



Automatic characterisation of goat behaviours using accelerometers and Artificial Intelligence

Sarah Mauny, Joon Kwon, Nicolas N.C. Friggens, Christine Duvaux-Ponter,
Masoomeh Taghipoor

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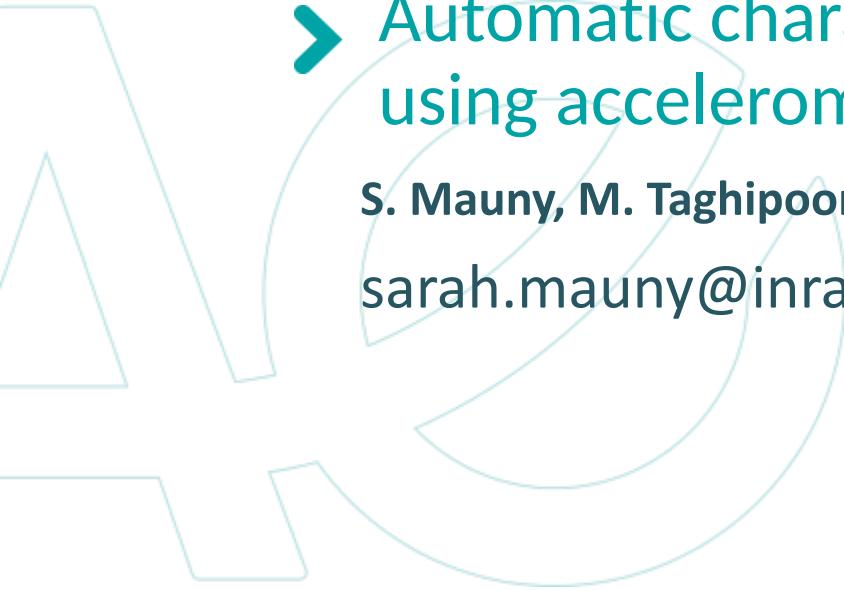
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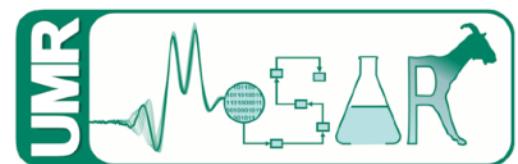
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▶ Automatic characterisation of goat behaviours using accelerometers and Artificial Intelligence

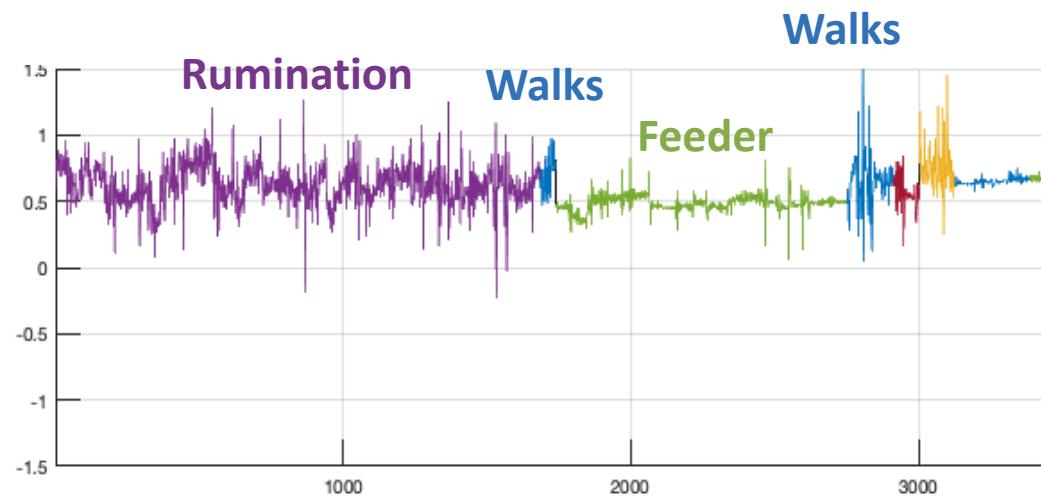
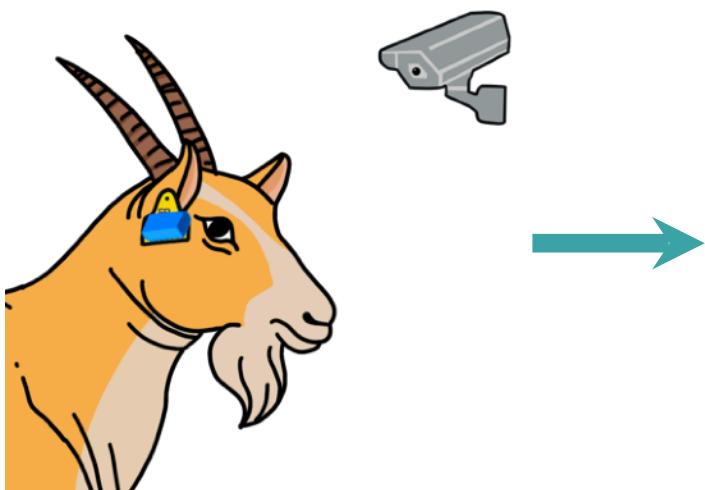
S. Mauny, M. Taghipoor, J. Kwon, N. Friggens, C. Duvaux Ponter
sarah.mauny@inrae.fr



MIA Paris-Saclay



> Automatic characterisation of goat behaviours using accelerometers and Artificial Intelligence



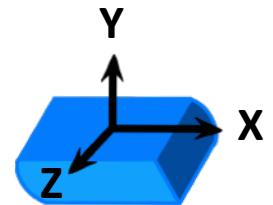
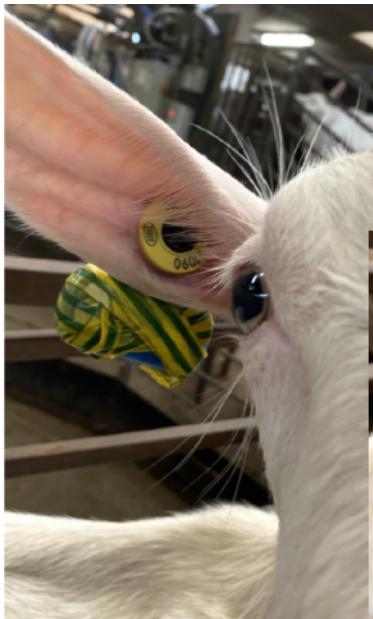


Outline

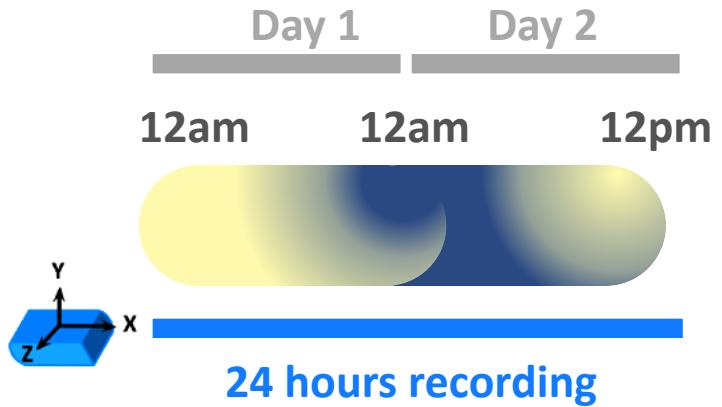
- **Data collection and preprocessing**
- **Features engineering**
- **Machine learning algorithm**
- **Conclusion and future**
- **Q&A**

➤ Data collection and preprocessing

The experimental setup



5Hz



➤ Data collection and preprocessing

The experimental setup

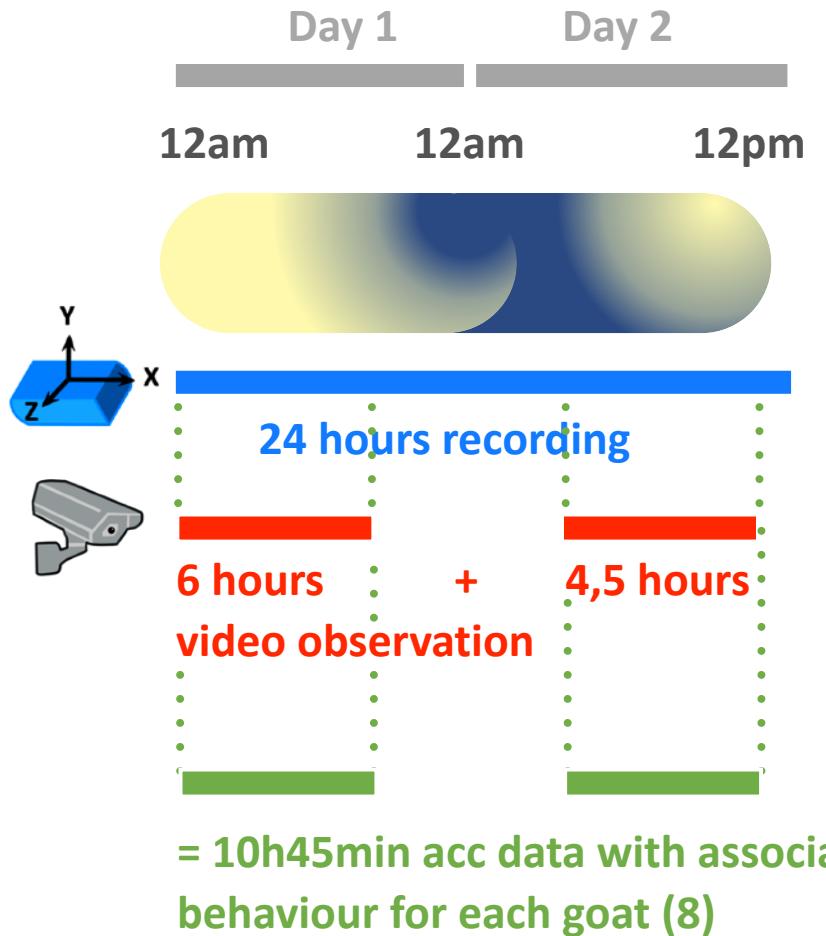
- Lying
- Walking
- Head in the feeder
- Rumination



➤ Data collection and preprocessing



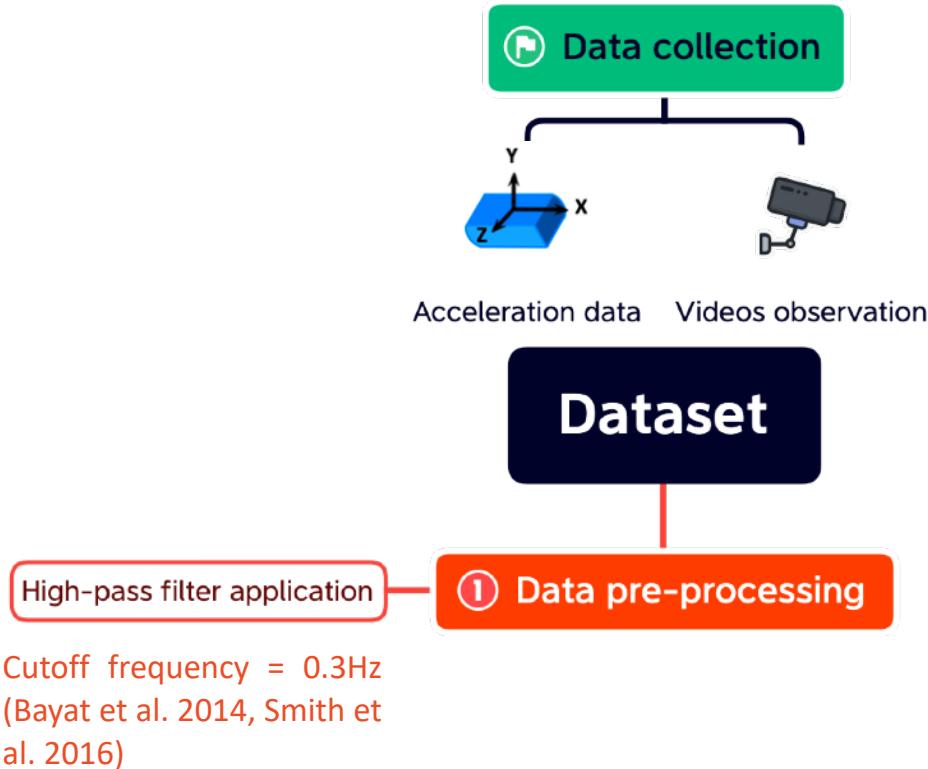
➤ Data collection and preprocessing



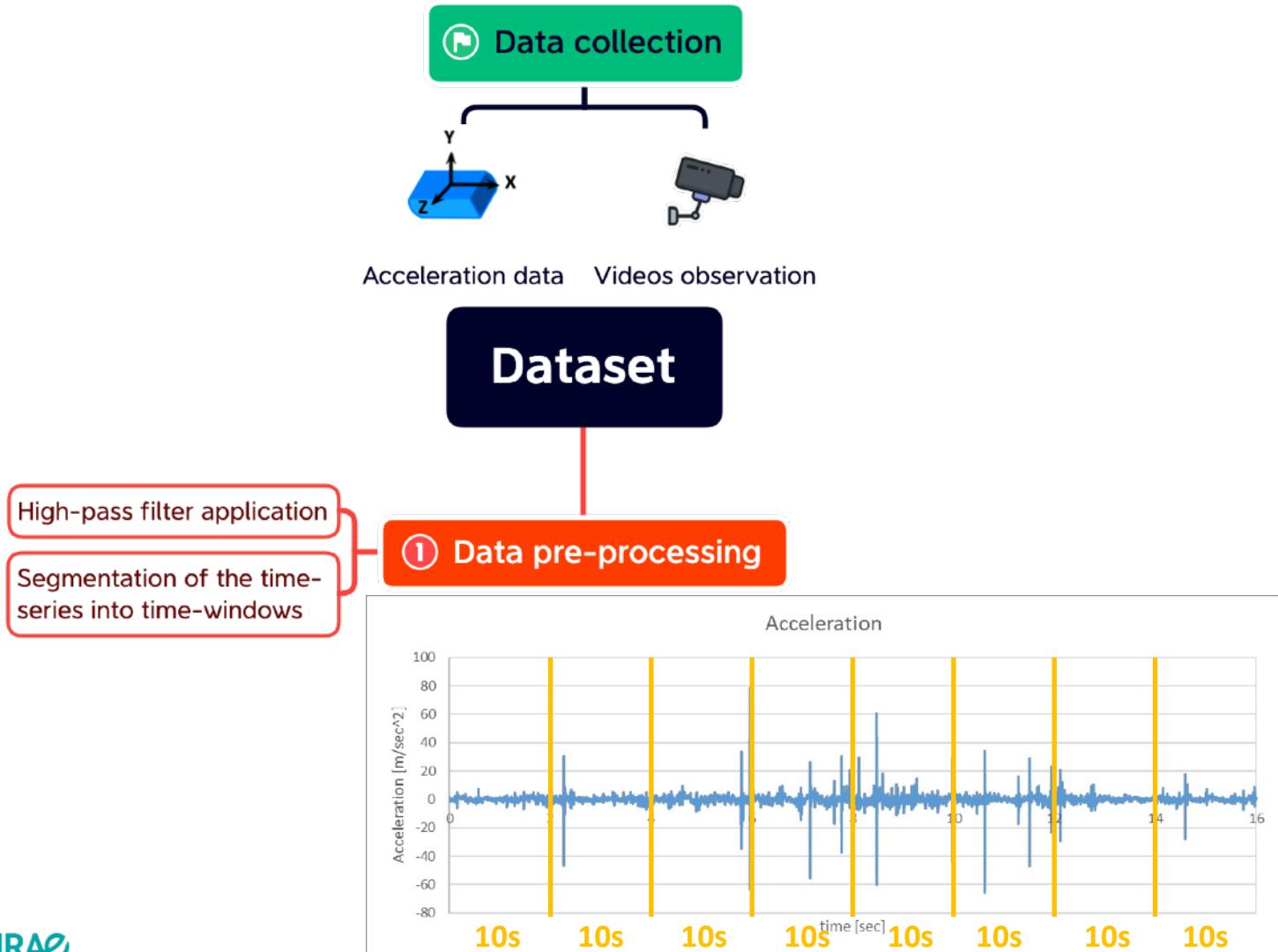
➤ Data collection and preprocessing



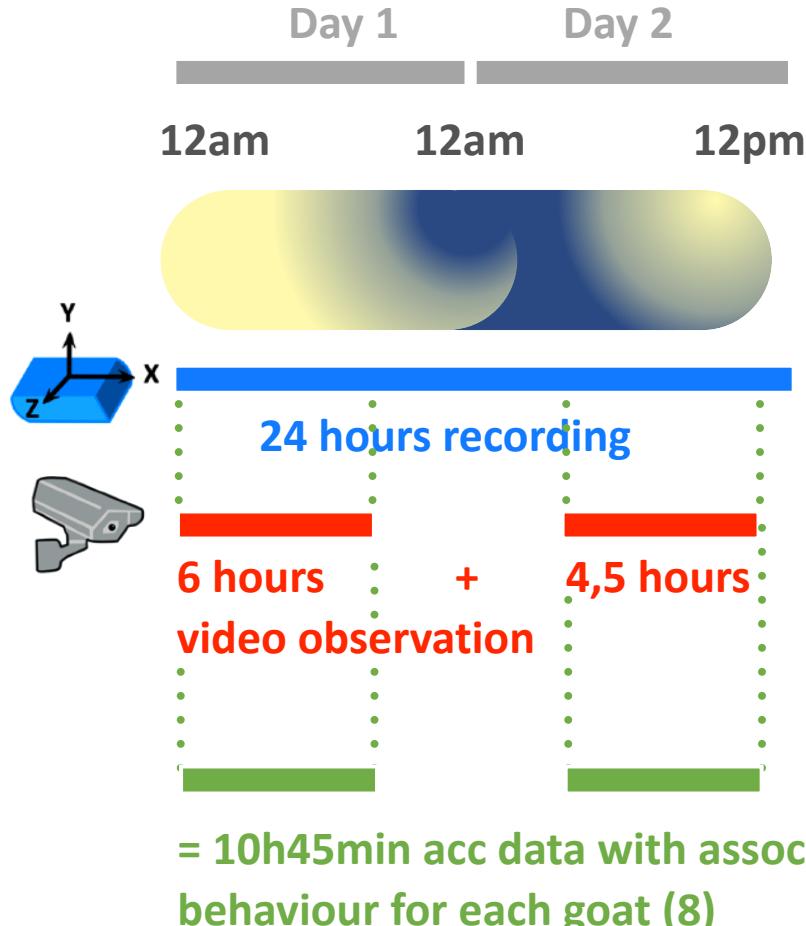
➤ Data collection and preprocessing



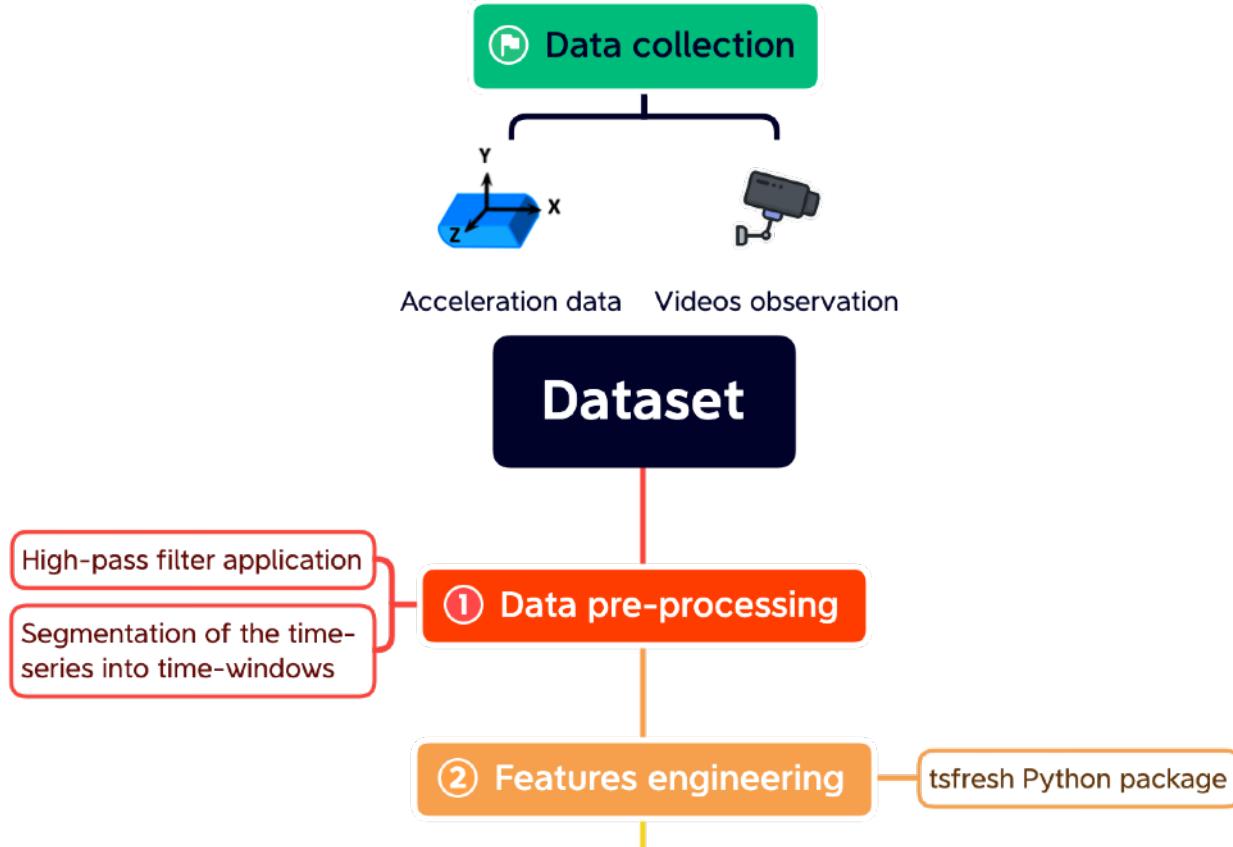
➤ Data collection and preprocessing



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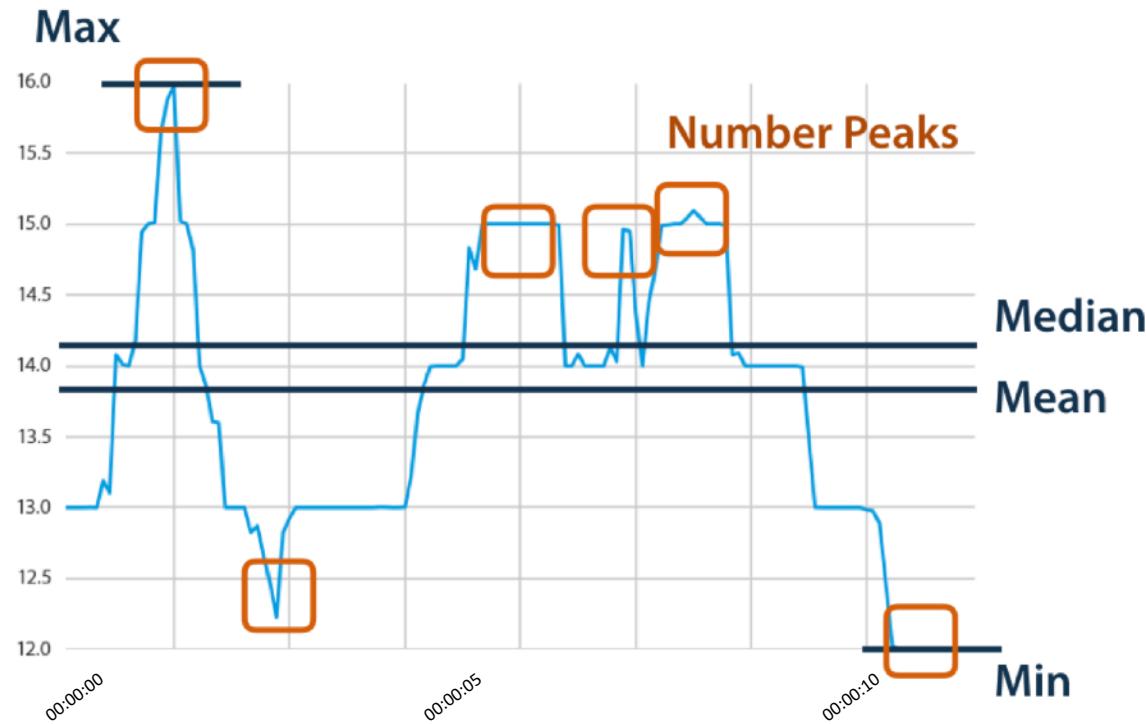


➤ Features engineering



➤ Features engineering

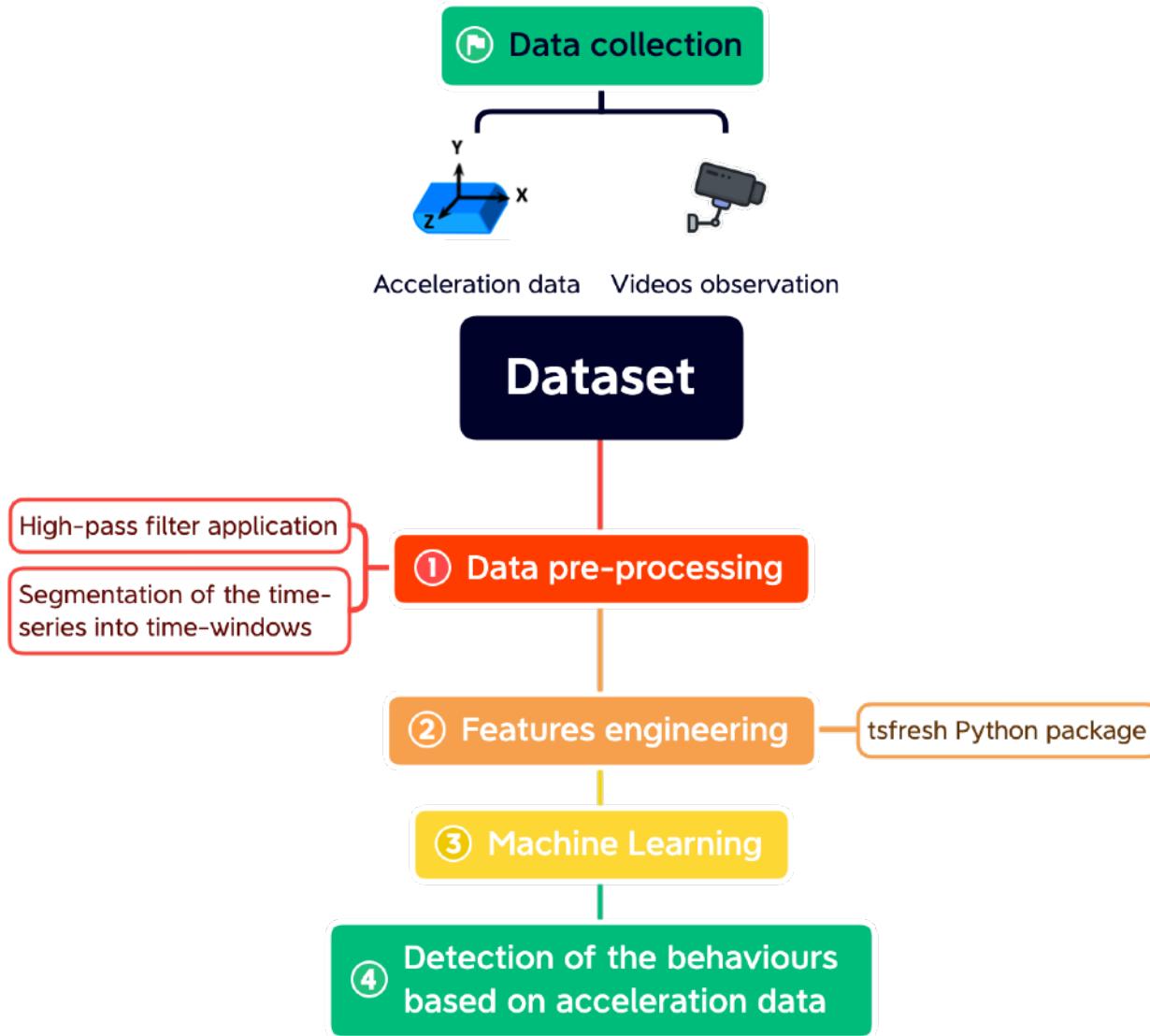
Examples - tsfresh documentation



➤ Features engineering

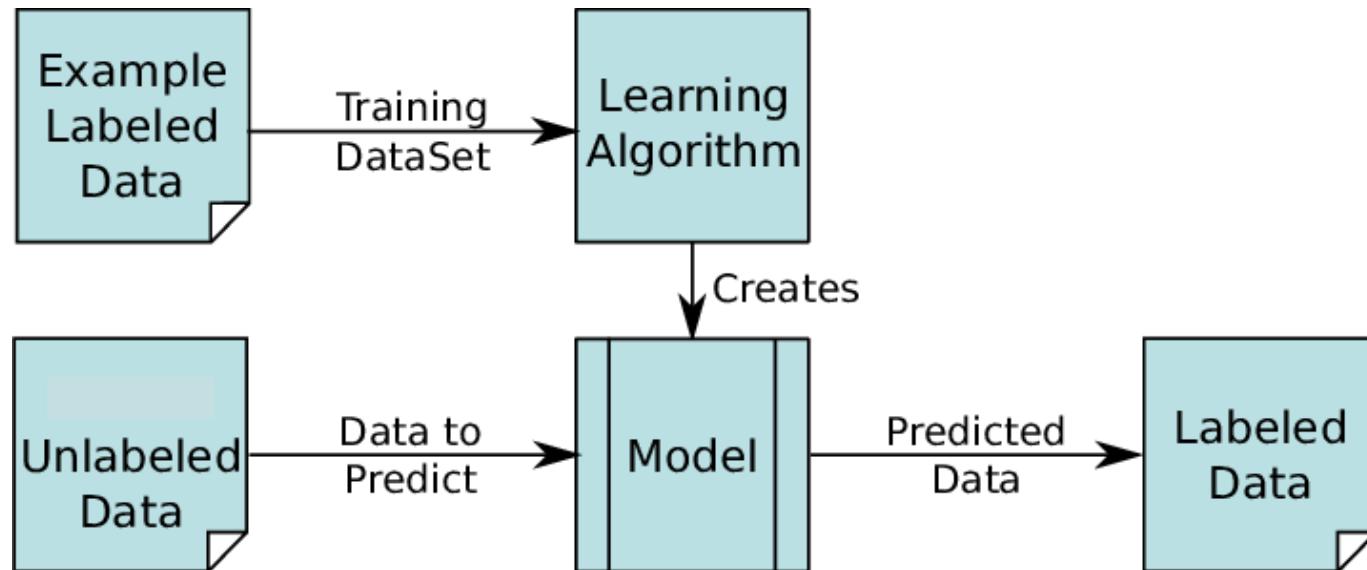
$$\text{euclidian norm} = \sqrt{(acc_x)^2 + (acc_y)^2 + (acc_z)^2}$$

Supervised Learning



Supervised Learning

Gradient Boosting algorithm (Catboost Python package)

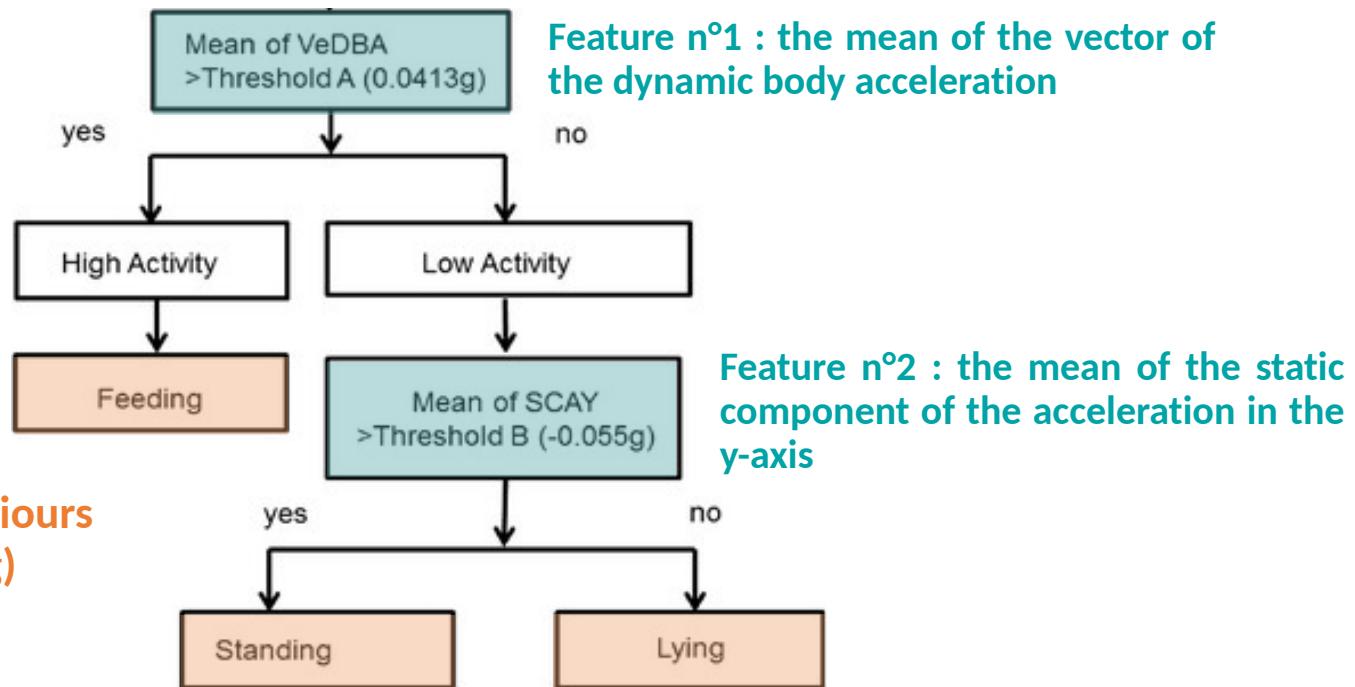


Berral et al., 2010

Supervised Learning

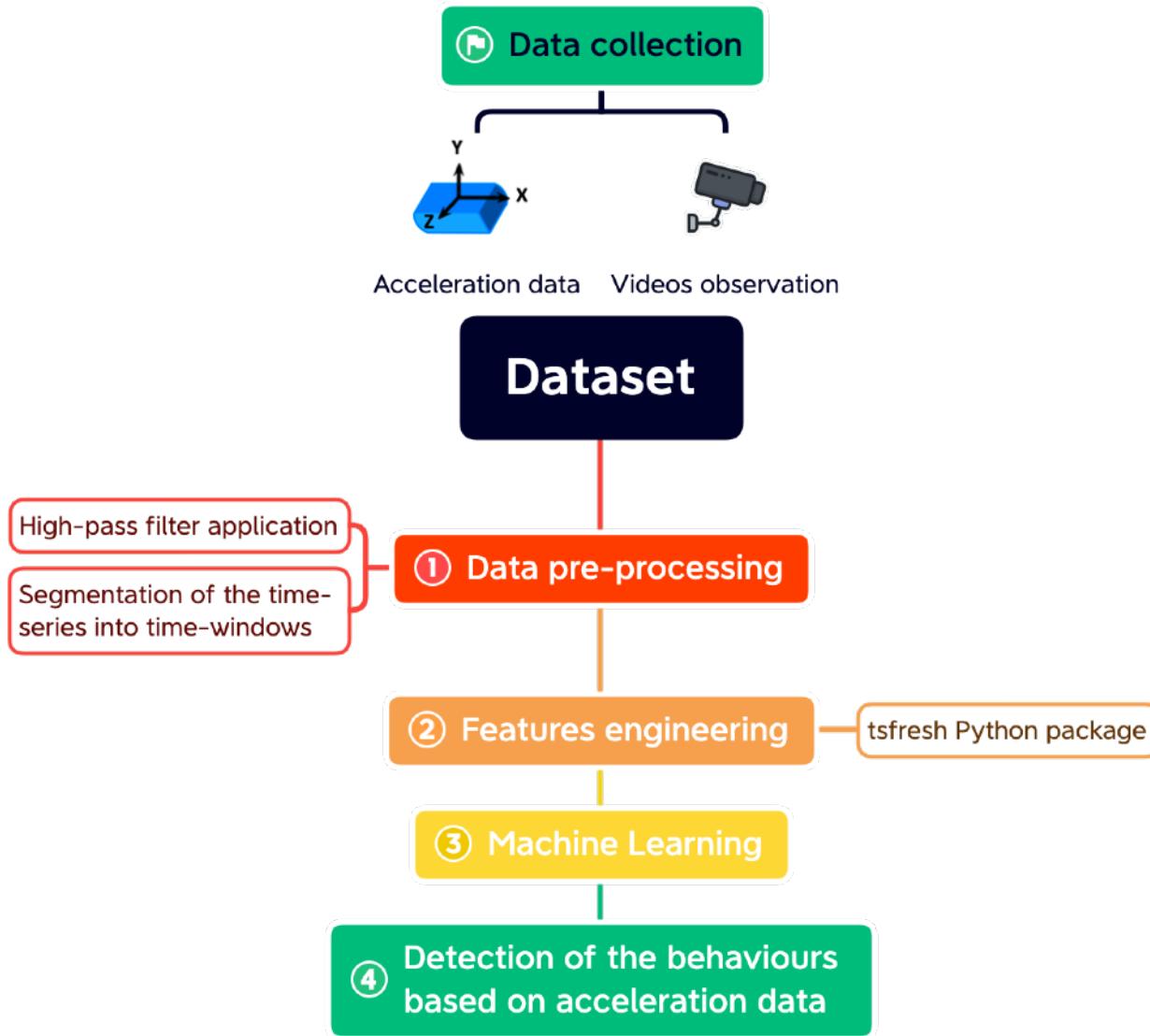
Decision trees

-> work by explaining a **target variable** based on other variables known as **explanatory variables**



Vazquez Diosdado et al., 2015

Supervised Learning



Supervised Learning

$$\text{Accuracy} = \frac{TP + TN}{TP + FP + TN + FN}$$

$$\text{F1-score} = \frac{2TP}{2TP + FP + FN}$$

$$\text{Sensitivity} = \frac{TP}{TP + FN}$$

AUC = area under the ROC curve

True class	
Predicted class	
TP (True Positive)	FP (False Positive)
FN (False Negative)	TN (True Negative)

