

Virtual herding for real animals

Ethics and healthy farming craftsmanship in a data-rich environment

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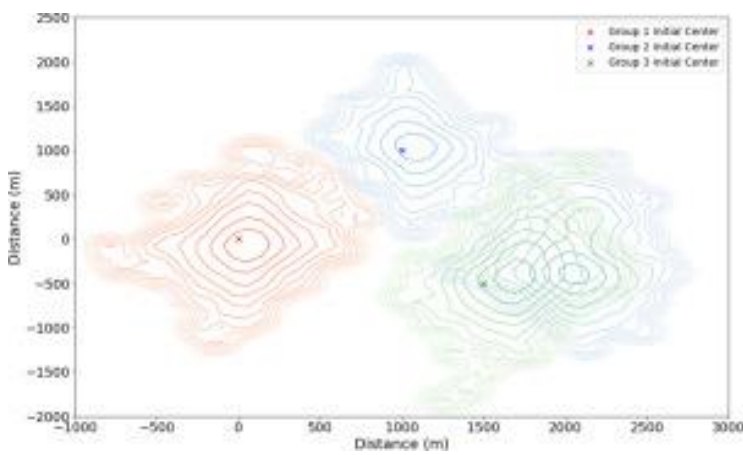
Ethics Institute, Faculty of Humanities



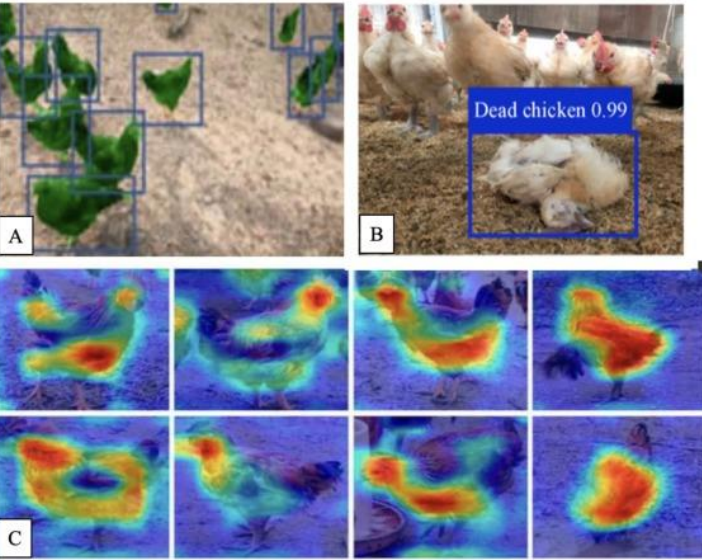
From animals.....



From animals to data



Butts et al. 2022

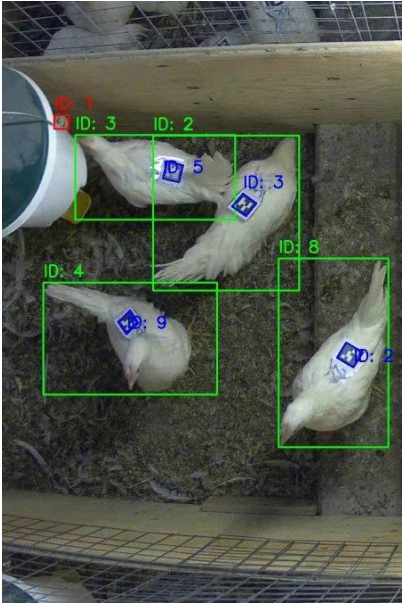


Yang et al. 2024

Task	Classification	Regression	Object Detection	Segmentation	Feature Extraction
Output Format	$[c_1, c_2, \dots]$	$[r]$	$\begin{bmatrix} x_1, y_1, w_1, h_1, c_1 \\ x_2, y_2, w_2, h_2, c_2 \\ \dots \end{bmatrix}$	$[p_1, p_2, \dots]$	$[f_1, f_2, \dots]$
Description	This image is class c (highest).	The animal weight r .	A box for class c with coordinates of x, y, w, h .	Each pixel is class p (highest).	Intermediate layer vector $[f_1, f_2, \dots]$.
Example					

Figure 2. Example of different deep-learning algorithms used in computer vision over the same image.

Guarnido-Lopez et al, 2024



From animals to data

This step promises greater precision and increased grip on animal health and welfare

It also raises key questions about translation:

- What is (currently) translated?
- What can be translated?
- What is lost in translation?

From animals to data: translation

It also raises key questions about translation:

→ What is (currently) translated?

Not the full behavioral repertoire of animals: technical limitation + context of existing animal husbandry systems

From animals to data: translation

It also raises key questions about translation:

→ What is (currently) translated?

→ What can be translated?

In the end a full set of behaviour, movement and physiology parameters.... But how do these quantitative indicators relate to animal welfare? Which aspects of animal welfare can be captured in data....?

From animals to data: translation

It also raises key questions about translation:

→ What is (currently) translated?

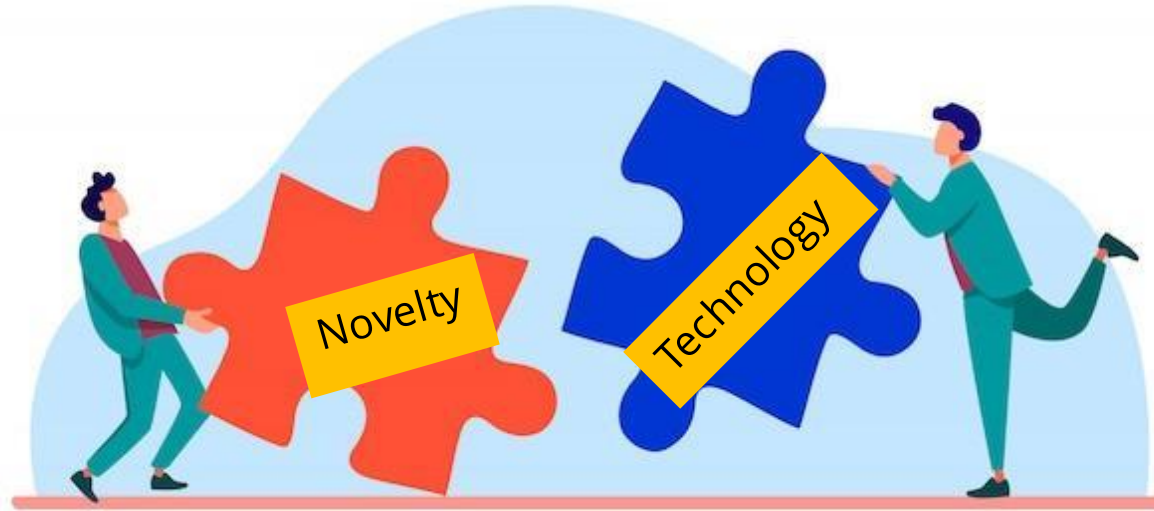
→ What can be translated?

→ What is lost in translation?

- The existing knowledge from animal (and environmental) sciences are not yet fully translated into livestock farming practice. How could AI contribute to a better translation?
- Direct experiential engagement with animals, and is it necessary?

Change of focus...

There is a trend to focus in the ethical and social implications of AI on what is novel. For good reasons, AI may lead to new risks and concerns.



Focusing on the novel aspects or on “technology only” runs the risk of excluding relevant ethical dimensions.

Beyond what's new!

An ethical analysis that tends to focus on what is, ethically speaking, novel about AI innovations may overlook that adding one element to an existing practice can have **far-reaching** consequences that **expand dimensions** that were already present in the existing situation.

A case study...one device



 **collie**

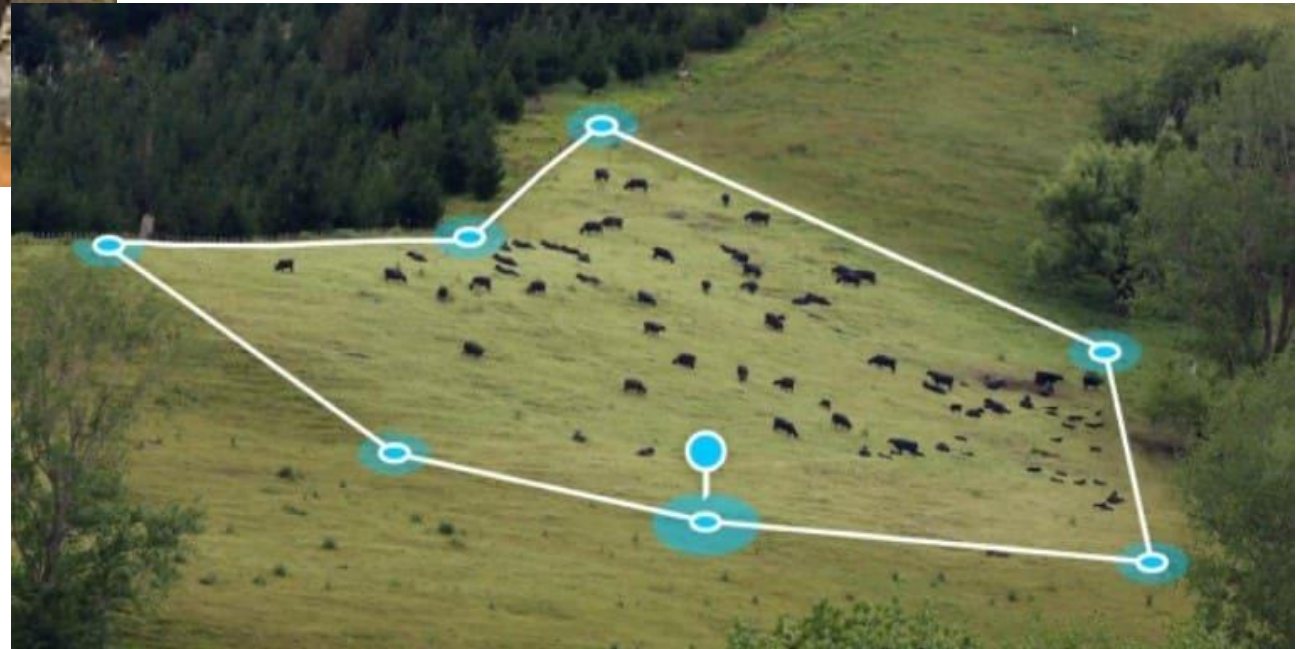


Virtual fencing/
herding

A case study...multiple contexts



- More room (for species specific behavior)
- More animal autonomy
- More individual care



A case study...multiple contexts



- More room (for species specific behavior)
- More animal autonomy
- Less human interference
- More interaction with (other parts of) nature



Farmers' expertise?



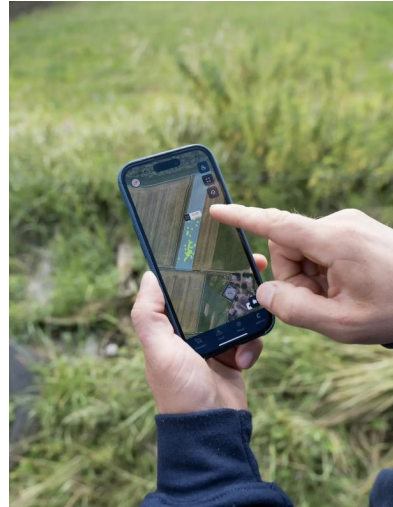
Ter Beek /© Bob Awick



Farmers' expertise?



Ter Beek /© Bob Awick



Undesirable?

Farmers' expertise?



Rijkswaterstaat is responsible for the Netherlands' primary infrastructure facilities



Farmers' expertise?



Ter Beek /© Bob Awick



Undesirable...?

- Not all experiential knowledge is (yet) included in AI models → tech/feasibility issue
- The role of individual farmers is marginalized → implementation/governance question

Farmers' expertise?



Ter Beek /© Bob Awick



Undesirable...?

- Mediates the view on animals via technology
- Start from too instrumental view on animals/ limited view of welfare
- Ignores that animal welfare requires human-animal interaction
- Limited room to include concepts of animal care

Farmers' expertise....

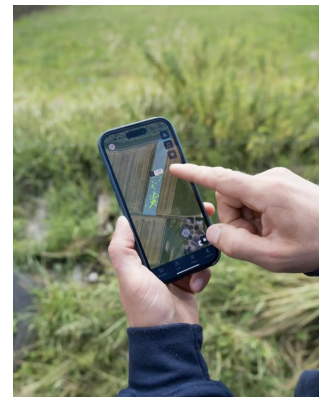
The relevance of including farming craftsmanship

Is more than as

- a source for existing data
- making AI end-user friendly
- a data-set of end-users

AI tools should be responsive to

- The professional autonomy of farmers (Meijboom & Stafleu 2016)
- The complex interaction between human/ farmer-animal-environment that influences animal welfare
- Power relations and injustice (ownership, open data,)



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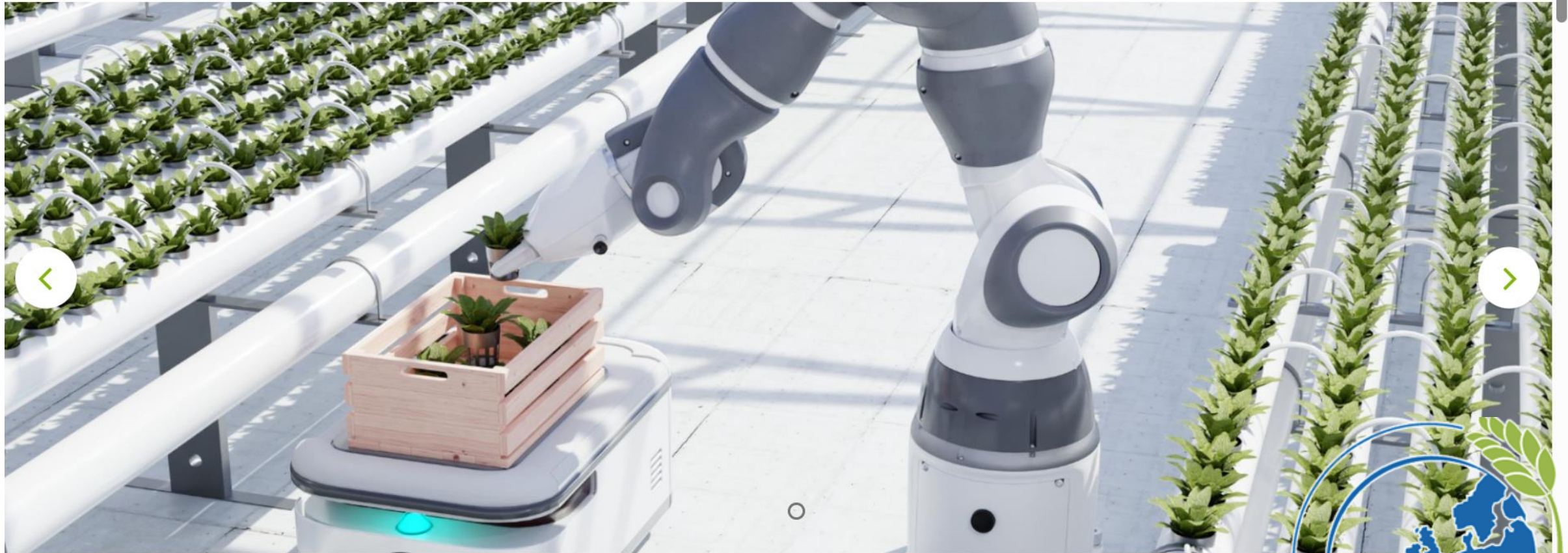
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9 - 12 September 2026, Cappadocia



Thank you for your attention

Many thank to Marten Admiraal & Daniel Reisman

