



 **ezako**
time series solutions

Ezako

L'entreprise

Startup basée à Paris et Sophia-Antipolis

L'activité

Séries temporelles, spectrogrammes, audio

Big Data & IA

Industries

Défense, Automotive, Télécom, Energie...



L'expérience d'Ezako avec le CNES

Expériences avec le CNES

R&T

- Amélioration de la détection d'anomalies dans la télémétrie satellite par machine learning

Nostradamus

- Performance assessment of NOSTRADAMUS & other machine learning-based telemetry monitoring systems on a spacecraft anomalies database, (Fuertes et al., 2018)
- Improving Spacecraft Health Monitoring with Automatic Anomaly Detection Techniques, (Fuertes et al., 2016)

ESA-BIC

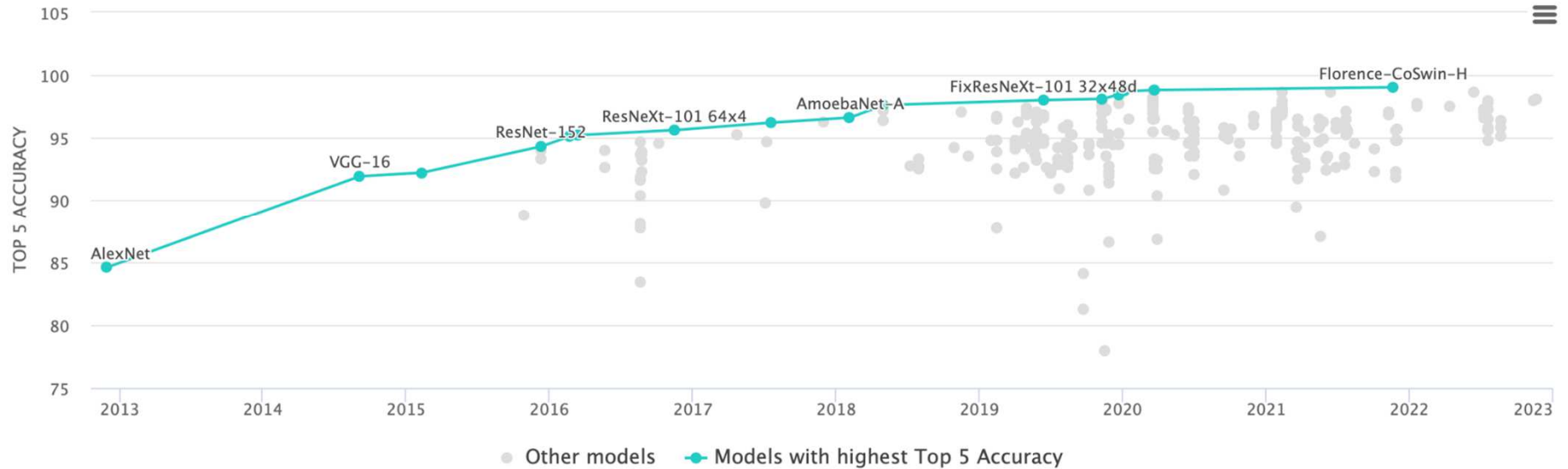


**business
incubation
centre**
Sud France



Labelliser, l'axe clé d'amélioration de vos IA

Précision des algorithmes de classification d'images - Etat de l'Art



Nos leviers: dataset en entrée et les processus d'optimisation

<https://paperswithcode.com/sota/image-classification-on-imagenet>



Pourquoi labelliser?

Avantages du non supervisé:

Détection d'événements nouveaux

Pas de nécessité de dataset équilibré : "On a pas d'anomalies dans notre historique"

Principalement une activité de data science

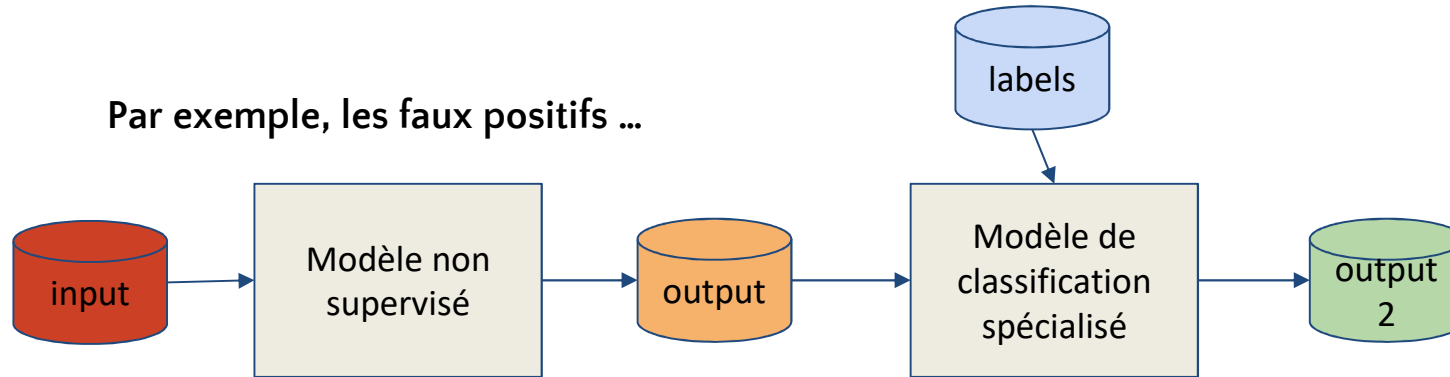
Limitations:

Précision nettement inférieure au supervisé

Faible contrôle sur la prédiction: choix des descripteurs, des seuils

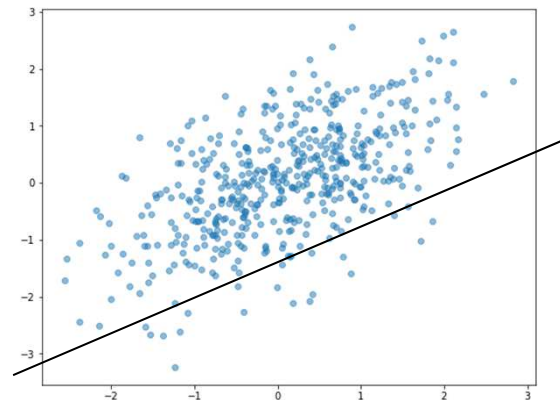
Quelques labels ont un impact énorme

Par exemple, les faux positifs ...

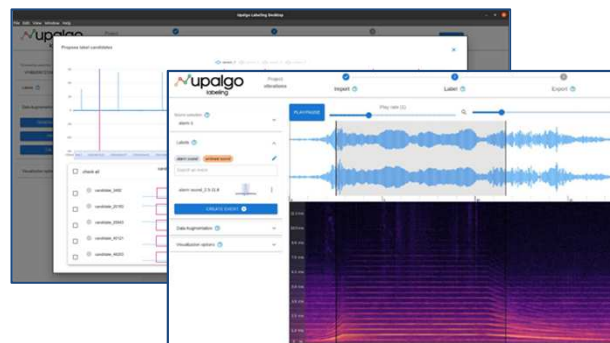


... sont souvent des clusters difficiles à isoler en non-supervisé,

Mais facile à classifier avec quelques labels!



Les solutions Ezako



Synthetic Data



Mais labelliser est complexe ...

Label	Time	Node 1	Node 2
	12.3	-2.55E-06	-1.79E-06
	12.4	-3.52E-06	-5.58E-07
	12.5	-4.62E-06	8.61E-07
	12.6	-5.87E-06	2.46E-06
	12.7	-7.19E-06	4.19E-06
	12.8	-8.53E-06	5.95E-06
	12.9	-9.76E-06	7.59E-06
	13	-1.08E-05	8.97E-06
	13.1	-1.14E-05	9.95E-06
	13.2	-1.17E-05	1.04E-05

Long

Coûteux

Fastidieux

Non valorisant

Erreur prone

Labellisation manuelle

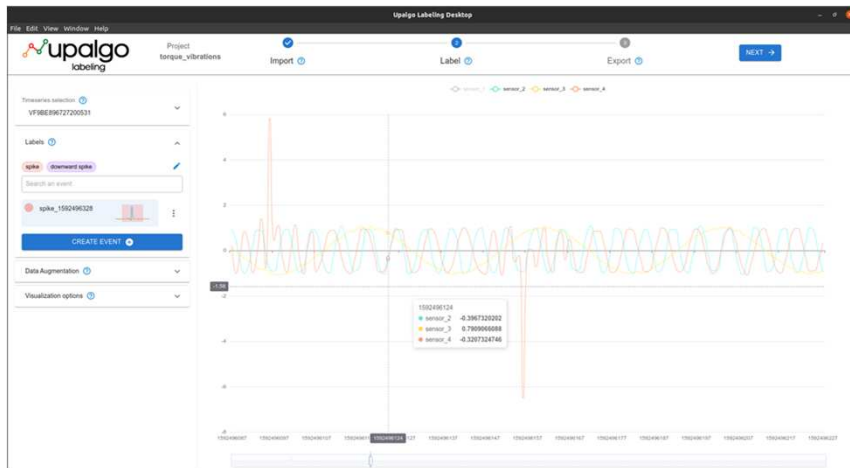
Label	Time	Node 1	Node 2
	12.3	-2.55E-06	-1.79E-06
	12.4	-3.52E-06	-5.58E-07
	12.5	-4.62E-06	8.61E-07
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	13.1	-1.14E-05	9.95E-06
	13.2	-1.17E-05	1.04E-05



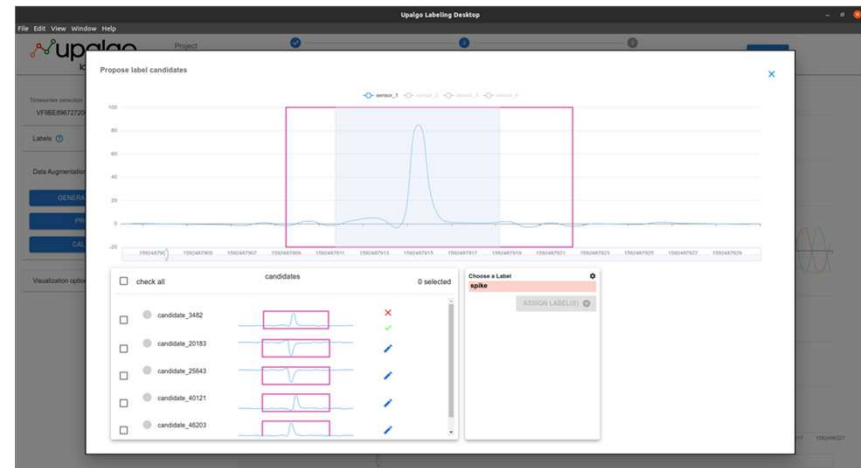
Label	Time	Node 1	Node 2
0	12.3	-2.55E-06	-1.79E-06
0	12.4	-3.52E-06	-5.58E-07
1	12.5	-4.62E-06	8.61E-07
1	12.6	-5.87E-06	2.46E-06
1	12.7	-7.19E-06	4.19E-06
0	12.8	-8.53E-06	5.95E-06
0	12.9	-9.76E-06	7.59E-06
0	13	-1.08E-05	8.97E-06
0	13.1	-1.14E-05	9.95E-06
0	13.2	-1.17E-05	1.04E-05

Upalgo Labeling résout ce problème!

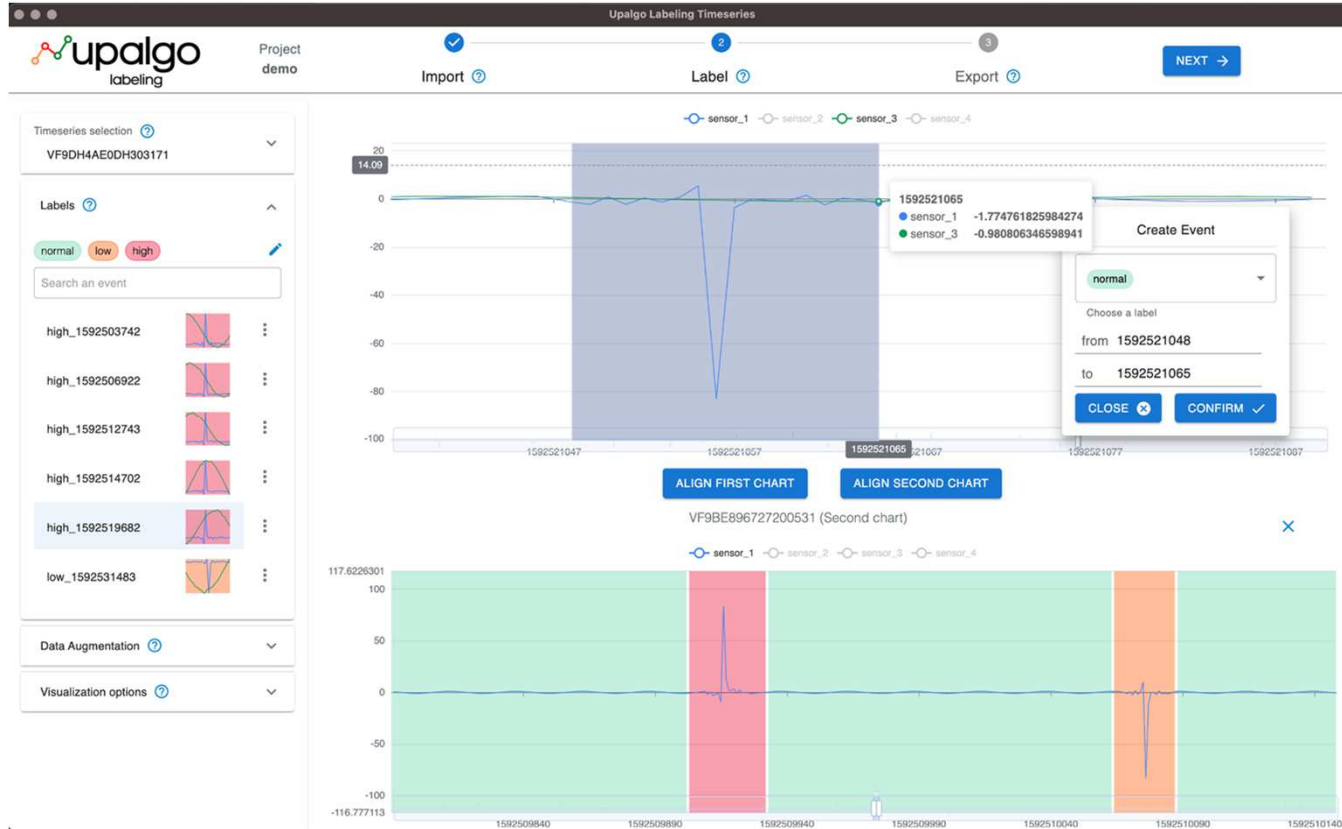
Ergonomie



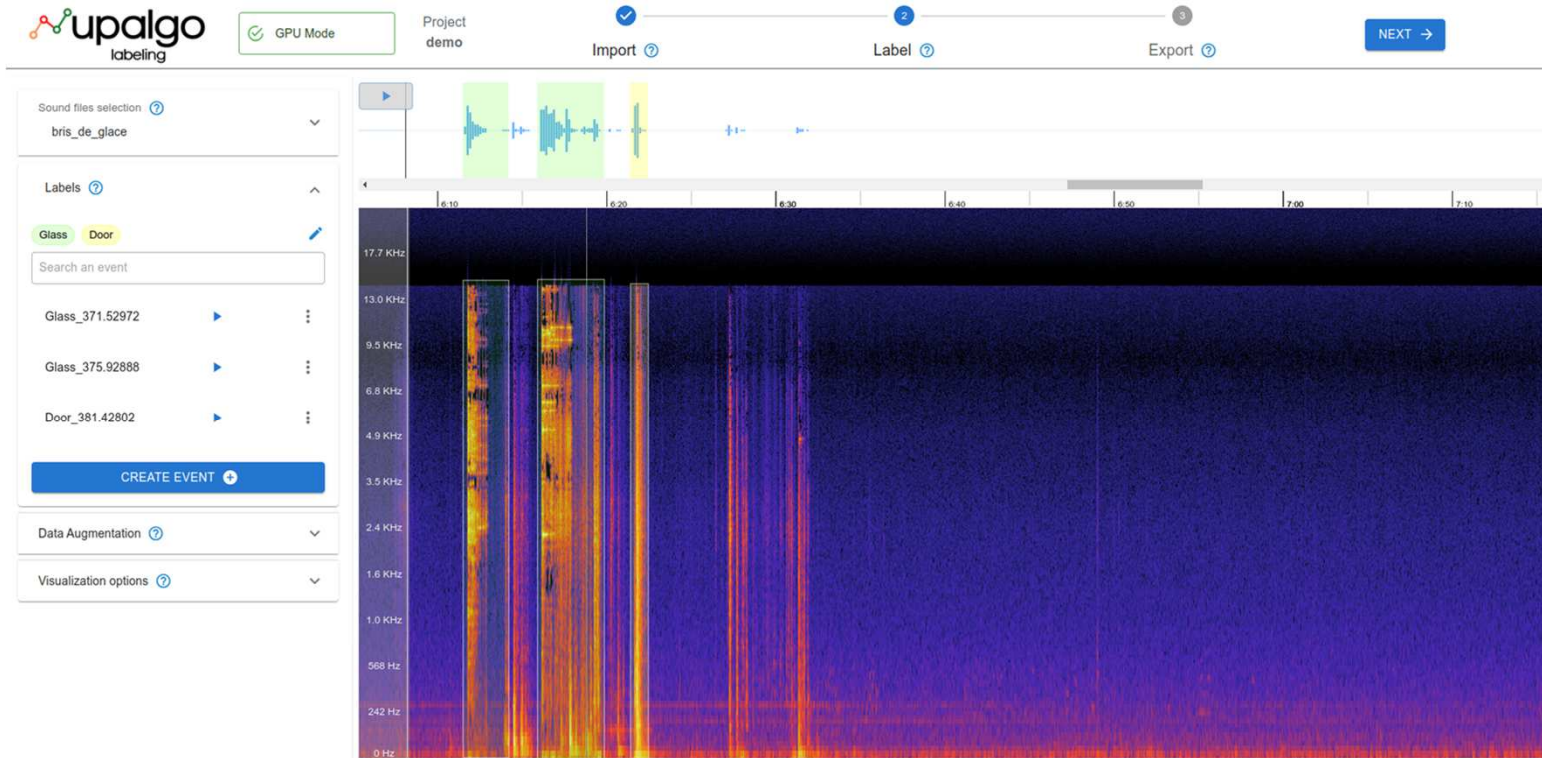
Assister avec de l'IA



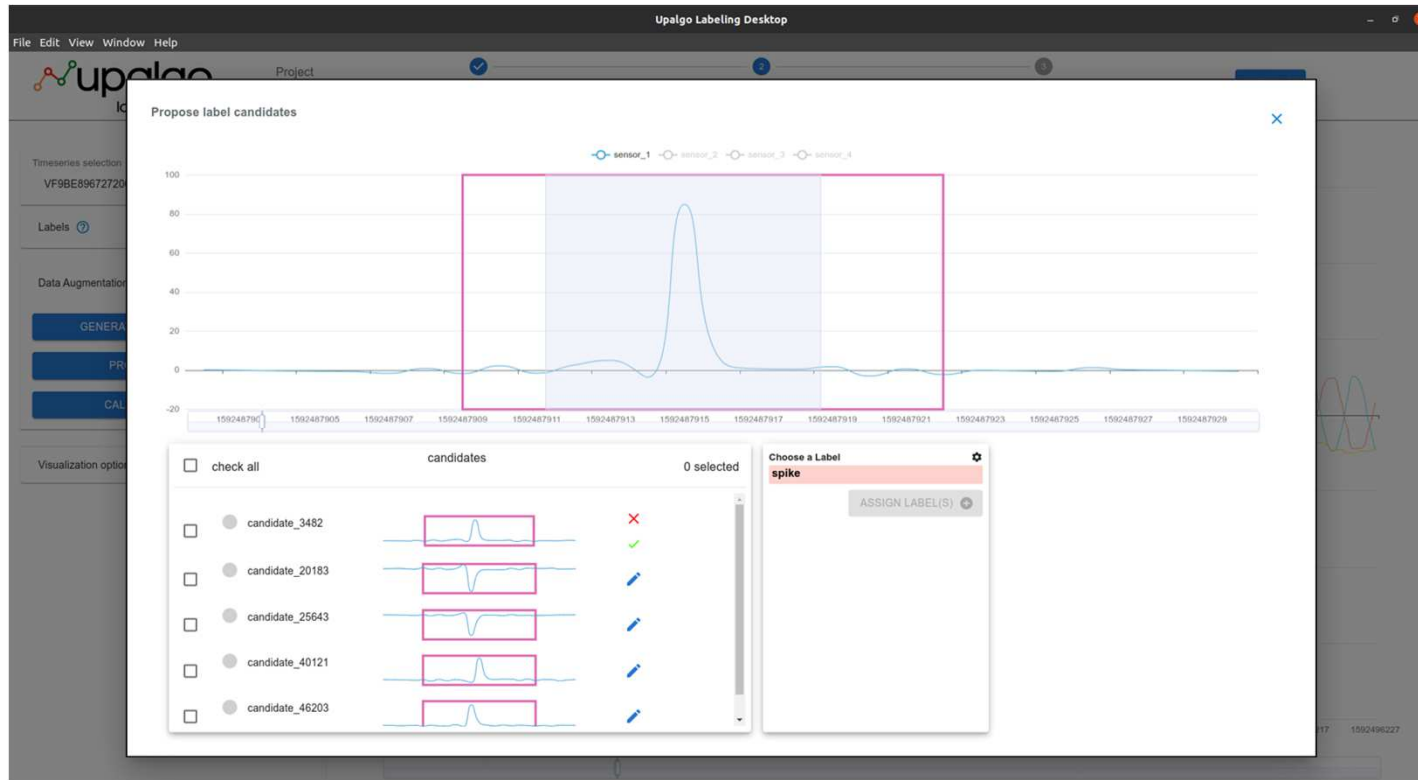
Faciliter la labellisation



Présenter les données pour la labellisation



L'IA pour assister la labellisation



Recherche de pattern

The screenshot shows the 'Upalgo Labeling Timeseries' application interface. A modal window titled 'Search similar patterns' is open, displaying a waveform for 'Pattern 2458' and a list of similar patterns. The waveform is a blue signal with a pink box highlighting a specific segment. Below the waveform, there are several time series plots for different sensors: acc_chest_x, acc_chest_y, acc_chest_z, ele_signal_1, ele_signal_2, acc_left_ankle_x, acc_left_ankle_y, acc_left_ankle_z, gyro_left_ankle_x, and gyro_left_ankle_y. The 'Similar patterns' section shows a list of patterns with their scores and labels. The 'Running' status is indicated by a green button.

Search similar patterns

Pattern 2458

Displayed Timeseries: subject_5.csv

acc_chest_x acc_chest_y acc_chest_z ele_signal_1 ele_signal_2 acc_left_ankle_x acc_left_ankle_y acc_left_ankle_z gyro_left_ankle_x gyro_left_ankle_y

subject_1.csv, subje...
Choose the target timeseries
acc_chest_x
Choose the target column
SEARCH

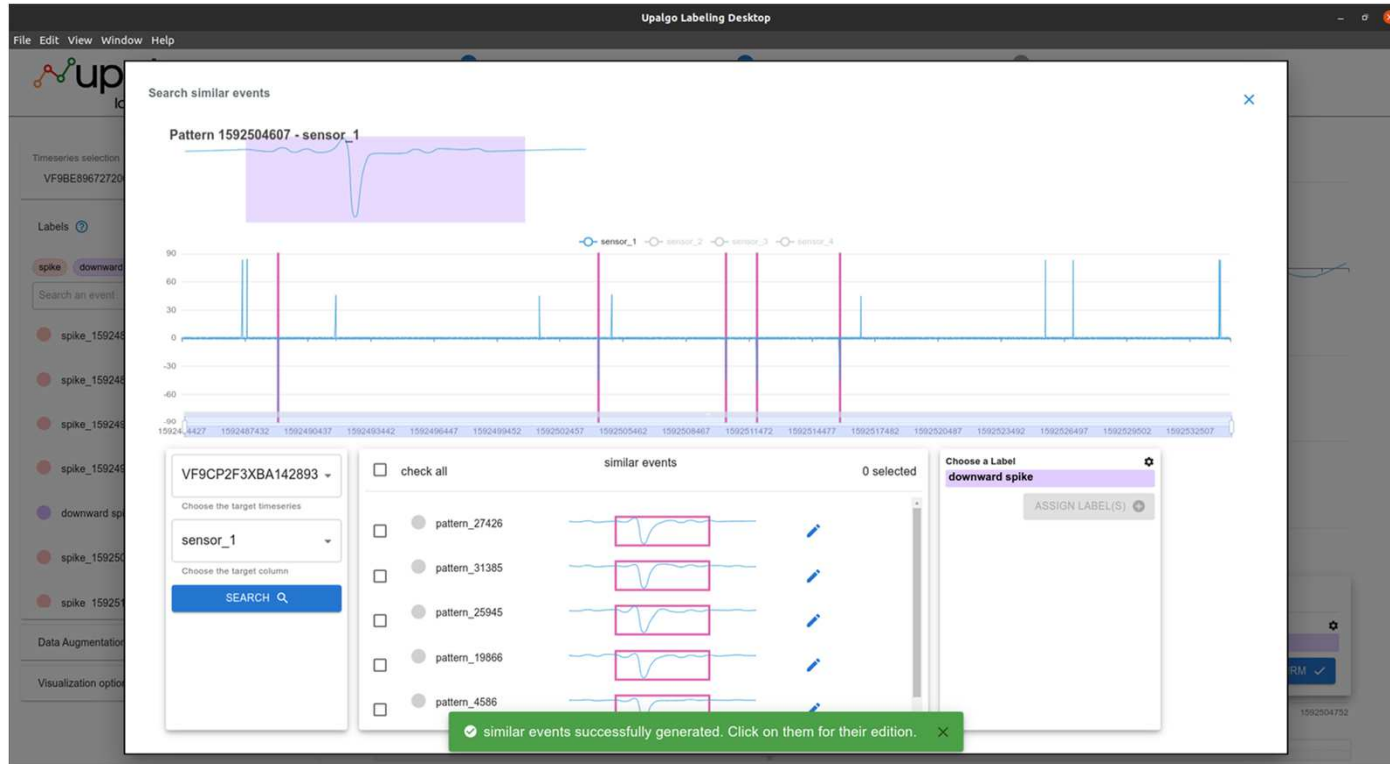
Similar patterns

check all 0 selected Score min: 0 Score max: 100

Pattern ID	Score	Label
27998-32525_subject_3...	87%	
25039-28110_subject_5...	83%	
2206-5273_subject_5.csv	81%	
18434-21501_subject_9...	78%	
6145-9213_subject_9.csv	78%	

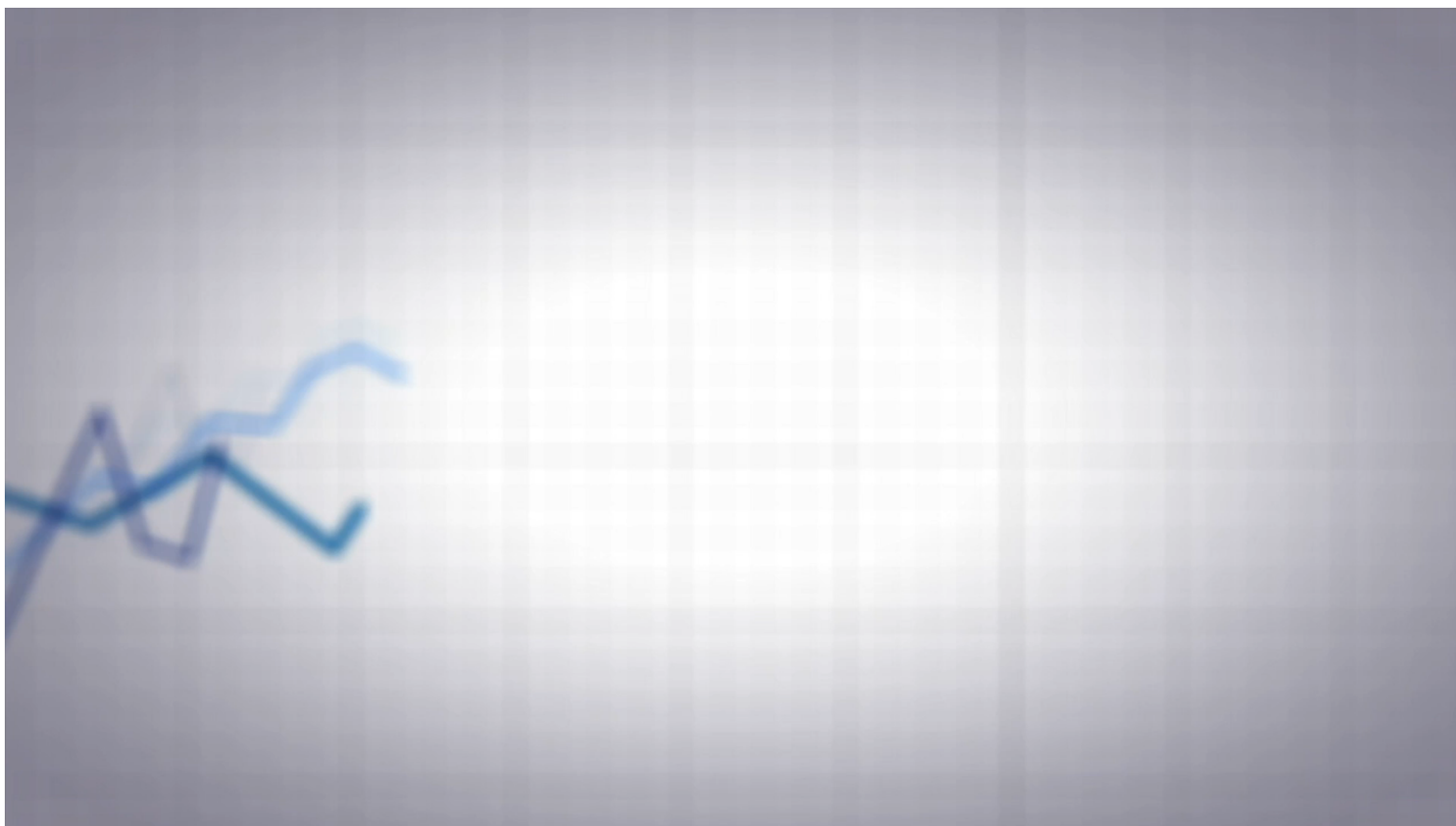
Running
Choose a label
ASSIGN LABEL(S)

La propagation de labels dans Upalgo Labeling



The screenshot shows the Upalgo Labeling Desktop application. A 'Search similar events' dialog is open, displaying a waveform pattern for 'Pattern 1592504607 - sensor_1'. Below the pattern is a time-series plot with four sensors (sensor_1, sensor_2, sensor_3, sensor_4) and a vertical axis ranging from -90 to 90. The plot shows several spikes, with one spike highlighted in purple. Below the plot is a list of similar events, each with a checkbox and a small waveform preview. The list includes patterns 27426, 31385, 25945, 19866, and 4586. A 'Choose a Label' dropdown is set to 'downward spike', and an 'ASSIGN LABEL(S)' button is visible. A green notification bar at the bottom of the dialog states: 'similar events successfully generated. Click on them for their edition.'

Upalgo Labeling démo





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