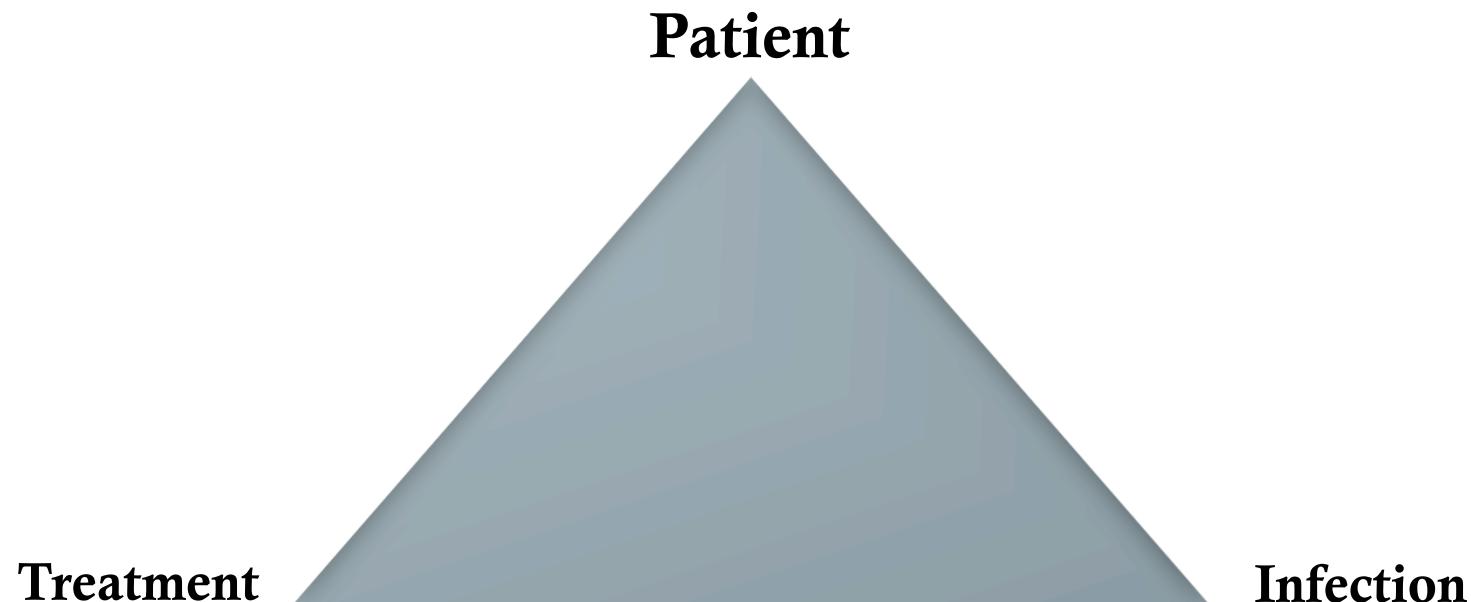
Patients:

- $\geq 72\text{h}$ of LOS in ICU
- Diagnose = “SEPSIS”
- They were discharged alive



Hypothesis

- Factors influencing in LOS in ICU:



Variables considered in the beginning of study



Patient

- Age
- Barthel Scale – not available
- Charlson Scale – not available
- SOFA at ICU admission
- Modified SOFA just considering hemodynamic, respiratory and Glasgow score
- Lactate ICU admission and its maximum value in the firsts 72 hours
- Type of ICU admission: EMERGENCY versus ELECTIVE
- Mechanical Ventilation at 72 hours
- LOS hospital previous to ICU admission
- Epinephrine

$\Delta \text{ SOFA} = \text{SOFA (ICU admission)} - \text{SOFA (72 horas)}$

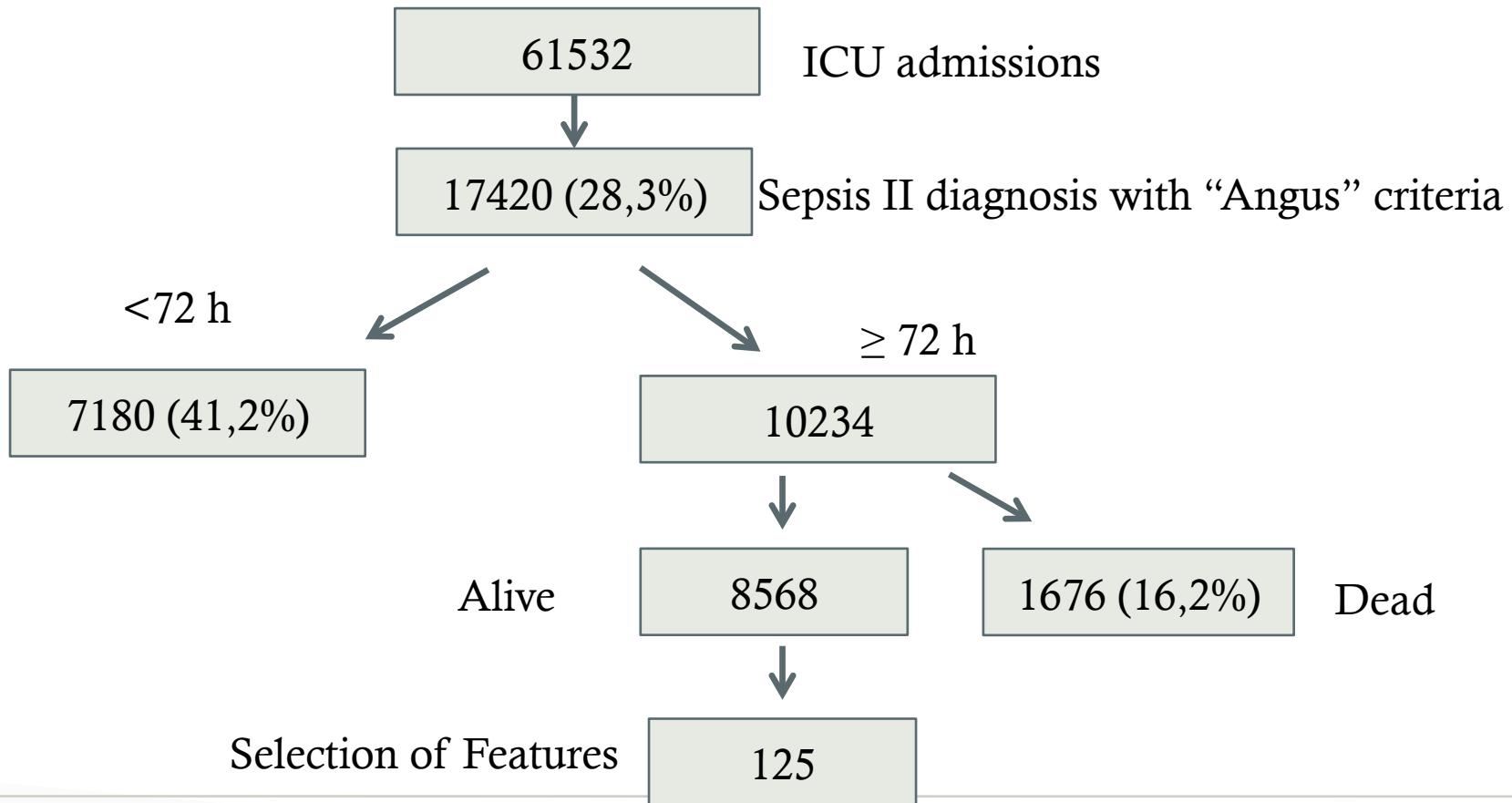
$\Delta \text{ Lactato} = \text{Lactato (ingreso)} - \text{Lactato (72 horas)}$

**No sufficient
data**

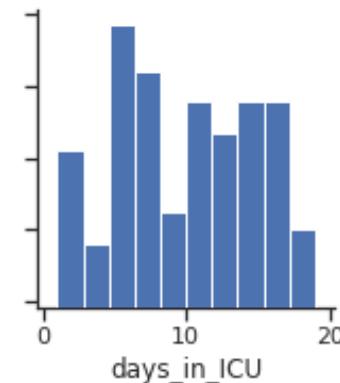
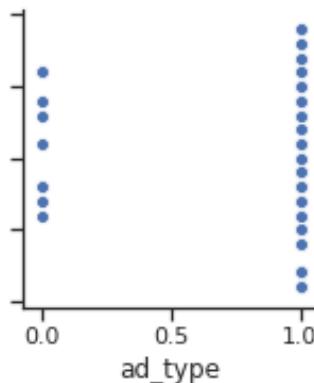
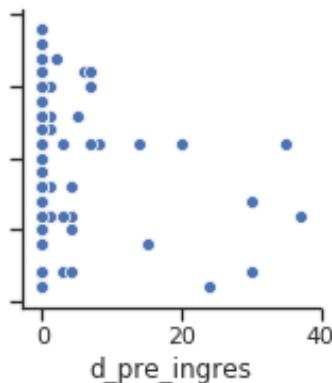
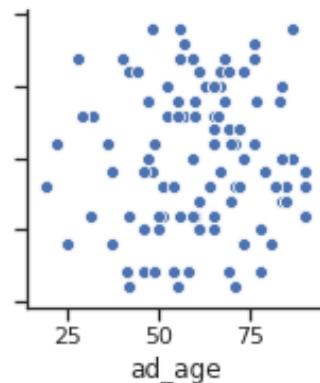
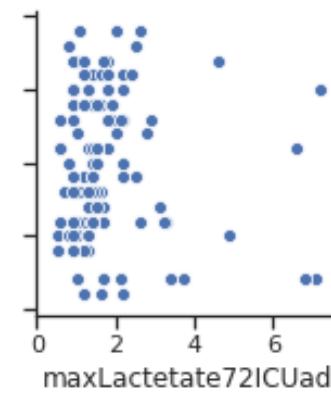
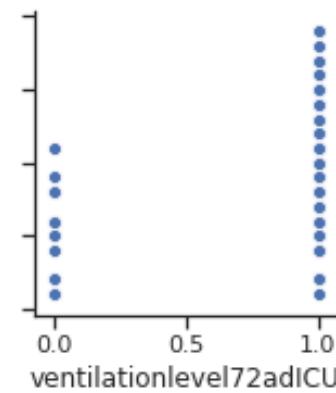
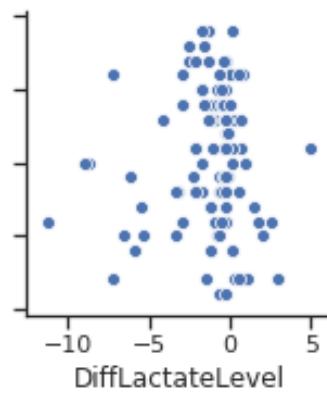
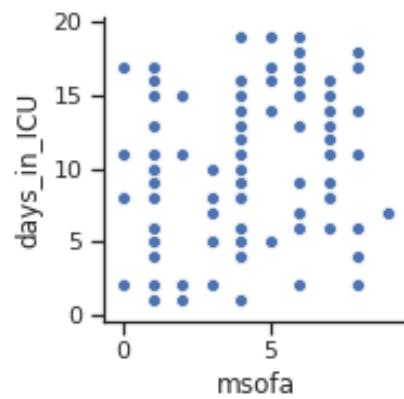
Features

- Age
- mSOFA
- Max.Lactate
- Δ Lactate
- Mechanical Ventilation
- LOS hospital previous to ICU admission
- Type of admission: “EMERGENCY”

Flow chart



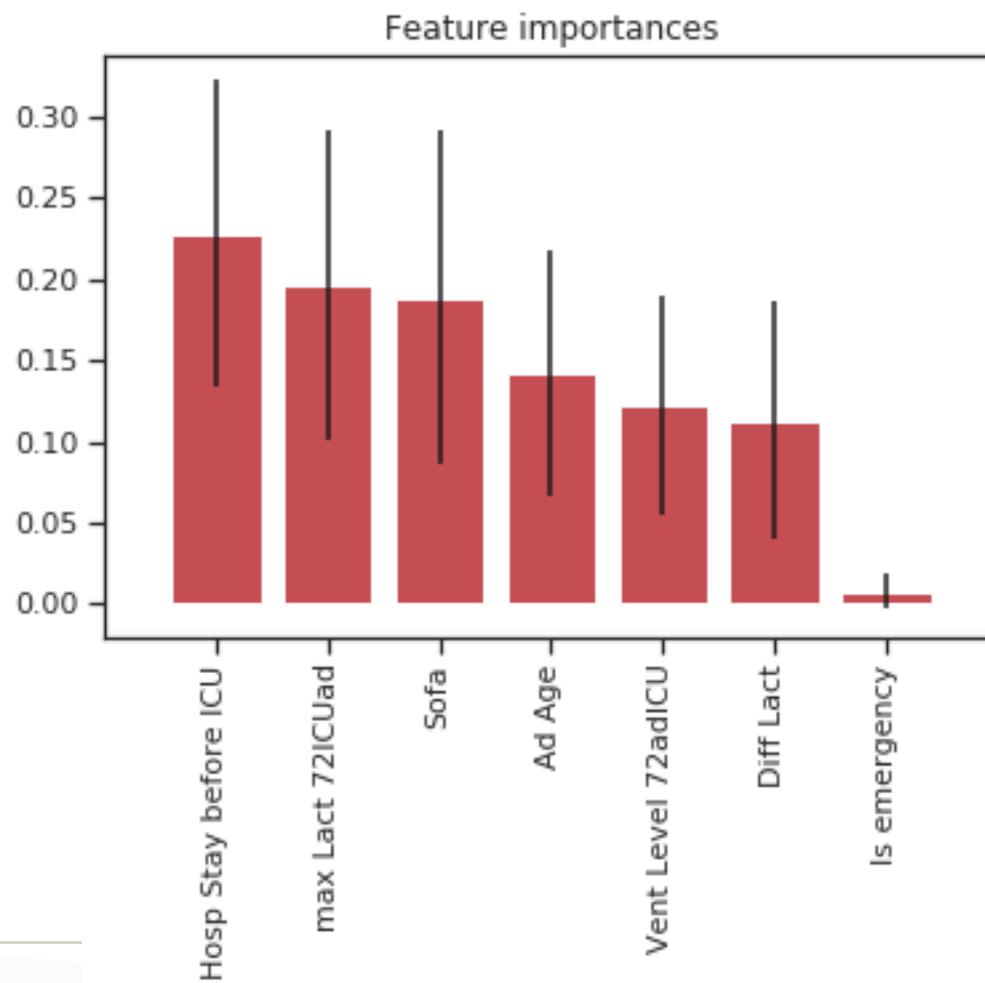
Exploration



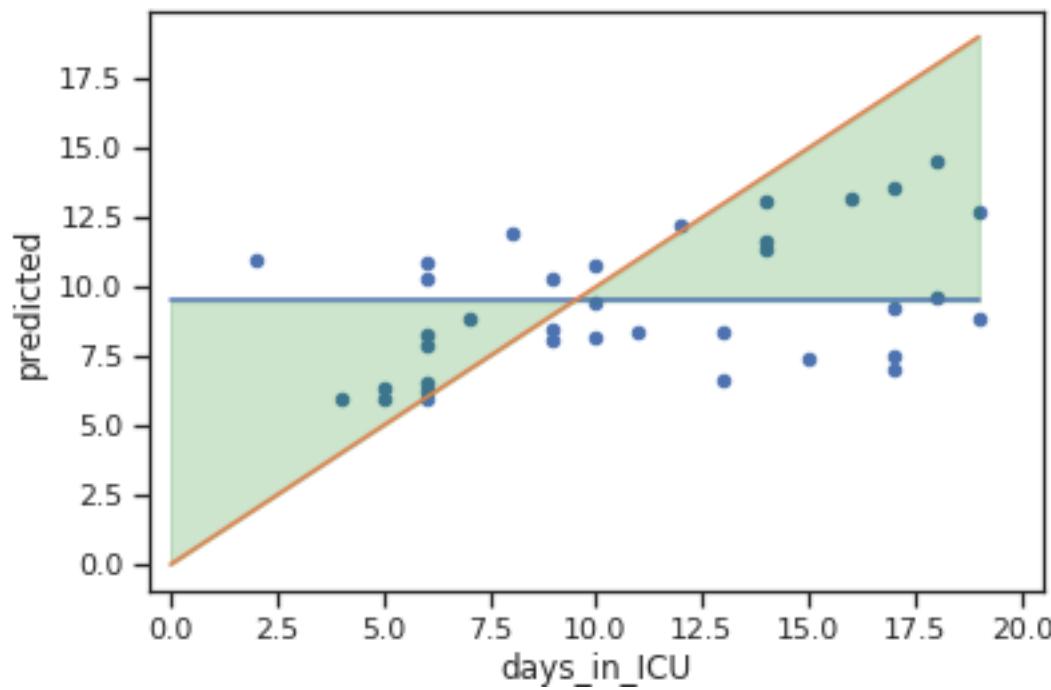
Methodology

- Splitting dataset (33% test and 67% training)
- Random Forest
- Hyperparameter tuning (cross-validation 5-fold)
 - Number of estimators
 - Max features
- Mean squared error

Feature Importance

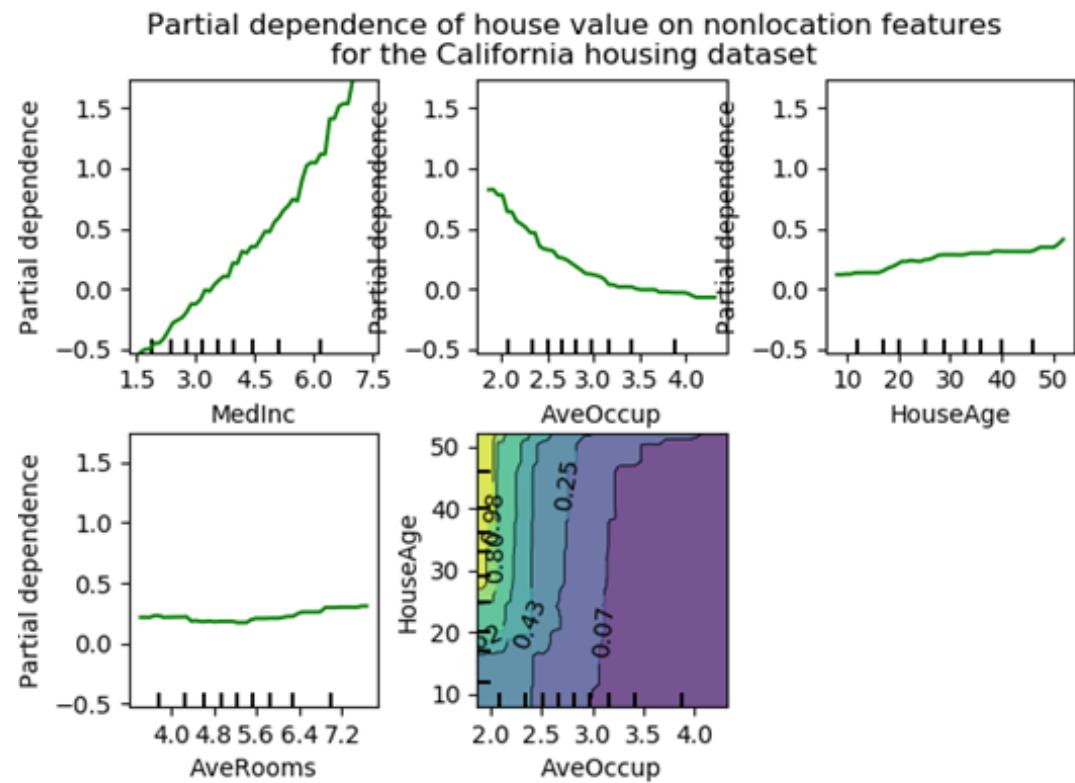


Results



Further steps

- Error analysis.
- ML interpretability methods (e.g., PDPs).



Conclusions

- Due to the high complexity of information and the inclusion criteria, we were not able to find a suitable model to predict ICU discharge in a short period.
- We suggest reanudating the analysis after a further evaluation of the recent literature (and repositories) and the potential possibilities present in the database.