

Turning notebook into a web app with Mercury

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Piotr Płoński





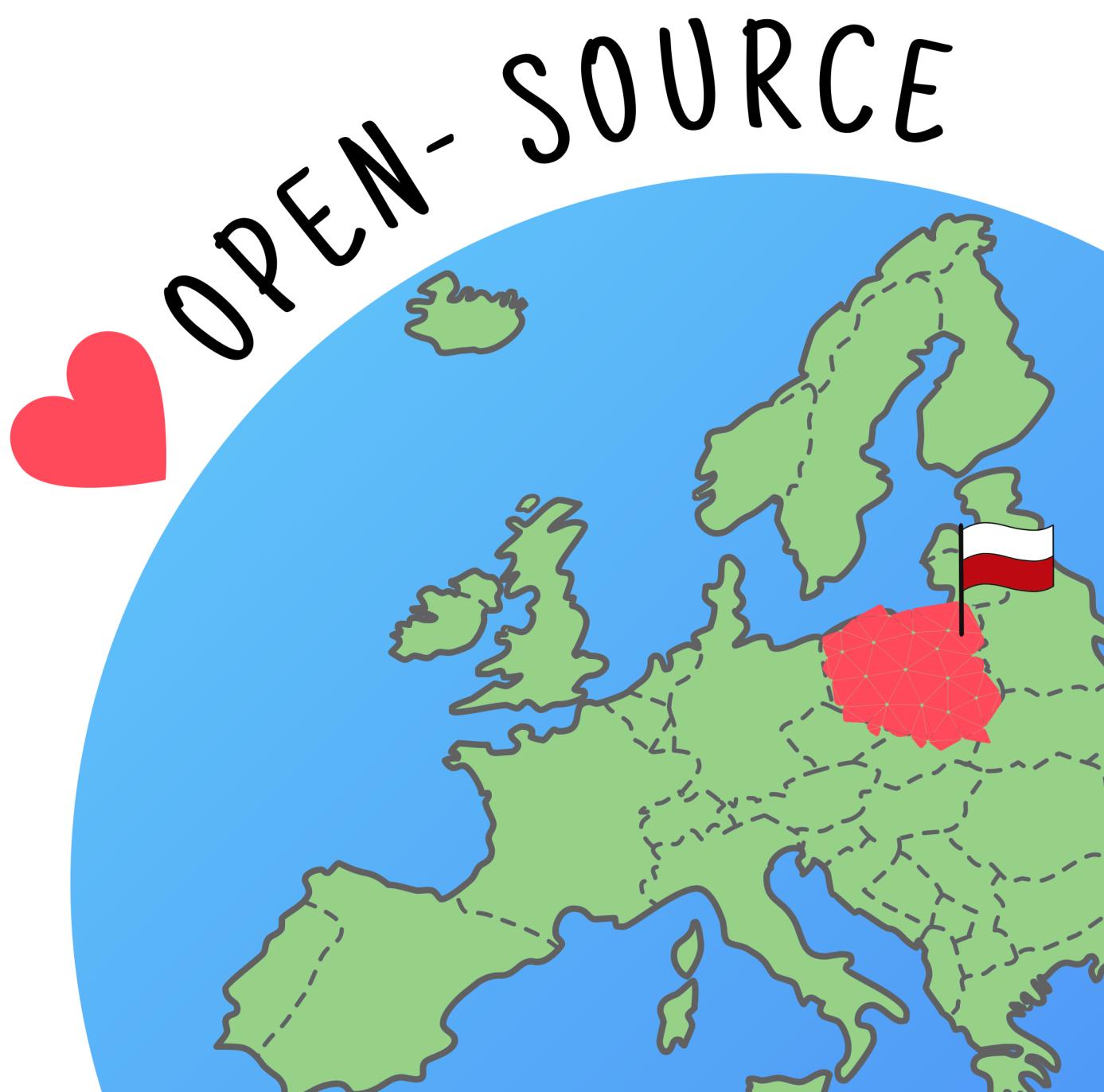
Data Science Tools

since 2016'



Based in Poland

Our mission is:
make data science accessible,
transparent, and efficient.



TOOLS



AutoML

MLJAR AutoML builds a complete Machine Learning Pipeline. It offers:

- advanced feature engineering
- algorithms selection and tuning
- automatic documentation
- ML explanations



Mercury is a web framework for converting Python Notebooks into interactive web applications



AutoML



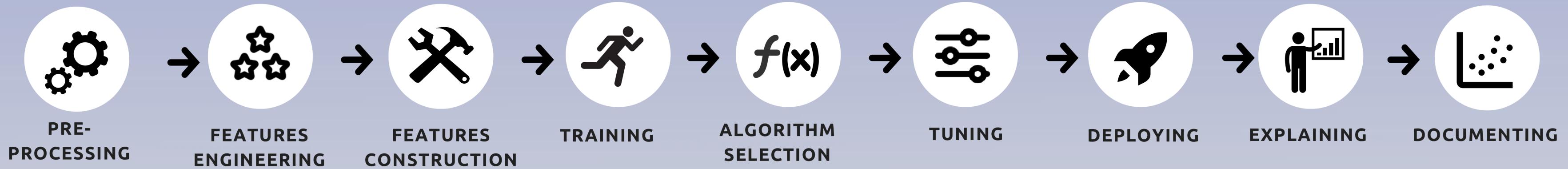
- ★ open-source
- ★ **86 citations** in research papers
- ★ around **1 million** downloads
- ★ works with **Python** with versions 3.8, 3.9, 3.10, 3.11
- ★ **MIT** license

HOW IT WORKS

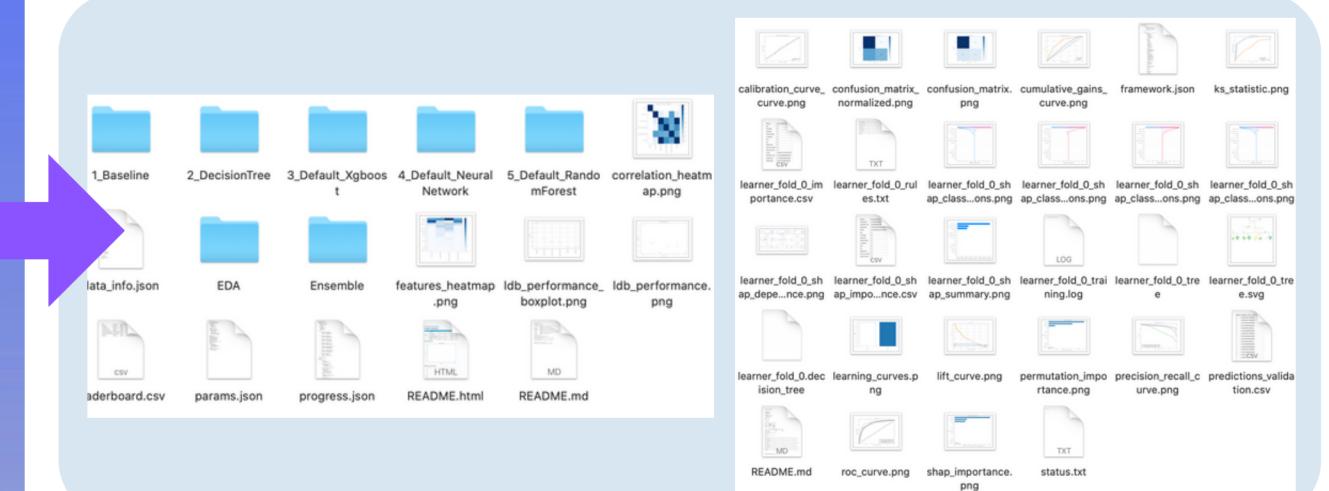
mljar-supervised
one Python package that includes



MACHINE LEARNING PIPELINE - STAGES AUTOMATED WITH AUTOML



AUTO-SAVE & AUTO-DOC



INPUT DATA FILE

| Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Survived |
|--------|--------------------------------------------------------|--------|-----|-------|-------|------------------|---------|-------|----------|
| 3 | Braund, Mr. Owen Harris | male | 22 | 1 | 0 | A/5 21171 | 7.25 | | 0 |
| 1 | Cumings, Mrs. John Bradley (Florence Briggs Thayer) | female | 38 | 1 | 0 | PC 17599 | 71.2833 | C85 | 1 |
| 3 | Heikkinen, Miss. Laina | female | 26 | 0 | 0 | STON/O2. 3101282 | 7.925 | | 1 |
| 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35 | 1 | 0 | 113803 | 53.1 | C123 | 1 |
| 3 | Allen, Mr. William Henry | male | 35 | 0 | 0 | 373450 | 8.05 | | 0 |
| 3 | Moran, Mr. James | male | | 0 | 0 | 330877 | 8.4583 | | 0 |
| 1 | McCarthy, Mr. Timothy J | male | 54 | 0 | 0 | 17463 | 51.8625 | E46 | 0 |
| 3 | Palsson, Master. Gosta Leonard | male | 2 | 3 | 1 | 349909 | | | 0 |
| 3 | Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg) | female | 27 | 0 | 2 | 347742 | | | |
| 2 | Nasser, Mrs. Nicholas (Adele Achem) | female | 14 | 1 | 0 | 237736 | | | |
| 3 | Sandstrom, Miss. Marguerite Rut | female | 4 | 1 | 1 | PP 9549 | | | |
| 1 | Bonnell, Miss. Elizabeth | female | 58 | 0 | 0 | 113783 | | | |
| 3 | Saunderscock, Mr. William Henry | male | 20 | 0 | 0 | A/5. 2151 | 8.05 | | 0 |
| 3 | Andersson, Mr. Anders Johar | male | 39 | 1 | 5 | 347082 | 31.275 | | 0 |
| 3 | Vestrom, Miss. Hulda Amanda Adolfina | female | 14 | 0 | 0 | 350406 | 7.8542 | | 0 |
| 2 | Hewlett, Mrs. (Mary D Kingcome) | female | 55 | 0 | 0 | 248706 | 16 | | 1 |
| 3 | Rice, Master. Eugene | male | 2 | 4 | 1 | 382652 | 29.125 | | 0 |
| 2 | Williams, Mr. Charles Eugene | male | | 0 | 0 | 244373 | 13 | | 1 |
| 3 | Vander Plank, Mrs. Julius (Emelia Maria Vandemoortele) | female | 31 | 1 | 0 | 345763 | 18 | | 0 |
| 3 | Masselmann, Mrs. Fatima | female | | 0 | 0 | 2649 | 7.225 | | 1 |
| 2 | Fynney, Mr. Joseph J | male | 35 | 0 | 0 | 239865 | 26 | | 0 |



AutoML

with a
few lines of code

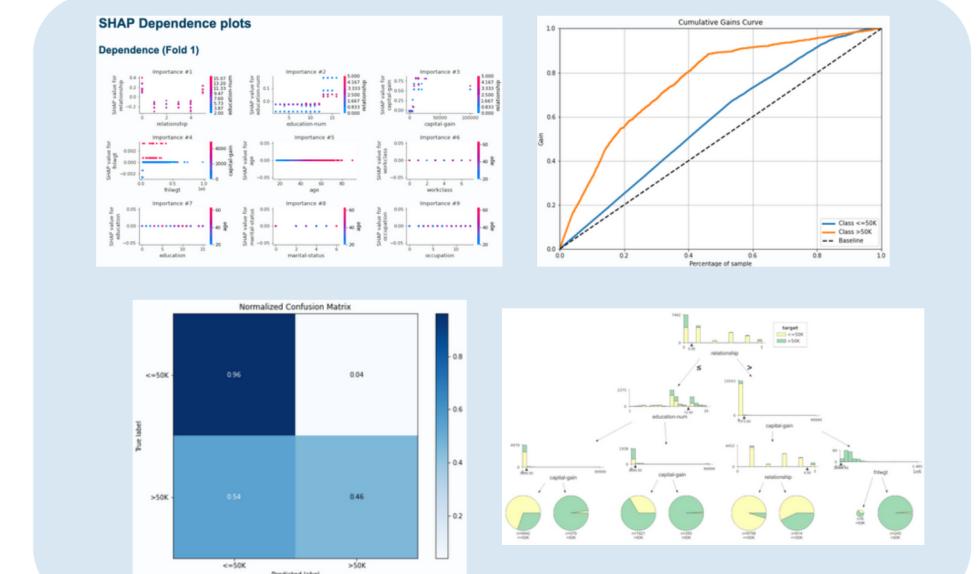


```
from supervised import AutoML  
automl=AutoML()  
automl.fit(X,y)  
pred = automl.predict(X_test)
```

MODEL LEADERBOARD

| Best model | name | model_type | metric_type | metric_value | train_time |
|------------|--------------------------------|----------------|-------------|--------------|------------|
| | 1_Baseline | Baseline | logloss | 0.555532 | 0.74 |
| | 2_DecisionTree | Decision Tree | logloss | 0.376732 | 10.99 |
| the best | 3_Default_Xgboost | Xgboost | logloss | 0.285863 | 7.57 |
| | 4_Default_NeuralNetwork | Neural Network | logloss | 0.341575 | 6.63 |
| | 5_Default_RandomForest | Random Forest | logloss | 0.353436 | 6.95 |
| | Ensemble | Ensemble | logloss | 0.285863 | 1.2 |

MANY VISUALIZATIONS



EXPLAIN YOUR WORK

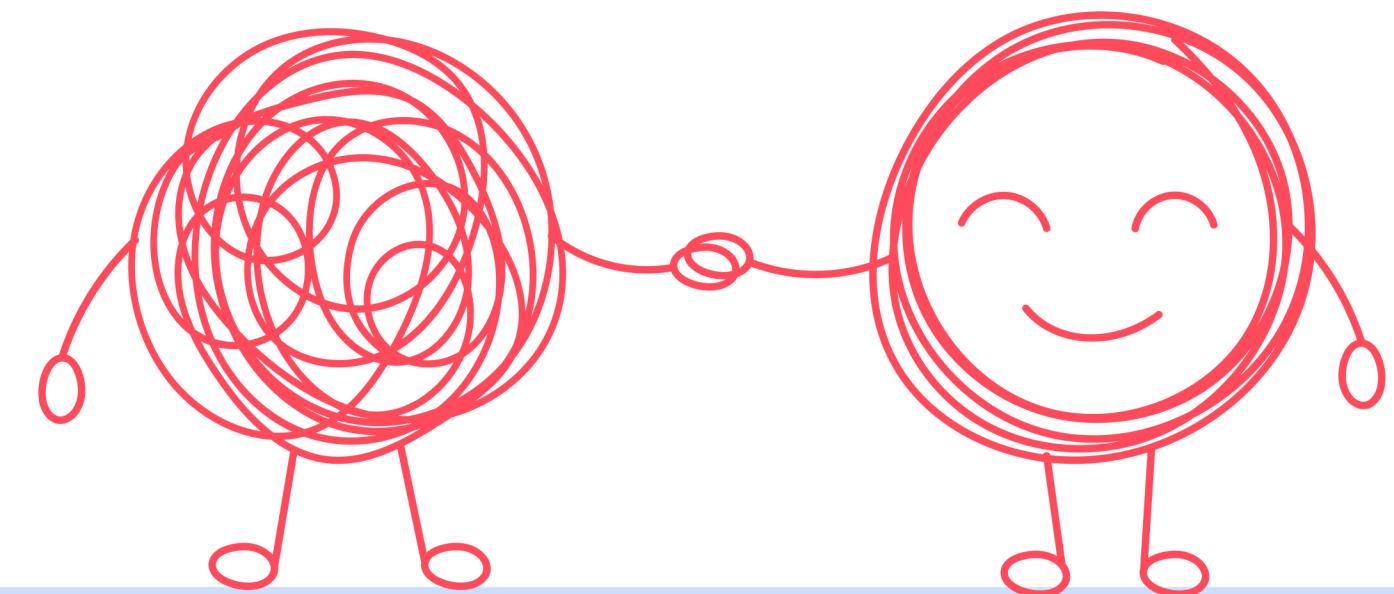
SHOW ML PIPELINE FOR BOSS



PROBLEM TO SOLVE

Can't share notebooks with non-technical users

- PYTHON KNOWLEDGE
- INSTALLING & UPDATING PACKAGES
- SOMETIMES SPECIAL HARDWARE
- DATA ACCESS



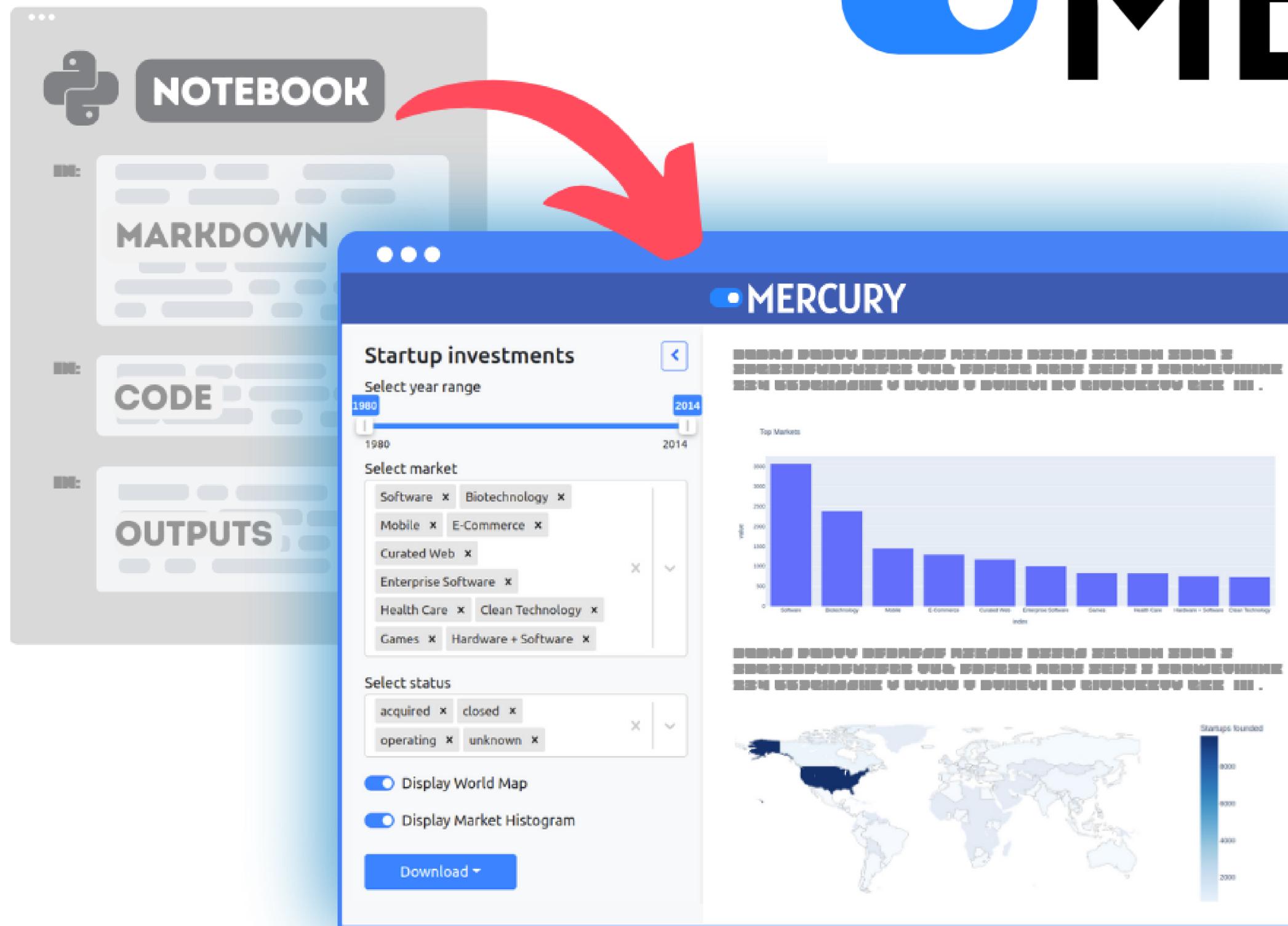


PROBLEM TO SOLVE

You can share your results:

- E-MAIL
- POWERPOINT
- REWRITE TO WEB APP

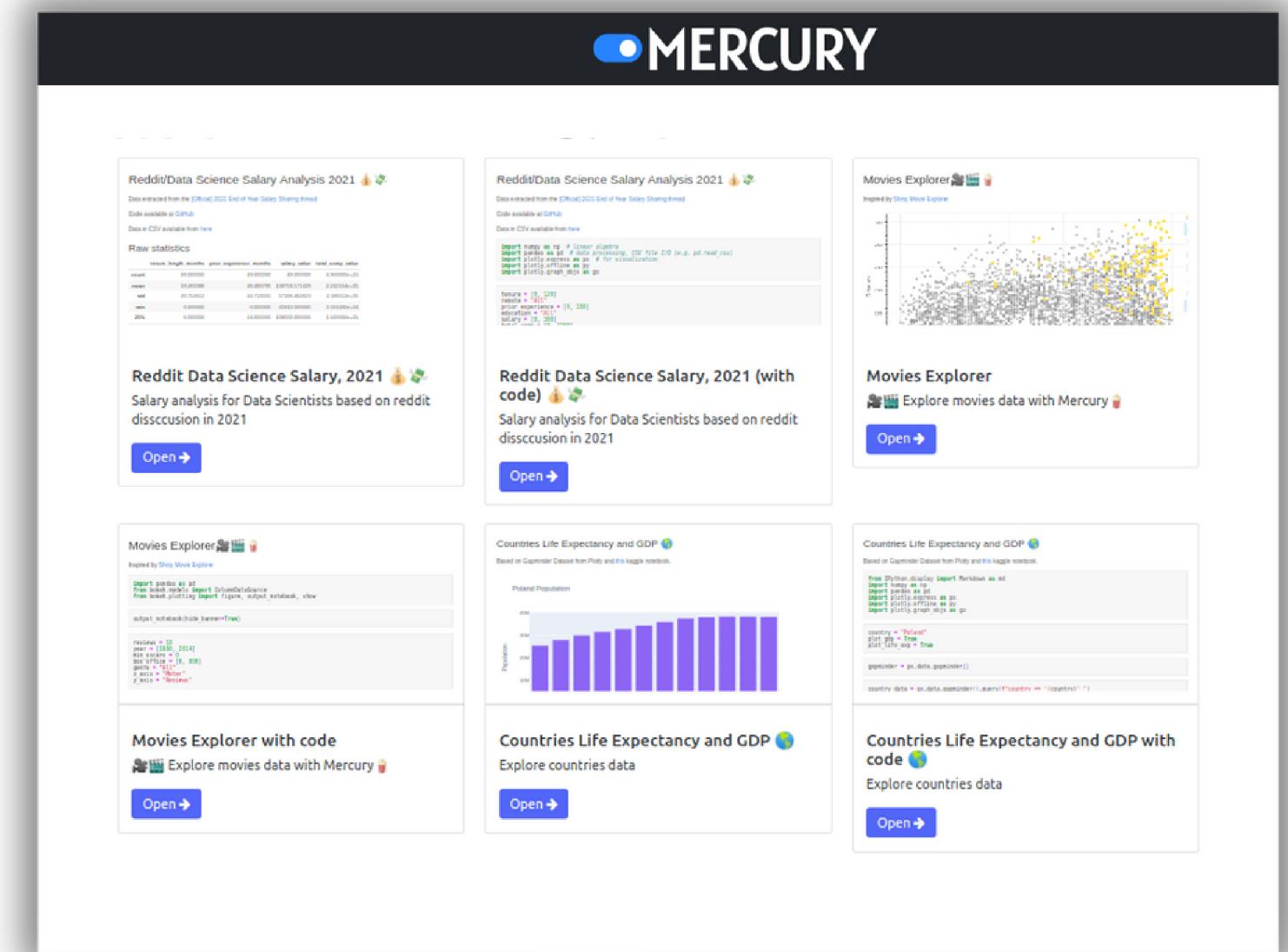
•MERCURY



Framework for
sharing notebooks

WHY IT IS DIFFERENT?

- NO CALLBACKS!
- NO LAYOUT WIDGETS





LET'S CODE

github.com/mljar/pydata-nyc-2023

CUSTOM

3D PyDeck

Maps

Pivot Table

... and more

WIDGETS

INPUT

Checkbox

Button

Slider

Range

App

Notes

Text

Multi Select

Select

Numeric

File

OUTPUT



Markdown



Chat



Stop



OutputDir



JSON

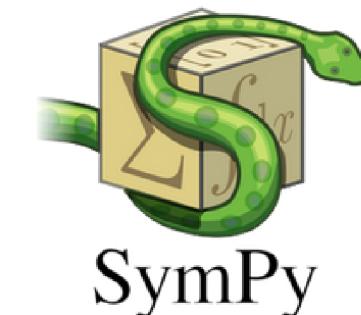


Confetti

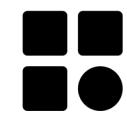


NumerBox

WORKS WITH



FEATURES



multiple apps

Share as many notebooks as you want.



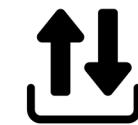
authentication

Decide with whom to share your notebooks.



export to PDF or HTML

Users can easily export the executed notebook as a PDF or HTML



output files

Produce files in notebook and make the downloadable for users



embedding

Run notebook with Mercury and embed it on any website



hide or show code

Decide whether you want to show or hide code in the app

YOU CAN BUILD

REPORT

WEB APP

PDF

This block displays two main components: a 'REPORT' section on the left featuring a 'SELECT' button and a 'PDF' icon, and a 'WEB APP' section on the right containing several data visualization elements such as bar charts, line graphs, and pie charts.

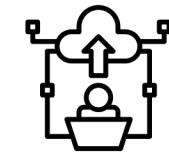
PRESENTATION

This block shows a 'PRESENTATION' section with a variety of charts and graphs, including a line graph, a bar chart, and a pie chart. A blue double-headed arrow is positioned between this section and the 'WEB APP' section, suggesting a connection or comparison between the two.

DASHBOARD

This block represents a 'DASHBOARD' with a large title. It contains a collection of data visualizations arranged in a grid, including a line graph with an upward arrow, a bar chart, a pie chart, and a world map.

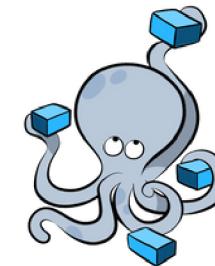
DEPLOYING



self-hosted

with

Docker-Compose



Ngrok

ngrok



self-hosted

Commercial

Deployment dashboard to manage notebooks and users, and:

- User analytics
- Private forks
- Style customization
- Email support



mercury cloud

Create your site

- choose from many domains & set your custom domain:

YOUR NAME.isDataScientist.com

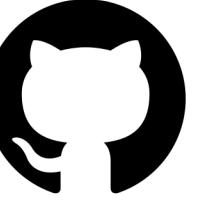
.PreviewReport.com

.RunMercury.com

.DataInAdvance.com

- or use your custom domain

THANK YOU!



github.com/mljar/mercury

