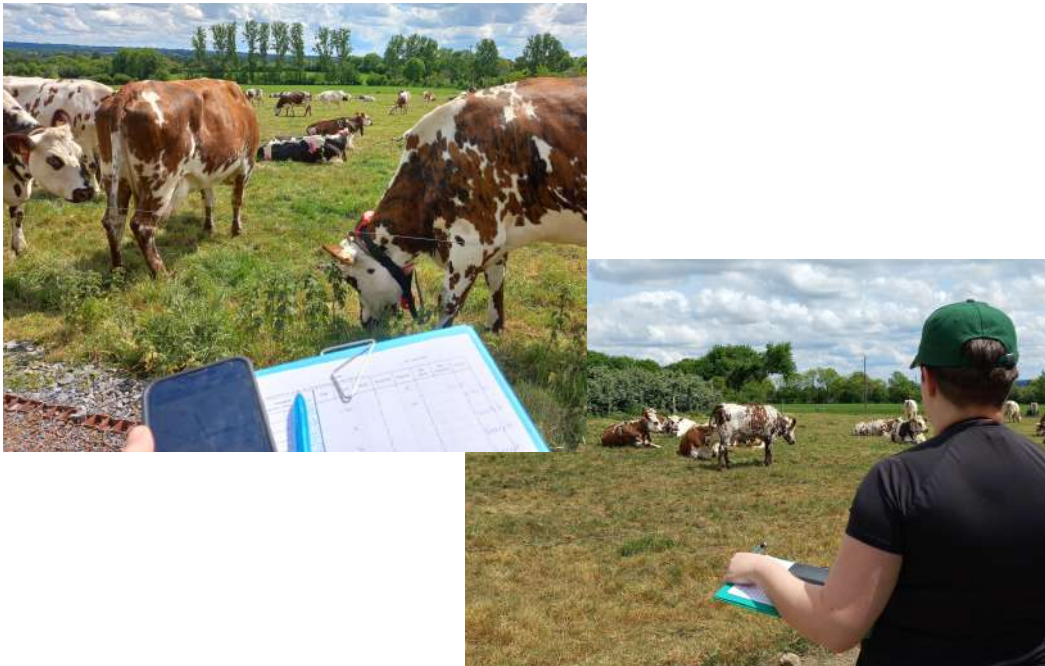


Validating an accelerometer-based smart collar for automated behavioural monitoring in grazing dairy cattle – a new gold standard for research?

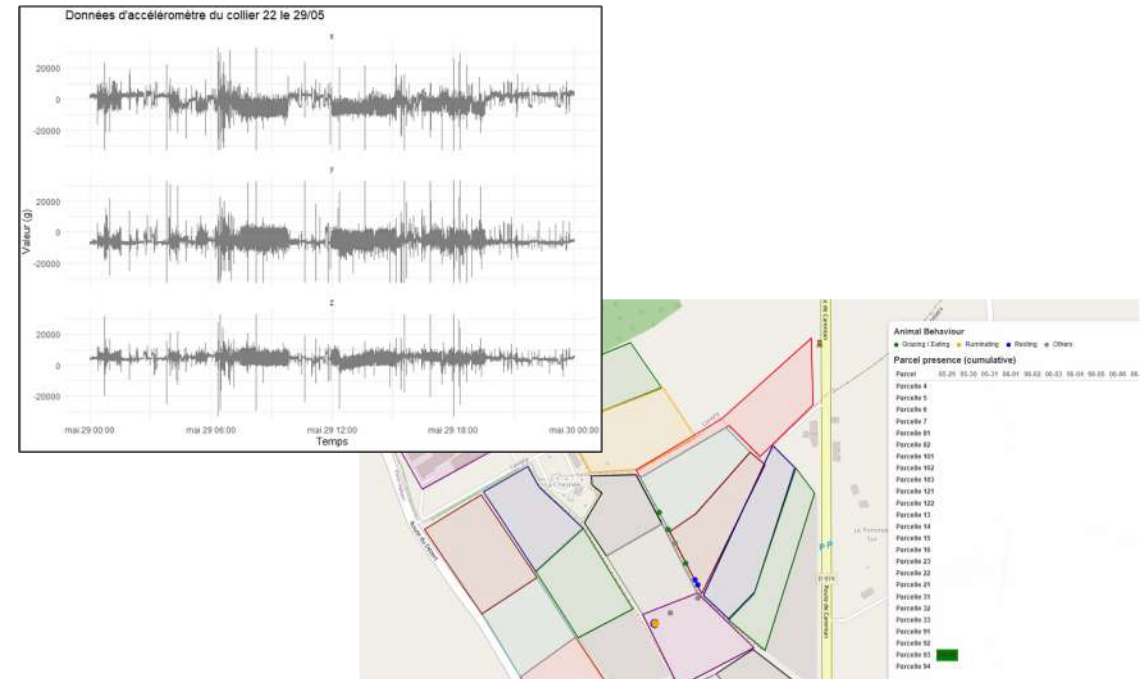


C. Ducrue, C. Allain, T. Dechaux, U. Jean-Louis, C. Littlejohn, [Z. Guy](mailto:zoe.guy@idele.fr)
zoe.guy@idele.fr

Behaviour monitoring: A key component of Animal Science research

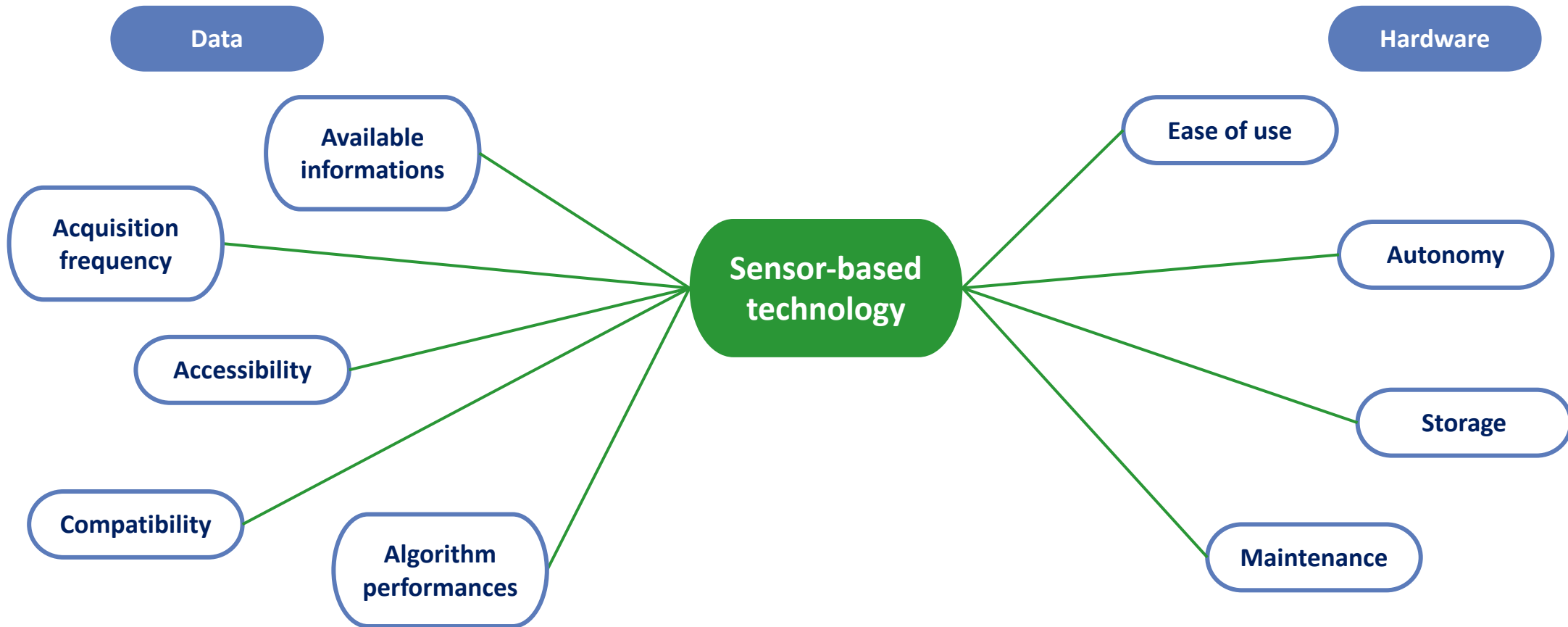


Ethological observations as a gold standard



Sensor-based technologies as a promising proxy

What can we consider a good research-oriented technology ?



Tauro Research Collar

TAURO



Sensors :

3-axis accelerometer }
Gyroscope } 60 Hz

GPS → 1 Hz

Thermometer }
Hygrometer } 0,2 Hz
Barometer } = Every 5s

Battery + Solar
panels



SD card data storage



eGrazor algorithm :

Accelerometer data

→ Behaviour every 5-6s :

- Grazing
- Ruminating
- Resting
- Walking
- Drinking
- Other

Embeint

X



X

CERES
TAG



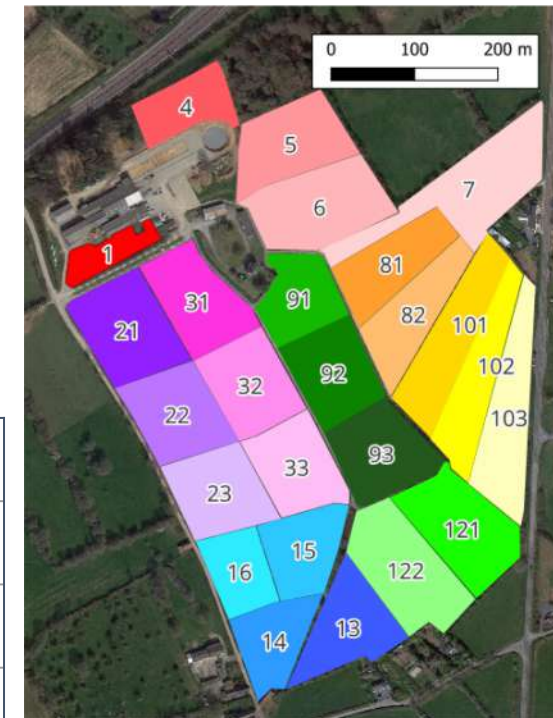
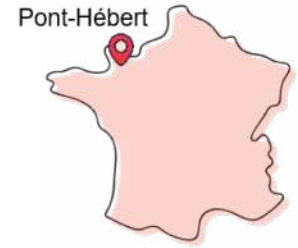
Experimental design



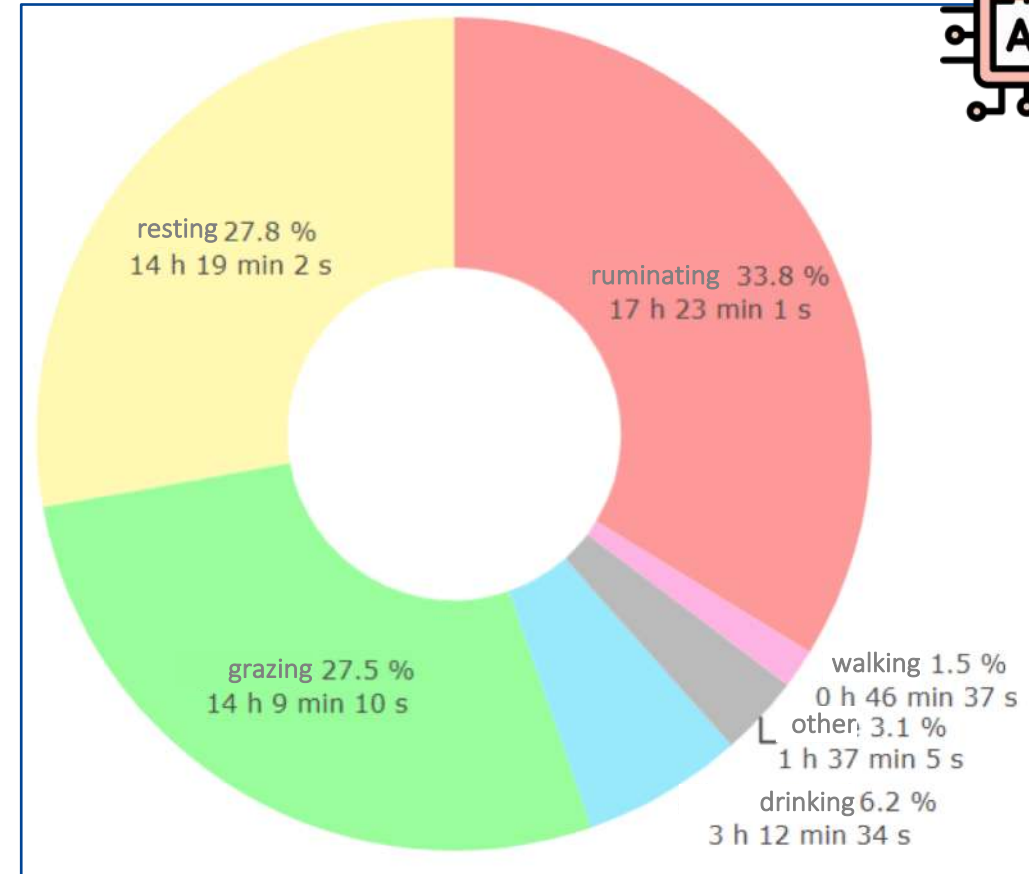
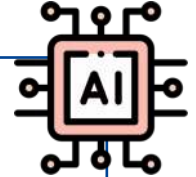
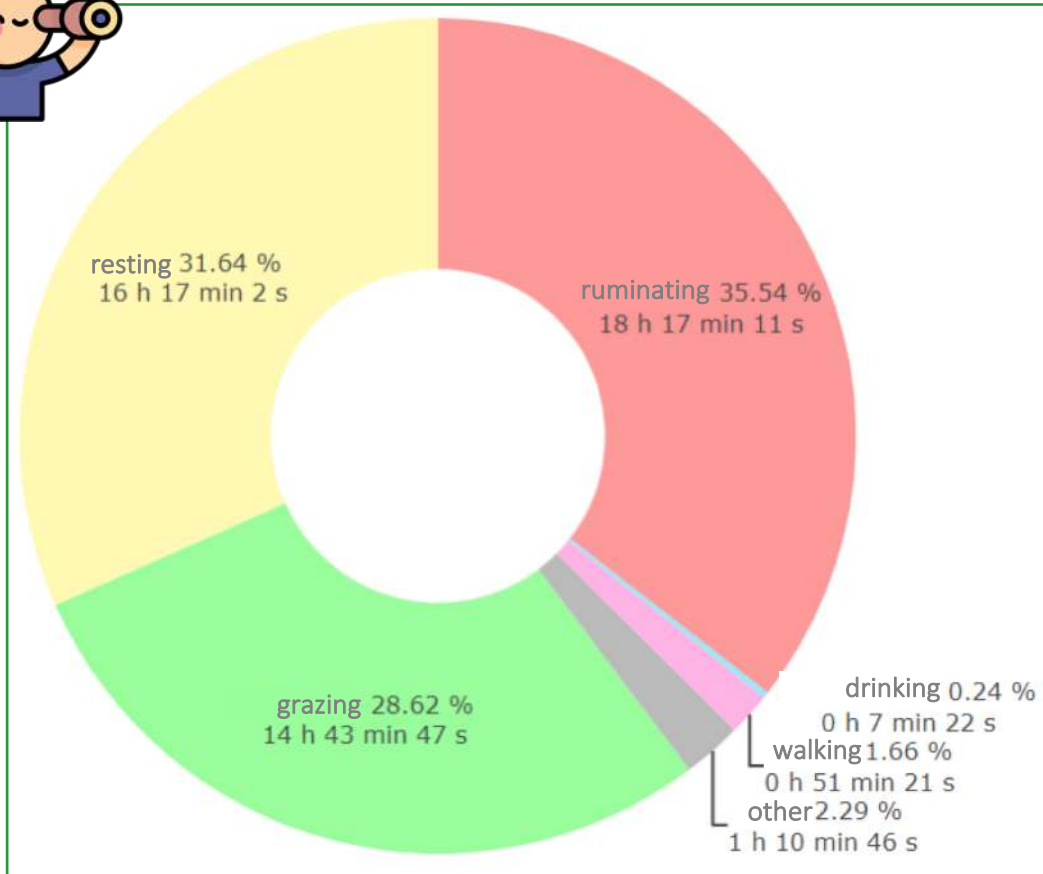
- La Blanche Maison experimental farm
- May to June 2025
- 13 Normande cows
 - Focal observation at pasture
 - 2 x 2h / cow



Grazing	The cow keeps its muzzle close to the ground and regularly lifts its head to pull up or tear at the forage, chew it and swallow it.
Ruminating	The cow regurgitates a bolus of food, then chews it using circular movements of her head and jaw, before swallowing it.
Resting	An animal that is stationary, either standing or lying down, and capable of making a few movements of the head or limbs.
Walking	The cow moves by making a relatively slow, continuous movement of its legs, with its head more than 15 cm above the ground.
Drinking	The cow's muzzle is placed in the drinking trough whilst she drinks.
Other	Anything that does not correspond to the behaviours mentioned above.



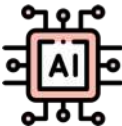
Results – Behaviours distribution



51 h 33 min 33 s

Results – Algorithm performances

Confusion matrix



Algorithm output	ruminating	24	388	152	387	6452	55178
	resting	39	597	311	702	47536	2357
	grazing	66	1290	980	46251	1345	1018
	walking	25	166	978	1502	113	13
	other	12	1260	452	2850	924	327
	drinking	276	545	208	1335	2252	6938
		drinking	other	walking	grazing	resting	ruminating
	Observed behavior						

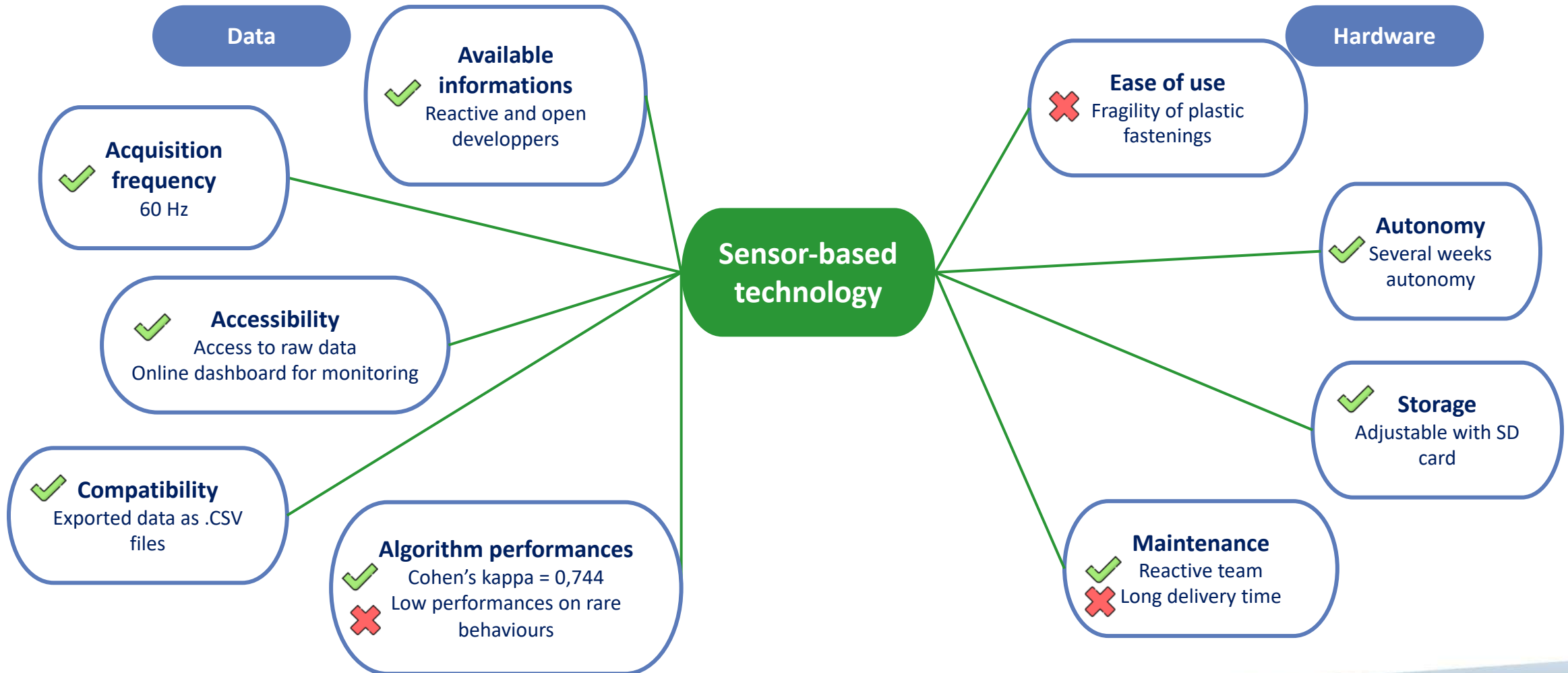
eGrazor conception

MCC	Grazing	0,847	0,980
	Ruminating	0,785	0,891
	Resting	0,809	0,883
	Walking	0,322	0,690
	Drinking	0,114	0,596
	Other	0,233	0,372
Global accuracy		81,77 %	
Cohen's kappa		0,744	

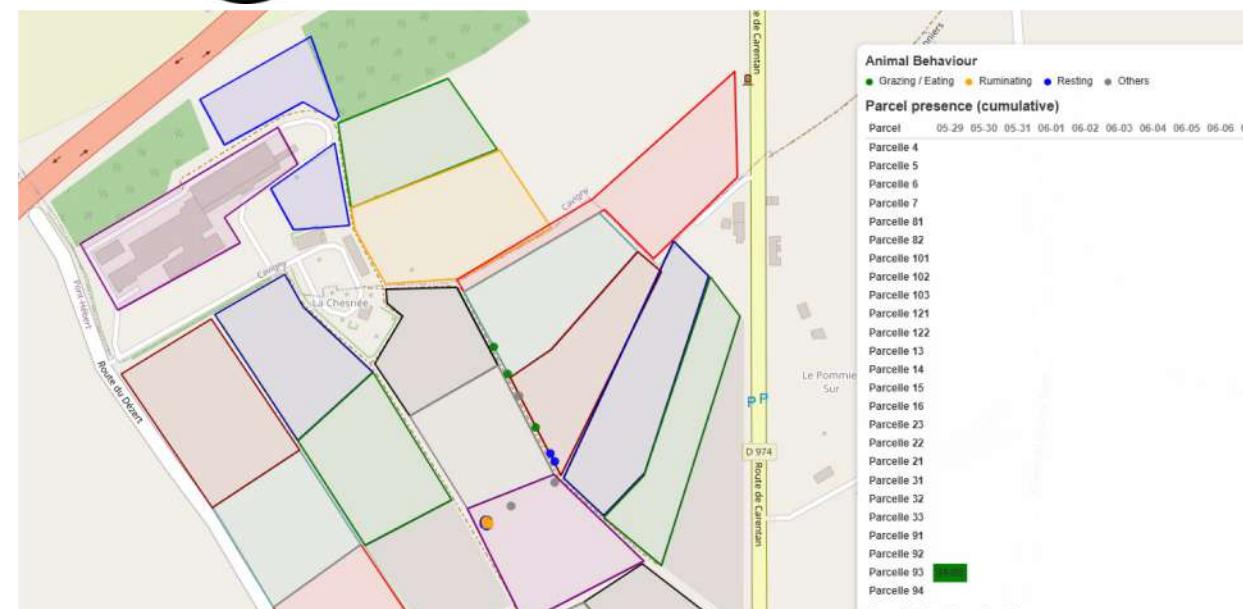
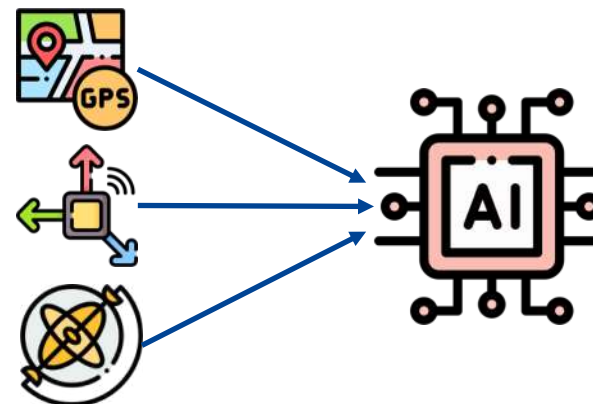
n = 185 249



Tauro Research collar : a new gold standard for research ?



Perspectives



Thank you for your attention !



Contact : zoe.guy@idele.fr