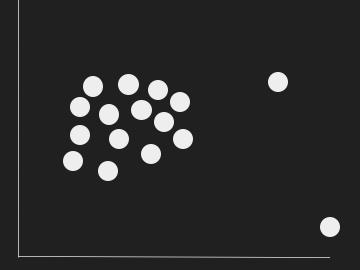


# © utlr.

Benn A Web application for analyzing subspace outliers of high ker dimensional datasets



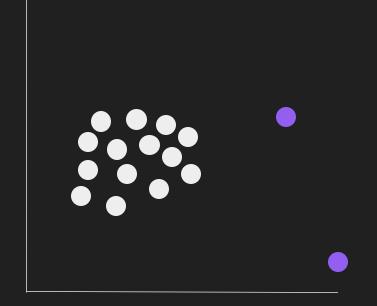
#### Outlier



data point that differs significantly from other data points



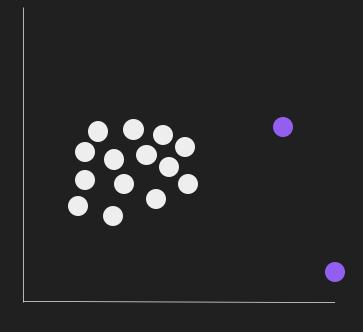
#### Outlier



data point that differs significantly from other data points



#### Why Outlier Detection?

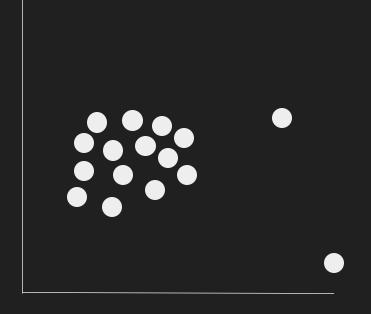


outliers degrade machine learning methods

analyze big data

• can be interpreted as errors or interesting data

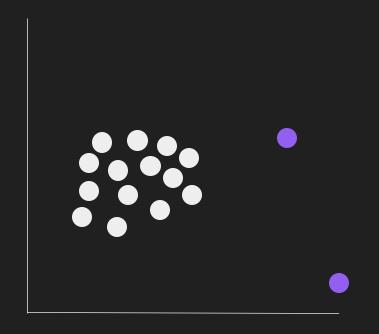




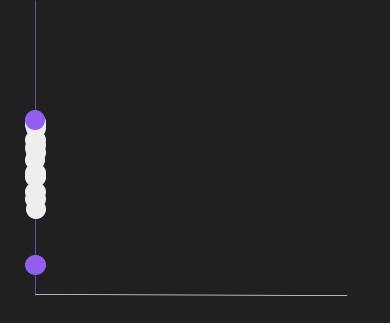








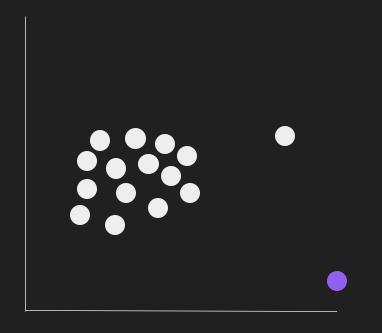






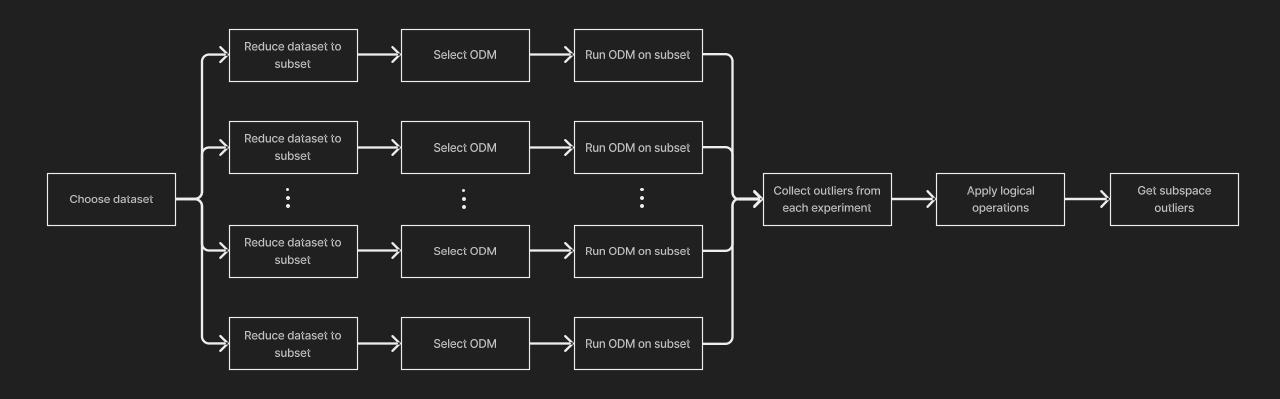






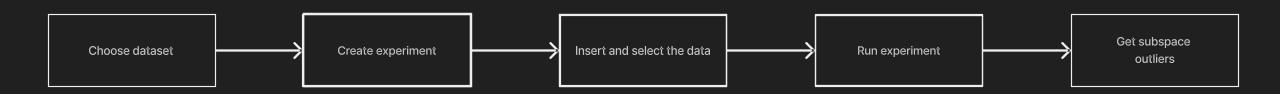


#### Problem





#### Solution





Sign Up



Sign Up



Sign Up

Login

Sign up

# 

thongroup autlier analysis

Login

Sign up



Email	0
Username	
Password	•
Re-enter Password	

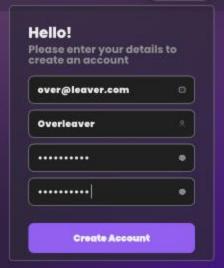
thorago outlier analysis





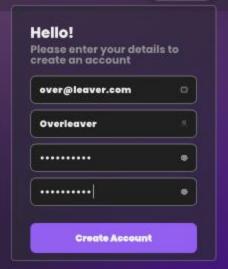


Sign Up





Sign Up









Signed in as Underleaver

Account Log out 1



Effective subspace outlier analysis



Signed in as Underleaver

Account Log out 1



**Outlr.** 

Effective subspace outlier analysis



Sign Up



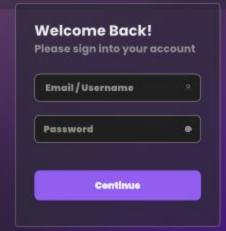
Sign Up

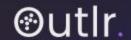






Sign Up

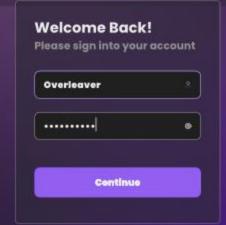








Sign Up

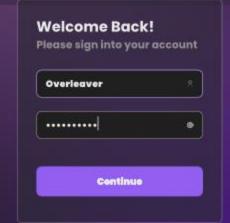








Sign Up



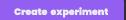




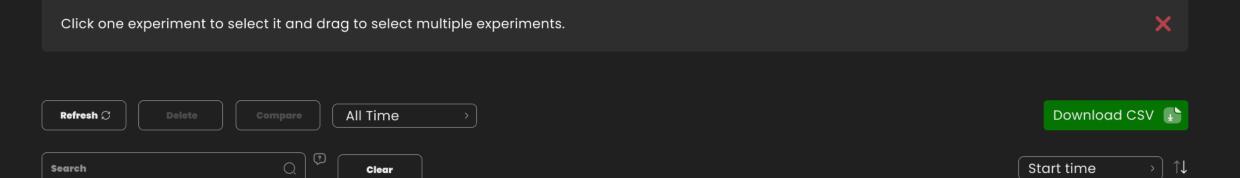




#### Dashboard







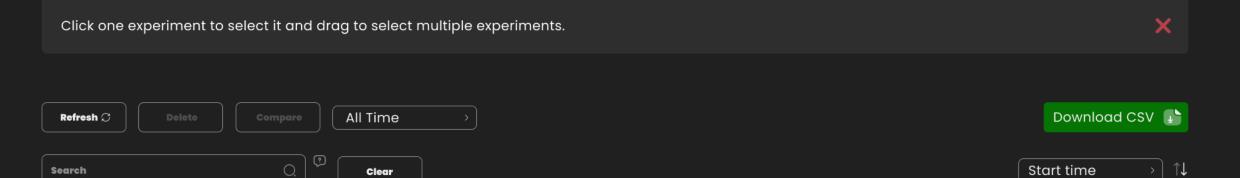
Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
> Experiment 4	Exampleset	Example ODM		20 minutes ago	87,67%
> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%



#### Dashboard







Experiment Name	Dataset	ODM	Hyperparameter	Start time •	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
Experiment 4	Exampleset	Example ODM		20 minutes ago	87,67%
> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

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> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

Experiment Name	Dataset
> Experiment 1	Exampleset
Experiment 2	Exampleset
> Experiment 3	Exampleset
Experiment 4	Exampleset
> Experiment 5	Exampleset
Experiment 6	Exampleset
> Experiment 7	Exampleset
> Experiment 8	Exampleset

ODM
Example ODM

Hyperparameter	Start time ↓	Accuracy
Parameters	5 seconds ago	87,67%
	20 seconds ago	87,67%
	5 minutes ago	87,67%
	20 minutes ago	87,67%
	1 hour ago	87,67%
	2 hours ago	87,67%
	1 day ago	87,67%
	3 days ago	87,67%

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> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

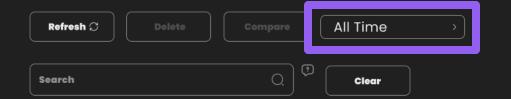
Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
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Start time  $\rightarrow$   $\uparrow\downarrow$ 

Experiment Name	Dataset	ODM	Hyperparameter	Start time ↓	Accuracy
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%





Start time 

↑↓

Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%





Start time  $\rightarrow$   $\uparrow\downarrow$ 

Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%





Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
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> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

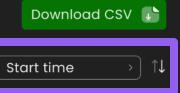




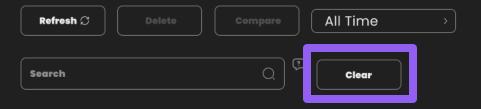
Start time  $\rightarrow$   $\uparrow\downarrow$ 

Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
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> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%





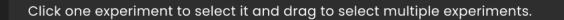
Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
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> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%





Start time  $\rightarrow$   $\uparrow\downarrow$ 

Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
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> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

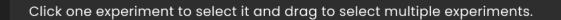




Download CSV 🔓

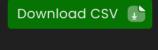


Experiment Name	Dataset	ODM	Hyperparameter	Start time 🖡	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
> Experiment 4	Exampleset	Example ODM		20 minutes ago	87,67%
> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%



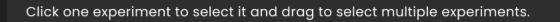






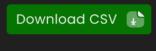
Start time

Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
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> Experiment 4	Exampleset	Example ODM		20 minutes ago	87,67%
> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
Experiment 8	Exampleset	Example ODM		3 days ago	87,67%







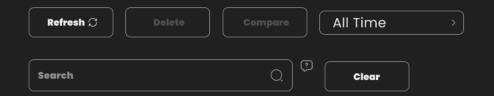


Start time > 1

Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
> Experiment 3	Exampleset	Example ODM		5 minutes ago	87,67%
> Experiment 4	Exampleset	Example ODM		20 minutes ago	87,67%
> Experiment 5	Exampleset	Example ODM		1 hour ago	87,67%
> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%

Click one experiment to select it and drag to select multiple experiments.







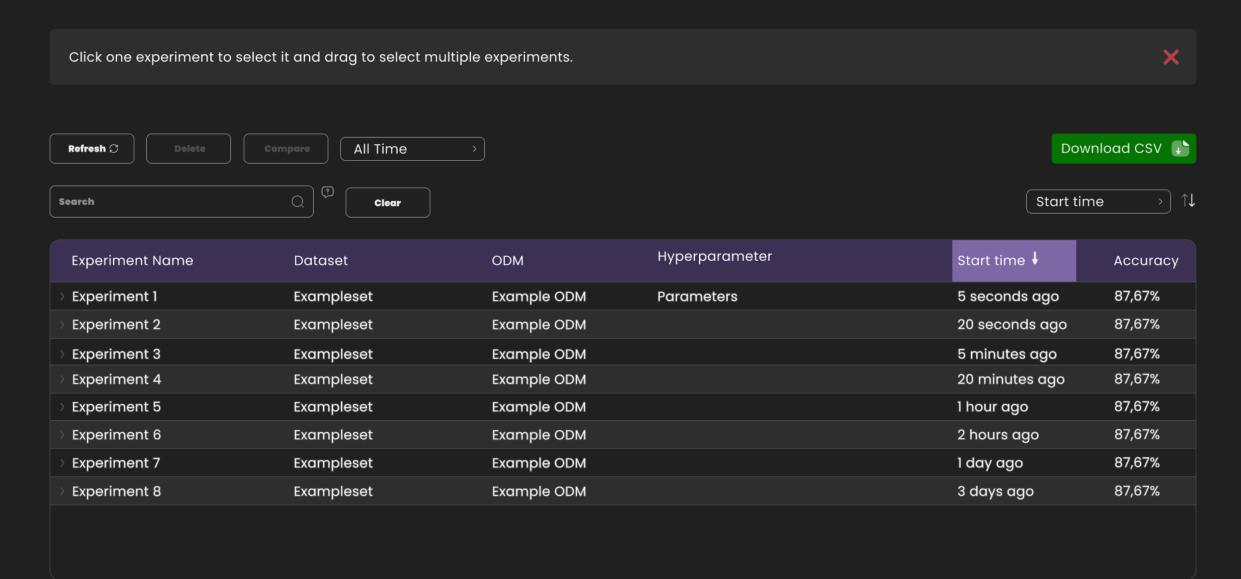
Experiment Name	Dataset	ODM	Hyperparameter	Start time <b>↓</b>	Accuracy
> Experiment 1	Exampleset	Example ODM	Parameters	5 seconds ago	87,67%
> Experiment 2	Exampleset	Example ODM		20 seconds ago	87,67%
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> Experiment 6	Exampleset	Example ODM		2 hours ago	87,67%
> Experiment 7	Exampleset	Example ODM		1 day ago	87,67%
> Experiment 8	Exampleset	Example ODM		3 days ago	87,67%



#### Dashboard





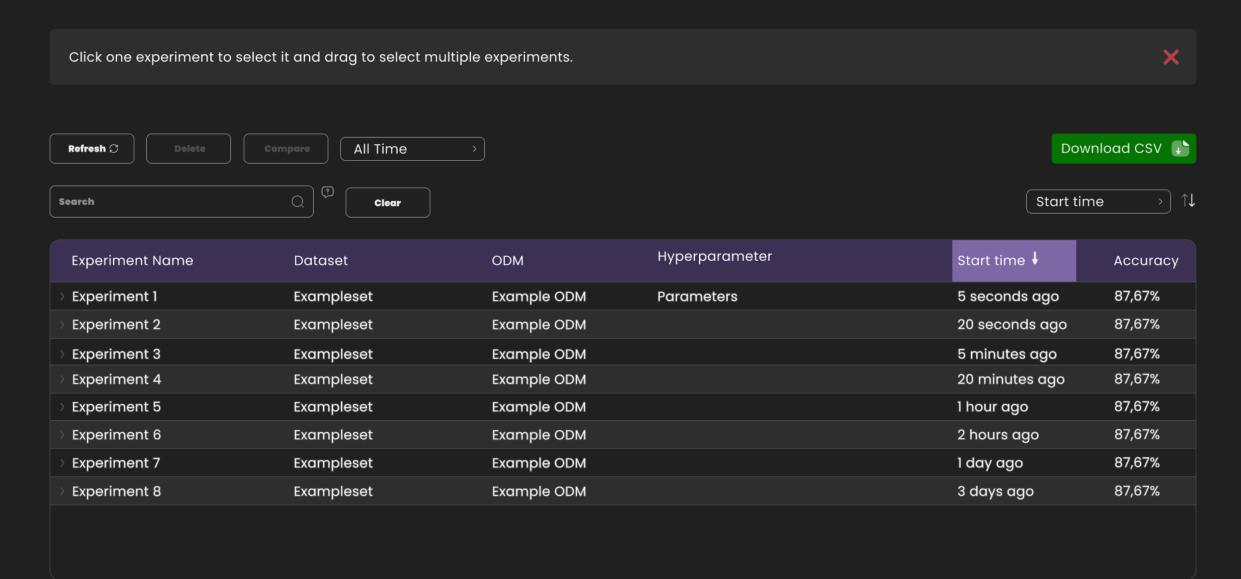




#### Dashboard





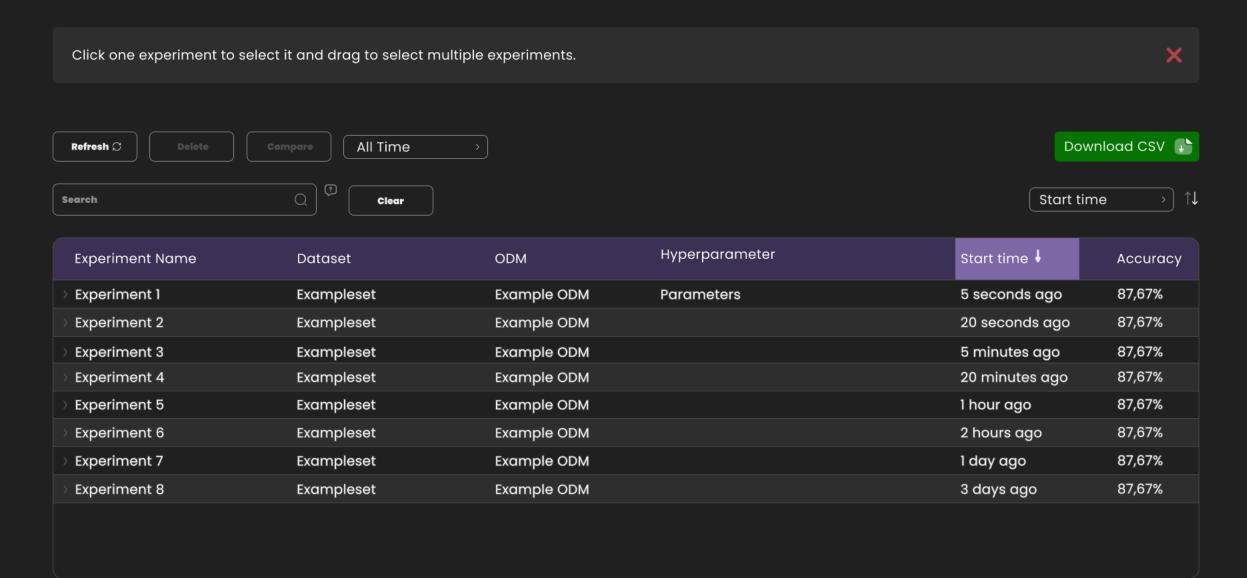




#### Dashboard



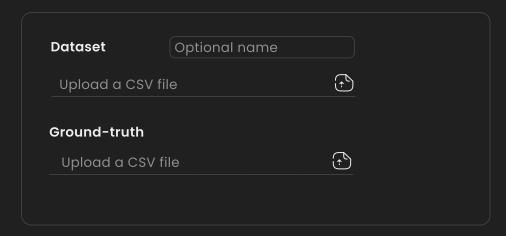


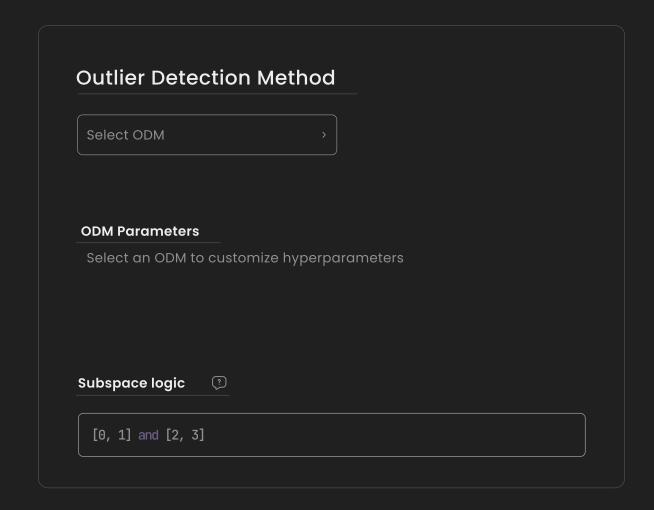






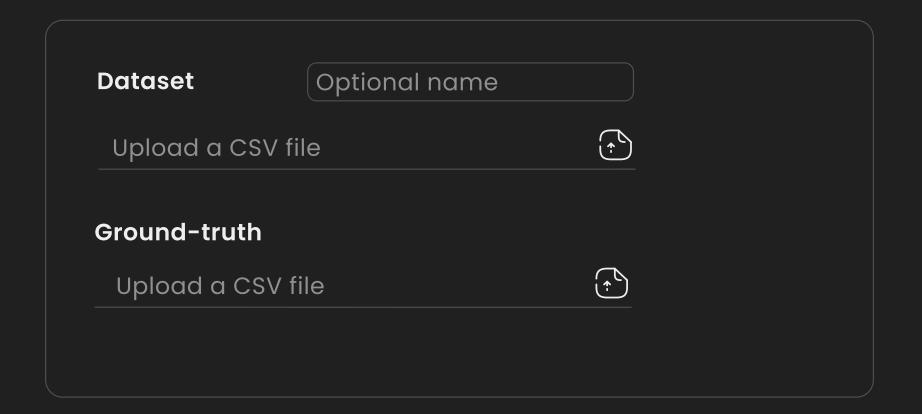
## Experiment #378







## Experiment #378



Ou

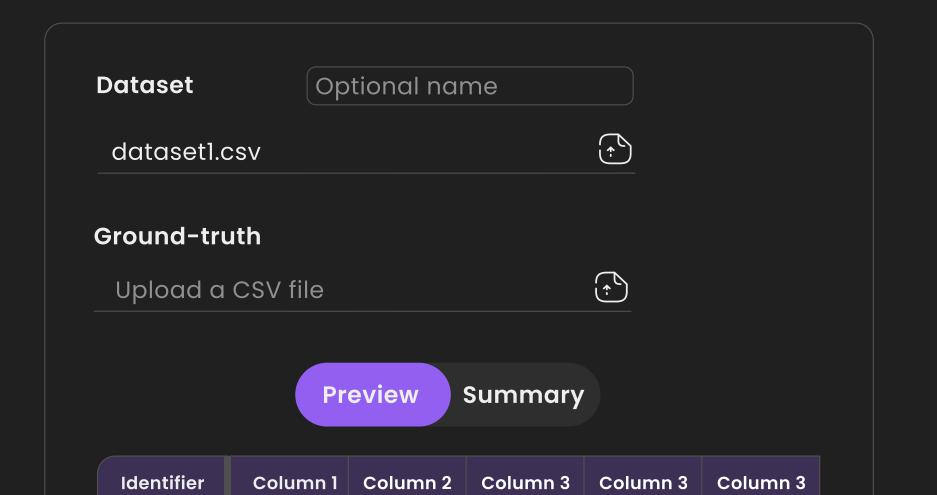
Sel

ODI

Sel



# Experiment #378



Ou

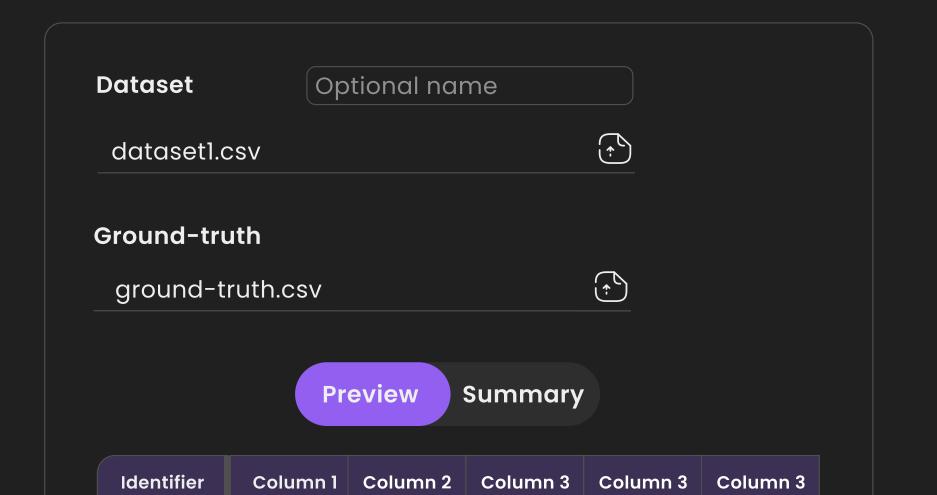
Sel

ODI

Sel



# Experiment #378



Ou

Sel

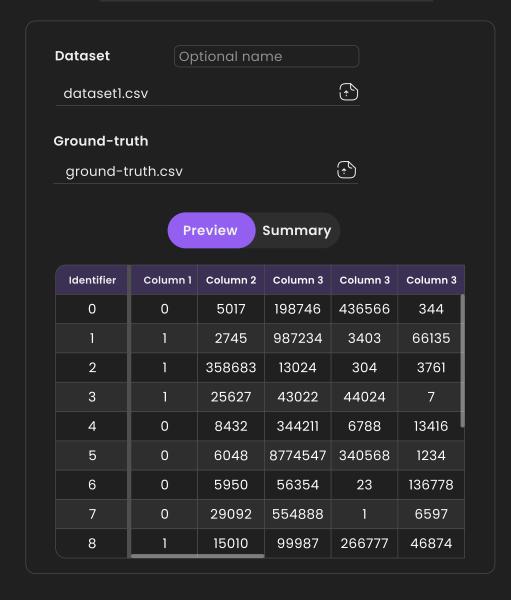
ODI

Sel





### Experiment #378



Select ODM			
ODM Parameters			
Select an ODM to cu	ıstomize hyperp	arameters	





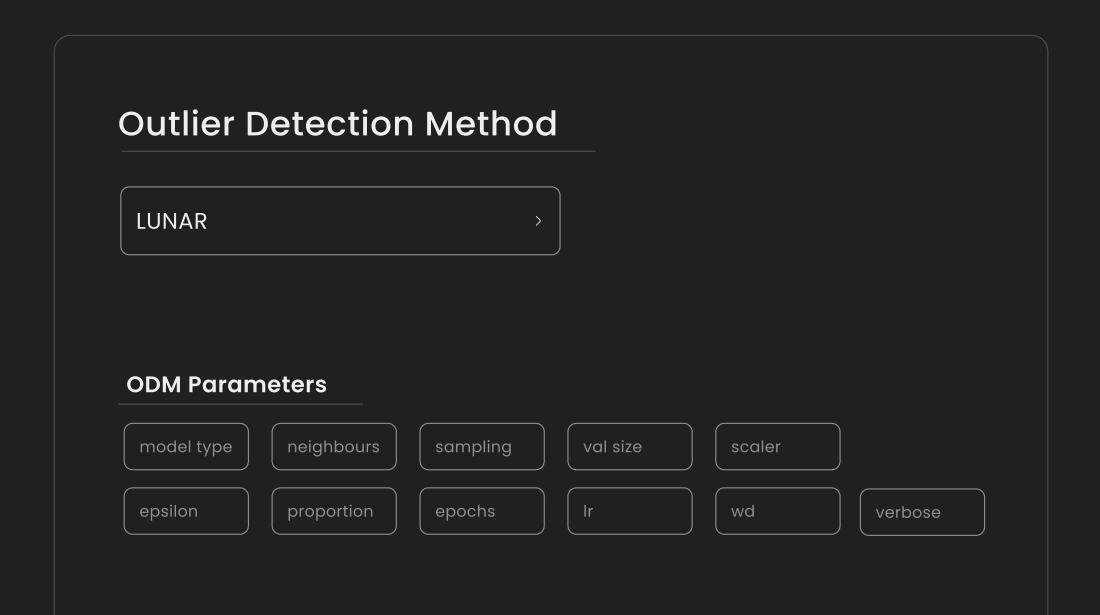
Select ODM

#### **ODM Parameters**

Select an ODM to customize hyperparameters

mn 3





mn 3

[0, 1] and [2, 3]

mn 3

 model type
 neighbours
 sampling
 val size
 scaler

 epsilon
 proportion
 epochs
 Ir
 wd
 verbose

Subspace logic ?

mn 3

35

61

116

34

778

97

374

[0, 1, 2, 3, 4] and [4, 5, 6, 7]

Subspace logic ?

mn 3

[0 .. 4] and [4 .. 7]

 model type
 neighbours
 sampling
 val size
 scaler

 epsilon
 proportion
 epochs
 Ir
 wd
 verbose

#### Subspace logic ?

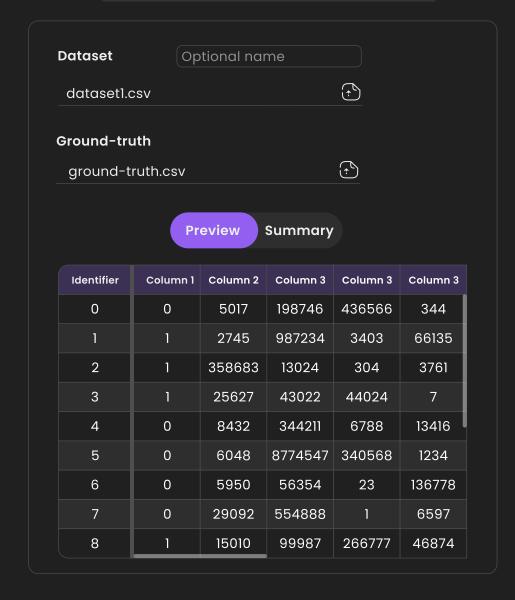
**Run experiment** 

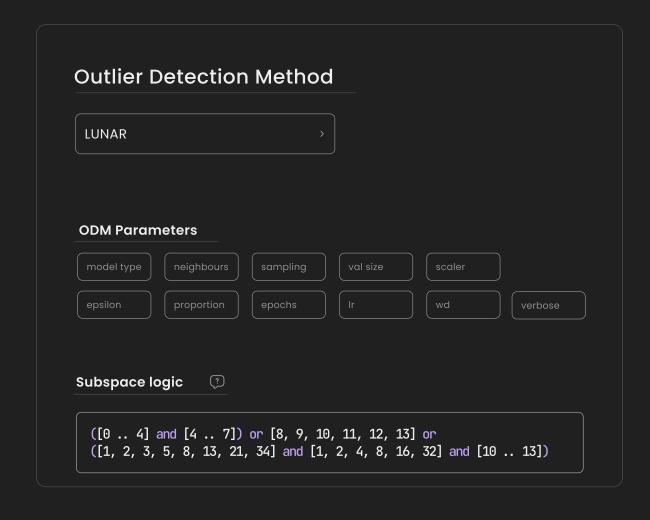
mn 3





#### Experiment #378

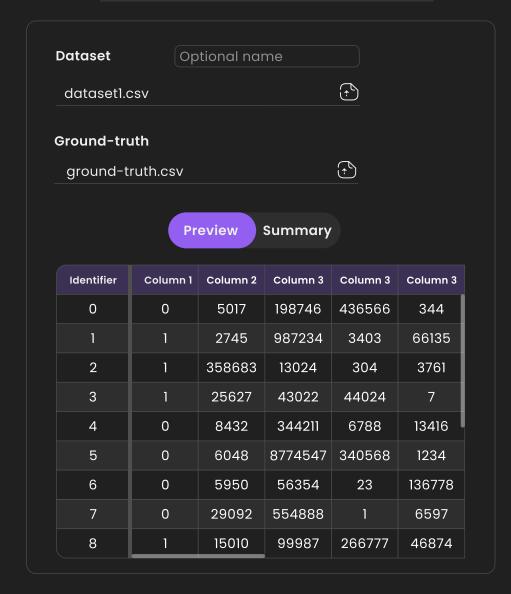


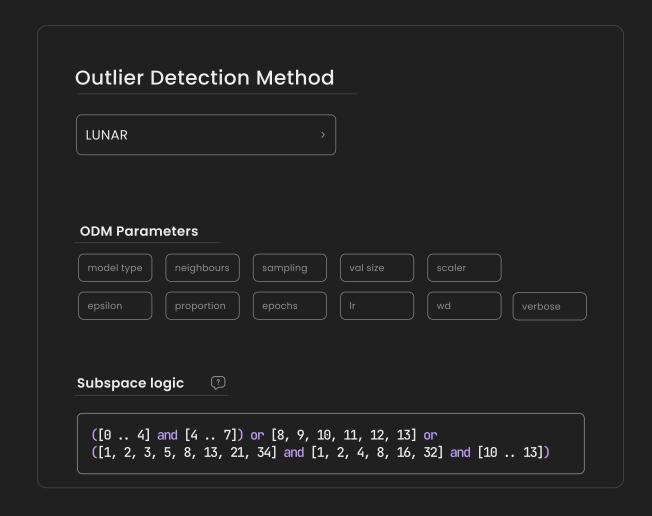






### Experiment #378

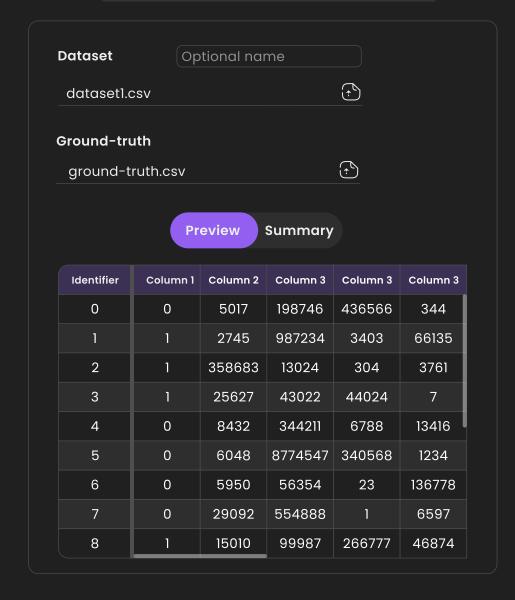


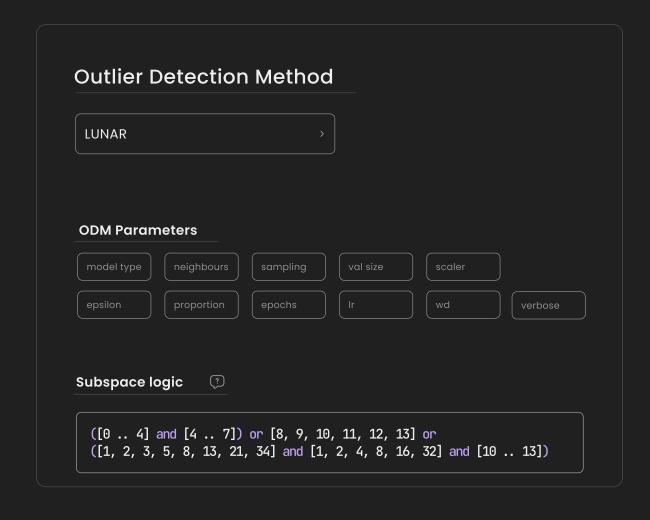






#### Experiment #378





## Experiment #378





#### Summary

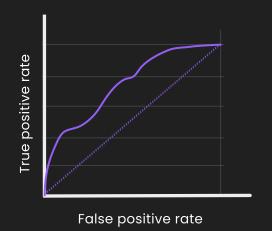
ODM: LUNAR

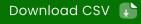
Accuracy: 98.643 %

Execution date: 20:36:42 23/11/2022

Execution time: 3d 4m 11.25s

Number of detected outliers: 735





Identifier	Results 📭	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	Х	X	Х	Х		
66	Х	Х	Х		Х	
76	Х	Х	Х		Х	
267			Х		X	
420	Х	Х	Х			I
999	Х		Х			
1234		Х	х			x
2048			Х			X
2222	Х	X	Х			Х

# Experiment #378

## Summary

ODM: LUNAR

Accuracy: 98.643 %

Execution date: 20:36:42 23/11/2022

Execution time: 3d 4m 11.25s

Number of detected outliers: 735

True positive rate

Execution date: 20:36:42 23/11/2022

Execution time: 3d 4m 11.25s

Number of detected outliers: 735





Identifier	Results 🗜	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	X	Х	X	Х		
66	X	Х	Х		X	
76	X	Х	Х		X	
267			Х		X	
420	X	Х	Х			I
999	X		Х			
1234		Х	Х			Х
2048			Х			X
2222	Х	X	Х			x

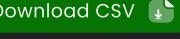
Execution time: 3d 4m 11.25s

Number of detected outliers: 735



False positive rate

Download CSV 🔓



Identifier	Results 🗜	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	X	Х	Х	Х		
66	x	Х	X		X	
76	x	Х	X		X	
267			X		X	
420	х	Х	X			
999	Х		X			
1234		Х	Х			Х
2048			X			X
2222	Х	X	x			х

Execution time: 3d 4m 11.25s

Number of detected outliers: 735





Identifier	Results 🕩	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	X	Х	х	х		1
66	Х	X	Х		Х	
76	X	X	Х		Х	
267			Х		Х	
420	Х	Х	Х			I
999	X		Х			
1234		Х	Х			X
2048			Х			X
2222	X	X	Х			X

Execution time: 3d 4m 11.25s

Number of detected outliers: 735



False positive rate

Download CSV 📑

Identifier	Results 🗜	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	X	X	X	X		
66	X	X	X		X	
76	Х	Х	X		Х	
267			Х		Х	
420	Х	Х	Х			
999	X		Х			
1234		Х	Х			Х
2048			Х			Х
2222	Х	X	Х			Х

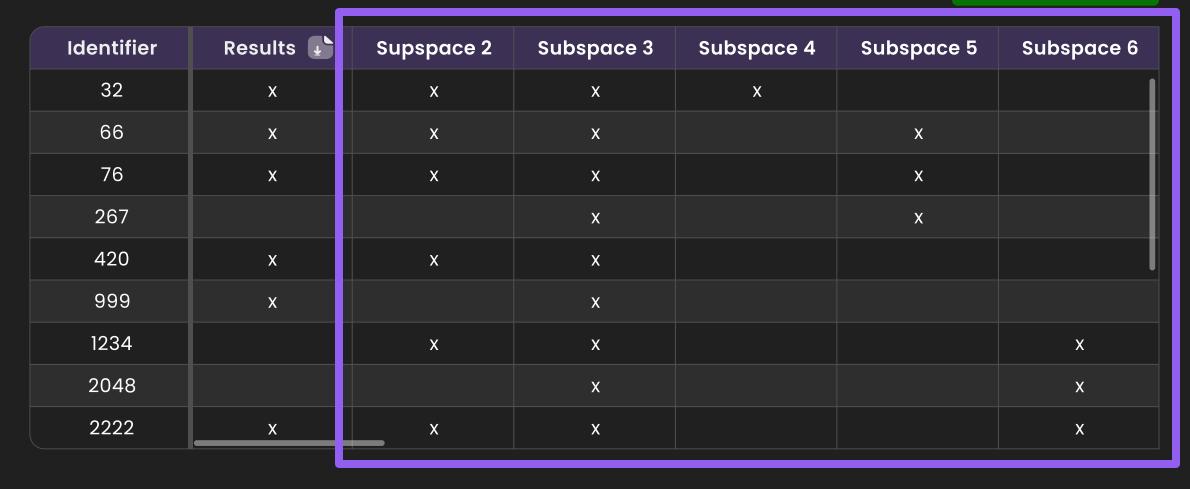
Execution time: 3d 4m 11.25s

Number of detected outliers: 735



False positive rate







## Experiment #378





#### Summary

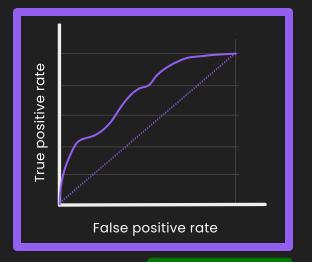
ODM: LUNAR

Accuracy: 98.643 %

Execution date: 20:36:42 23/11/2022

Execution time: 3d 4m 11.25s

Number of detected outliers: 735

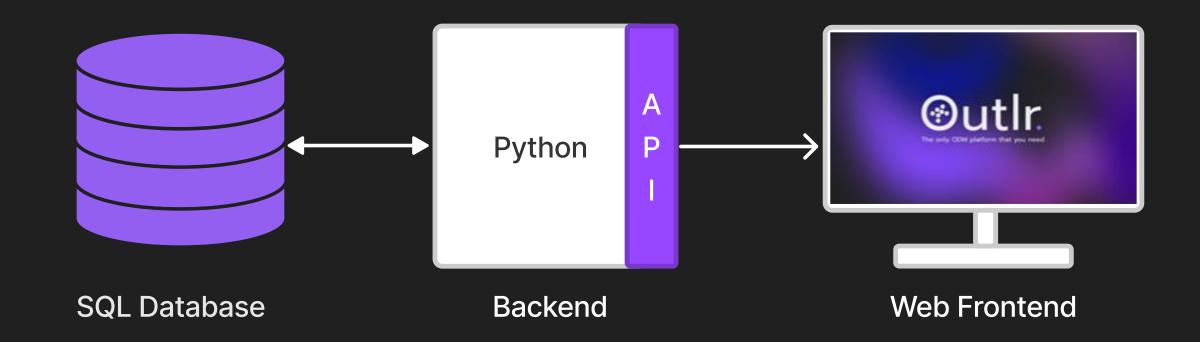




Identifier	Results 🗜	Supspace 2	Subspace 3	Subspace 4	Subspace 5	Subspace 6
32	Х	Х	Х	Х		1
66	Х	х	х		Х	
76	Х	Х	Х		Х	
267			Х		Х	
420	Х	Х	х			
999	Х		Х			
1234		х	х			x
2048			Х			Х
2222	х	×	x			х



# System Architecture



# Any Questions?



