Interpretable Machine Learning of PET Imaging for Individualized Predictions of Seizure Outcomes after Temporal Lobe Epilepsy Surgery

2022 GDMA Nuclear Medicine Annual Conference

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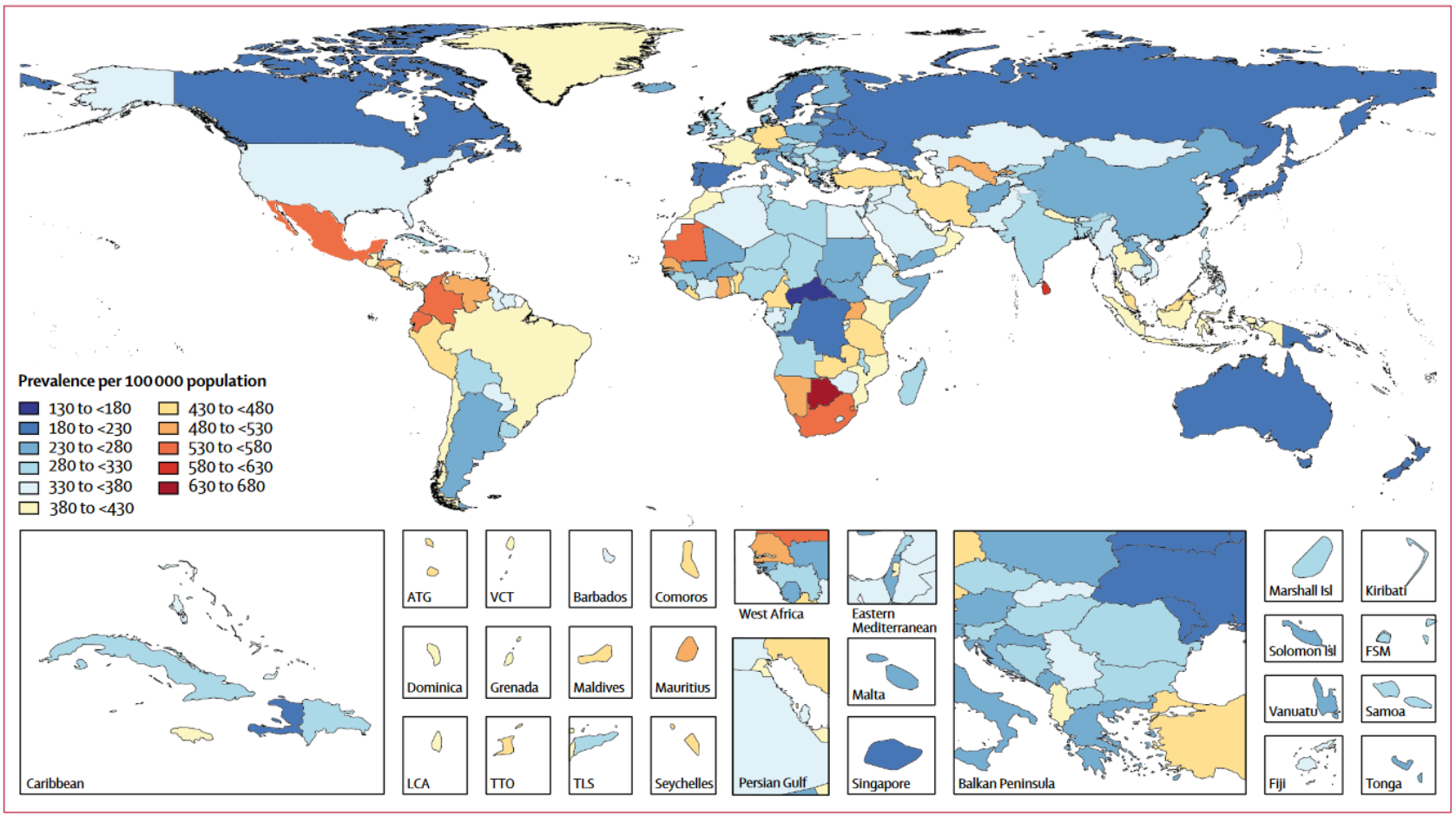
Introduction

Background

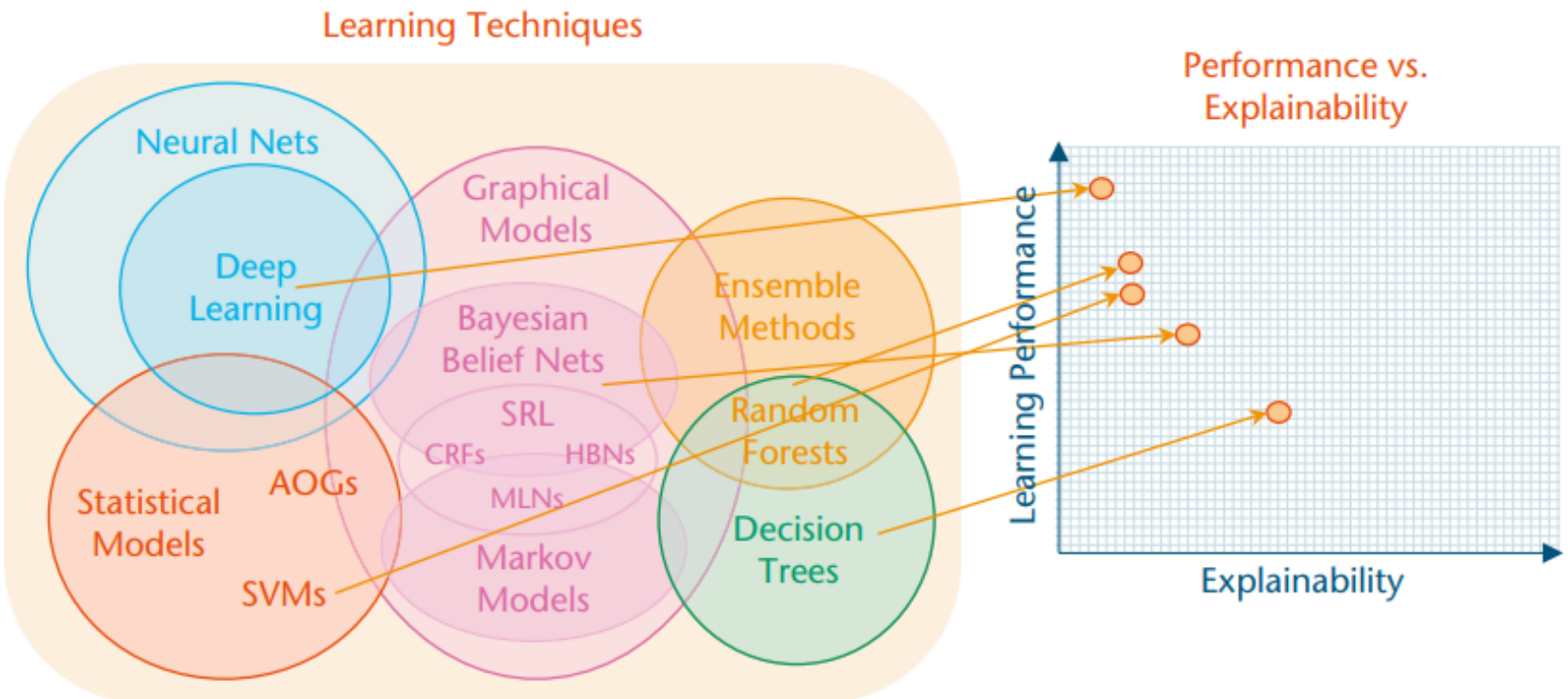
Epilepsy epidemiology



Prevalence per 100000 of idiopathic epilepsy, 2016(Beghi et al., 2019)

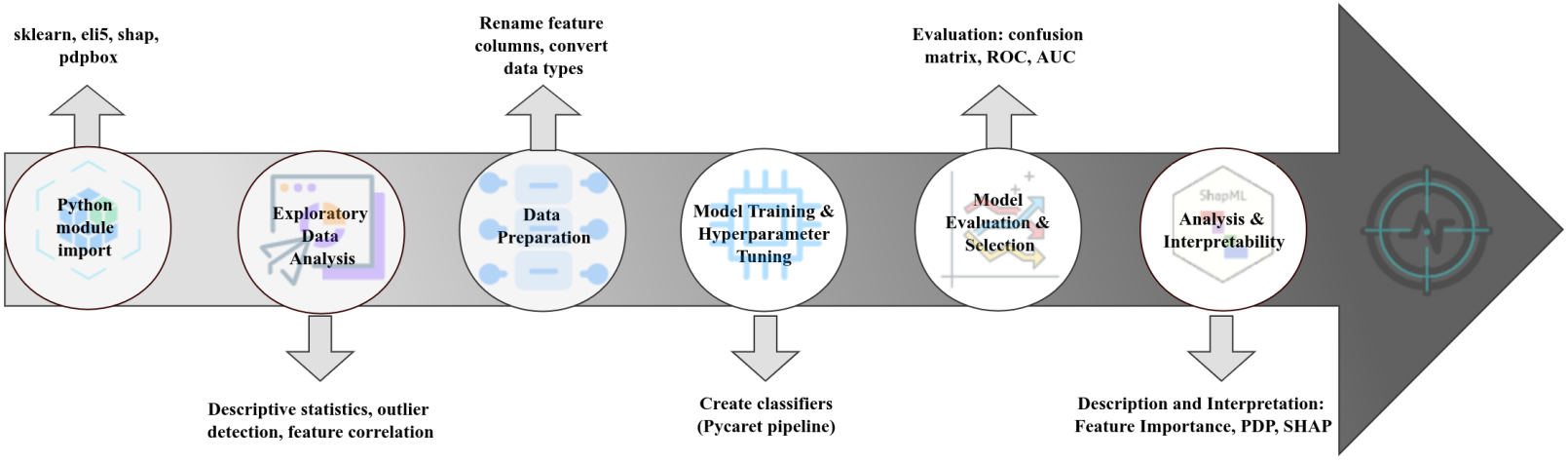
Aims

- Focuses on examining the interpretability of machine learning models rather than just building a short-term recurrence prediction model (IML, aka XAI).



Learning Performance Versus Explainability Trade-Off(Gunning and Aha, 2019)

Scheme



The flowchart of interpretable machine learning[@]

The Data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SHAP

- **Shapley**

The Model

Benchmark

This text is centered.

benchmark /

- KNN
- “ ” 5
- AUC
- AUC

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PipeOp PipeOps %>>% Graph

- PipeOp, %>>% gunion() ppl()
- Graph$plot()
- as_learner(Graph)

- ……
-
-

1.

- PipeOp
- %>>%
- PipeOp affect_columns Selector

The Explanation

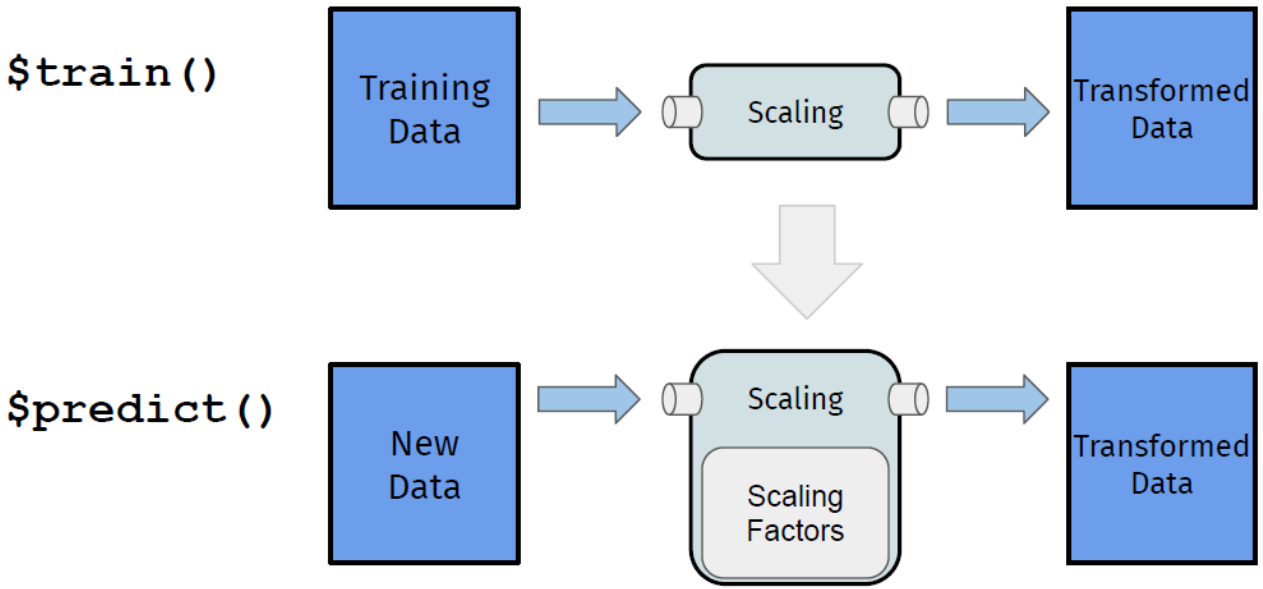
$train()
Training Data
Scaling
Transformed Data
$predict()
New Data
Scaling
Scaling Factors
Transformed Data

Figure 1:

- 3 KNN SVM Ranger
- method:
  ”grid_search” “random_search” gensa “nloptr”

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1.

`mlr3filters`

(1)

Conclusion

con

(2)

" " `ranger` "impurity"

```
task$select()
```

2.

mlr3fselect

- fselect()
- auto_fselector(),
- fselect_nested()

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R mlr3verse (?)

For more theoretical approaches to machine learning model explanation, see Interpretable Machine Learning: A Guide for Making Black Box Models Explainable,What Causes Heart Disease? Explaining the Model, refer to(Rajpurkar, 2021), (Marc Becker, 2022), (Molnar, 2022)

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THANKS !

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