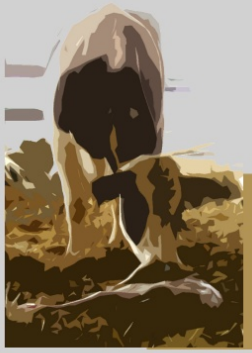
BOVI-ANALYTICS

Universiteit Utrecht

Faculteit Bio-ingenieurswetenschappen
Faculty of Bioscience Engineering



Veterinary Big Data Stakeholder Meeting

Once upon a time

Data

FAIR

Future

My background

Today

My background

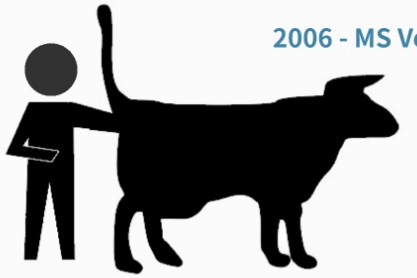
Today

This is me

This is me

This is me

2006 - MS Vet Med



This is me

UNIVERSITEIT
GENT

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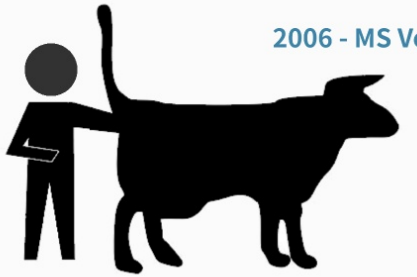

This is me

UNIVERSITEIT GENT

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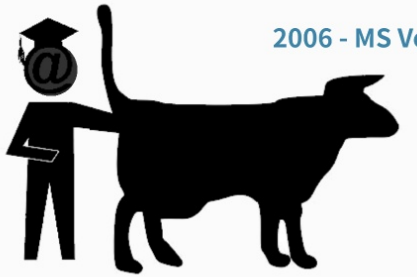

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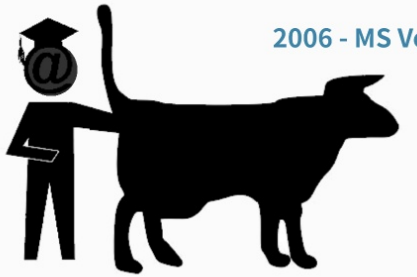

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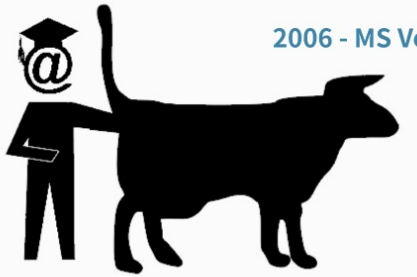

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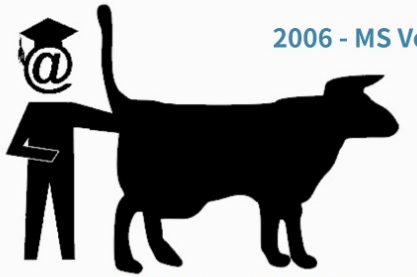

2019 - Ass. Prof. Farm Animal Health Utrecht University

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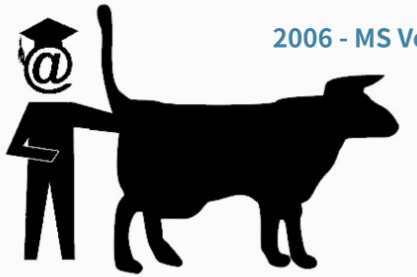

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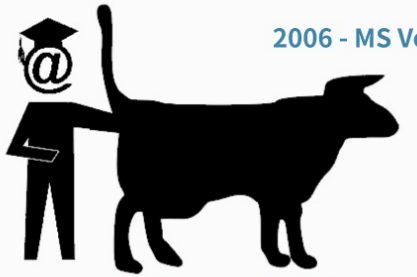

2006 - MS Vet Med

2019 - Ass. Prof. Farm Animal Health Utrecht University

Universiteit Utrecht

Disclaimer - I'm mainly interested in farm animals


اهلاً بكم في مزرعة ألبان الصافي
أكبر مزرعة ألبان متكاملة في العالم
WELCOME TO AL-SAFI FARM
THE LARGEST INTEGRATED DAIRY FARM
IN THE WORLD
WELCOMETOAL-SAFIDAIRY

BOVI-ANALYTICS

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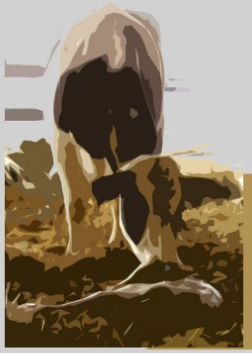

Veterinary Big Data Stakeholder Meeting

Once upon a time

Data

FAIR

Future

The PageRank Citation Ranking: Bringing Order to the Web

January 29, 1998

Vitae

Sergey Brin received his B.S.
1995. He is a recipient of a Na

Lawrence Page was born in E
research interests include the l

8 Appendix A: Adv

Currently, the predominant bu
one of the top results for cellul
came up first because of its hi
have difficulty justifying the page that our system returned to its paying advertis
the consumers.

Abstract

The importance of a Web page is an inherently subjective matter, which depends on the readers interests, knowledge and attitudes. But there is still much that can be said objectively about the relative importance of Web pages. This paper describes PageRank, a method for rating Web pages objectively and mechanically, effectively measuring the human interest and attention devoted to them.

We compare PageRank to an idealized random Web surfer. We show how to efficiently compute PageRank for large numbers of pages. And, we show how to apply PageRank to search and to user navigation.

In early 1998, Page submitted his first paper, an overview of the PageRank algorithm, to the Special Interest Group on Information Retriviel of the Association for Computing Machinery (SIGIR-ACM).

But the paper was rejected.

One peer reviewer wrote of the paper, "I found the overall presentation disjointed.... This needs to focus more on the IR issues and less on web analysis.

What kind of people are needed in the digital revolution for animal production

- Academia
- Research institutes
- SMEs
- Multinationals
- Global innovators

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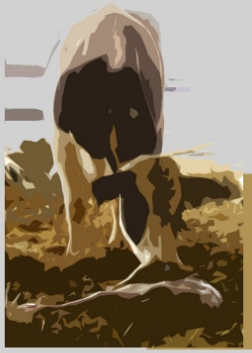
Faculty of Bioscience Engineering



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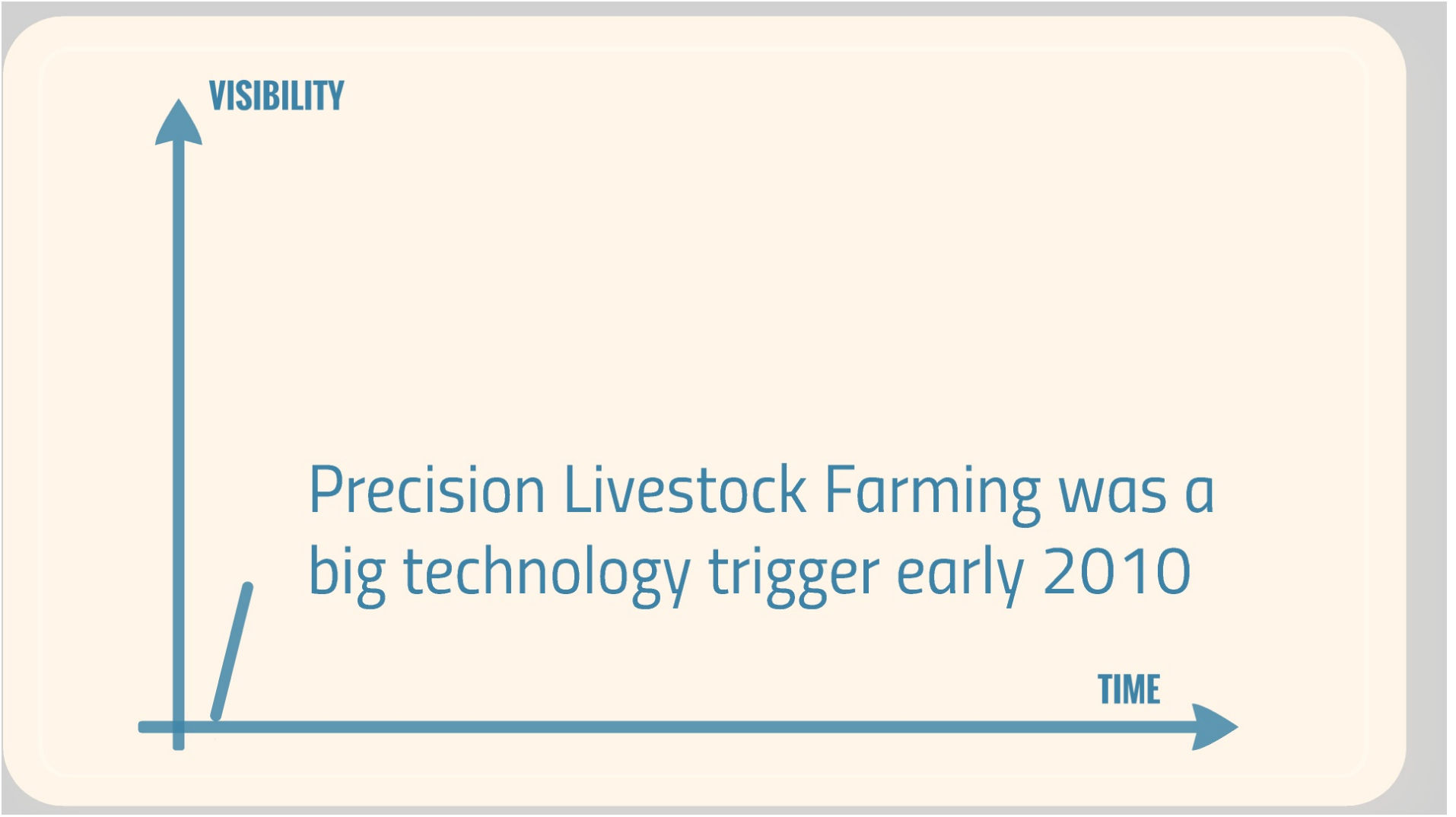
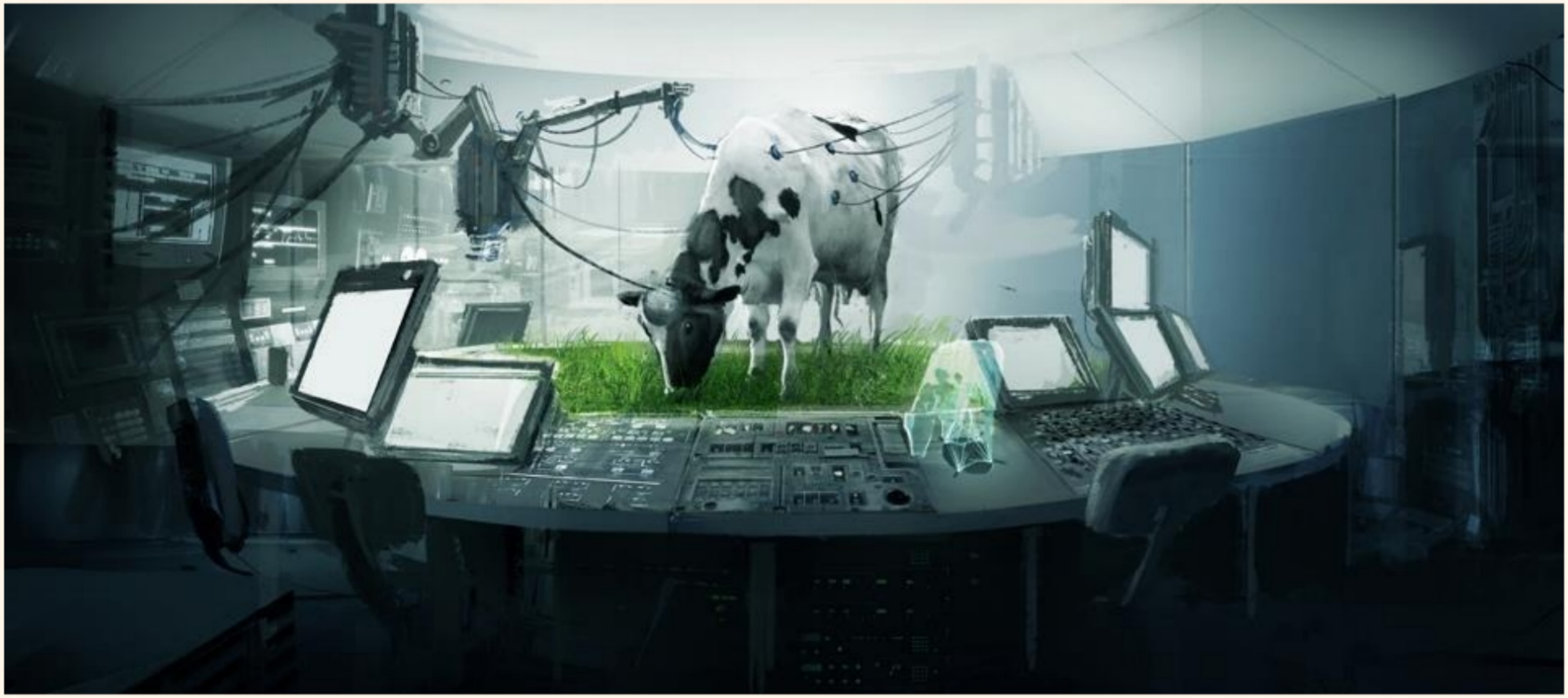

VISIBILITY
Precision Livestock Farming was a big technology trigger early 2010
TIME



Tolakker Precision Innovation Hub

Universiteit Utrecht

Tolakker Precision Innovation Hub

Universiteit Utrecht

Tolakker Precision Innovation Hub

Universiteit Utrecht

CRV

SenseHub™

AIHERD

LoRaWAN

CLARIFIDE plus

ida

FeedNow!

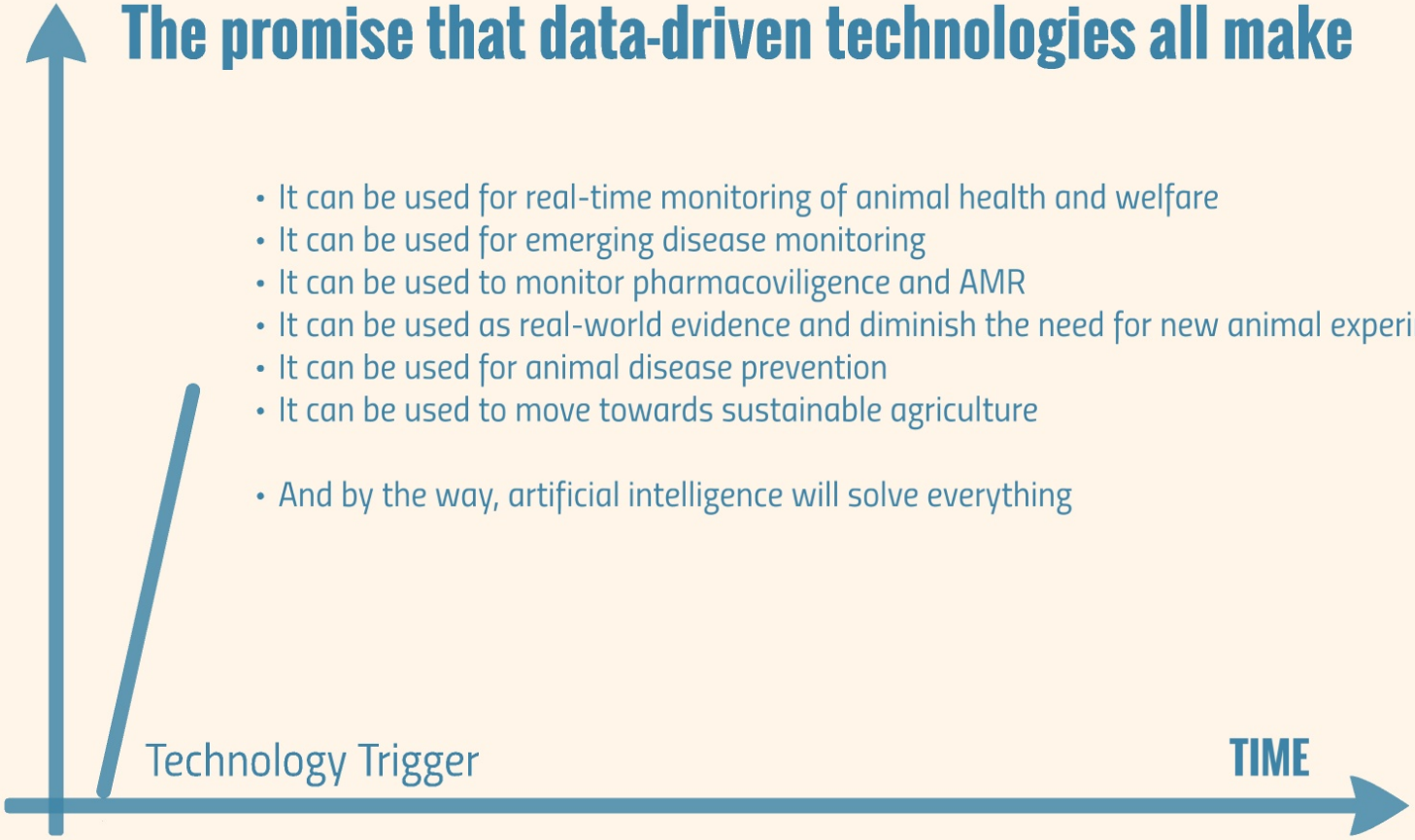
Fullwood Packo

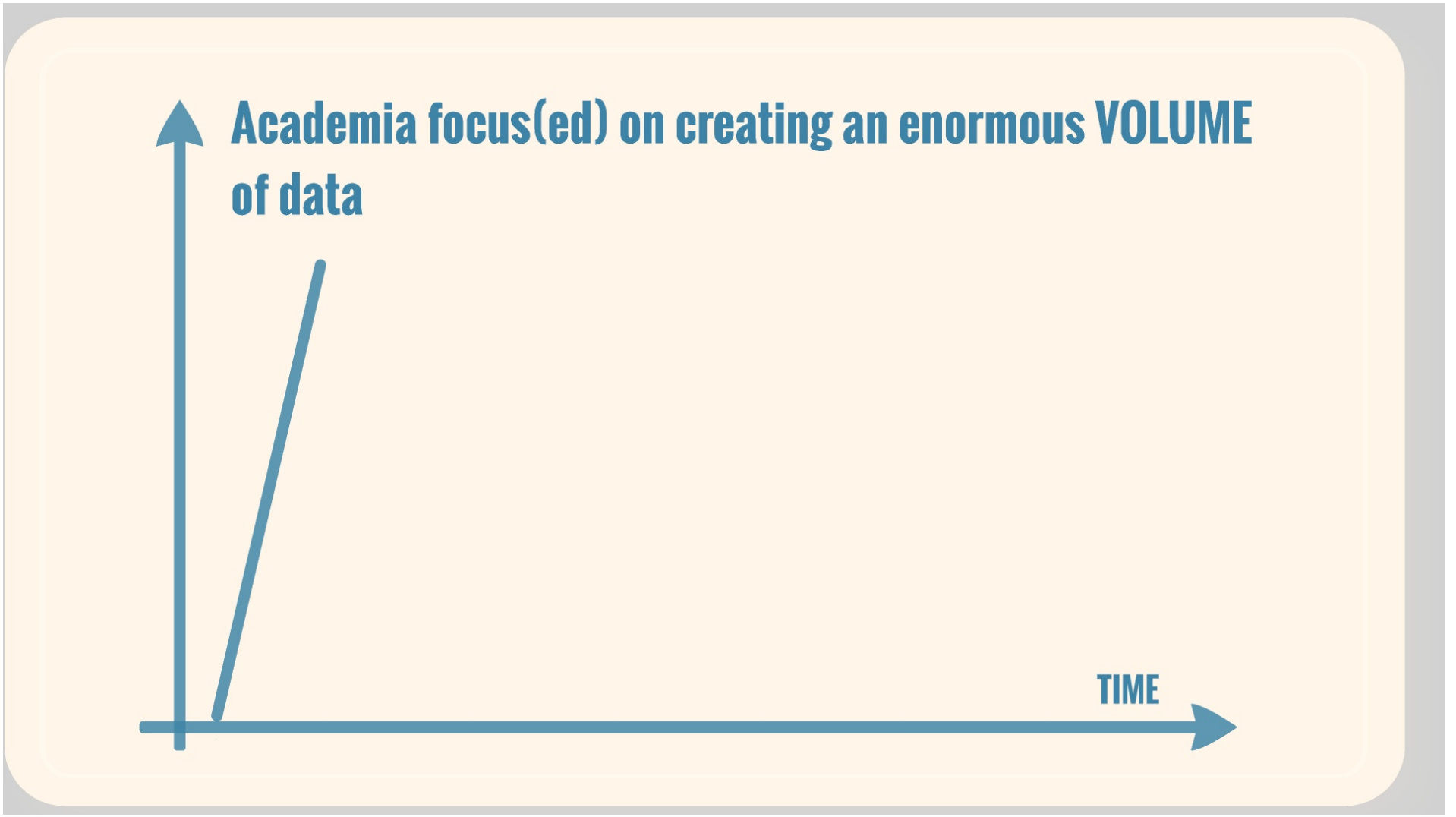
MmmooOgle

The promise that data-driven technologies all make

- It can be used for real-time monitoring of animal health and welfare
- It can be used for emerging disease monitoring
- It can be used to monitor pharmacoviligence and AMR
- It can be used as real-world evidence and diminish the need for new animal experiments
- It can be used for animal disease prevention
- It can be used to move towards sustainable agriculture

- And by the way, artificial intelligence will solve everything




Academia focus(ed) on creating an enormous VOLUME of data
TIME

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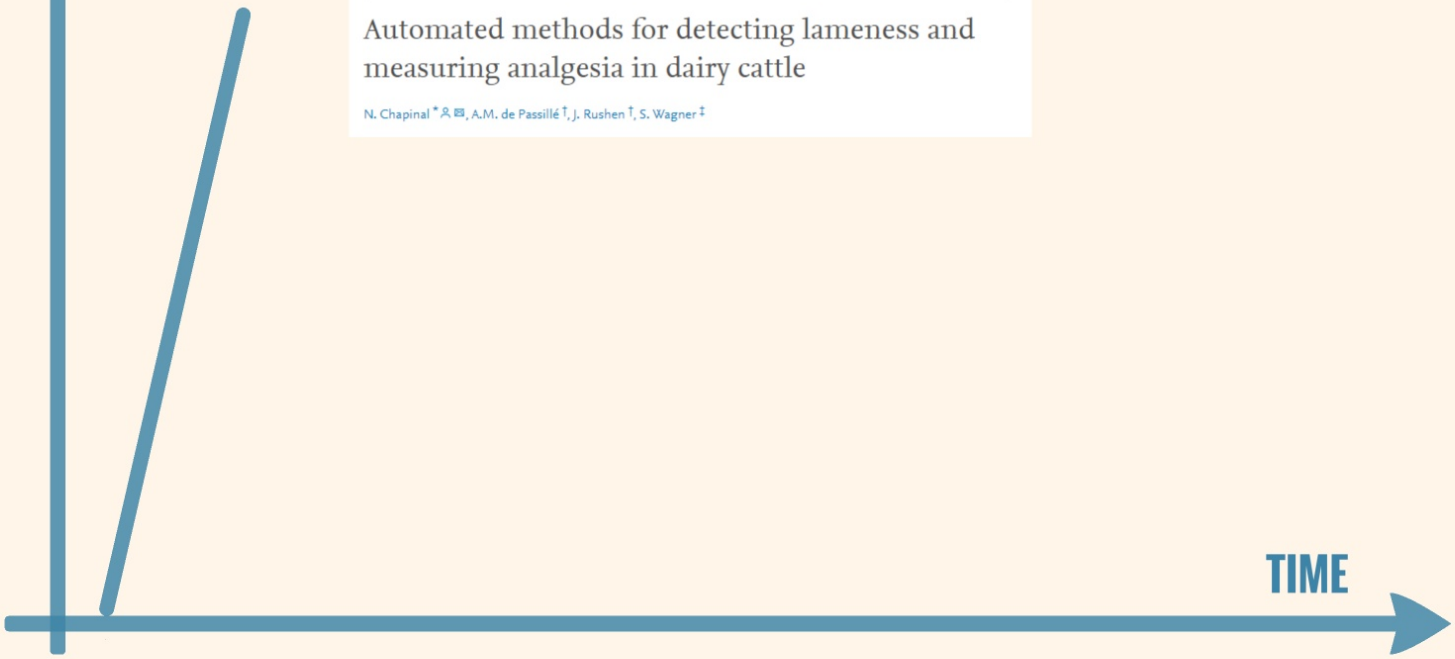
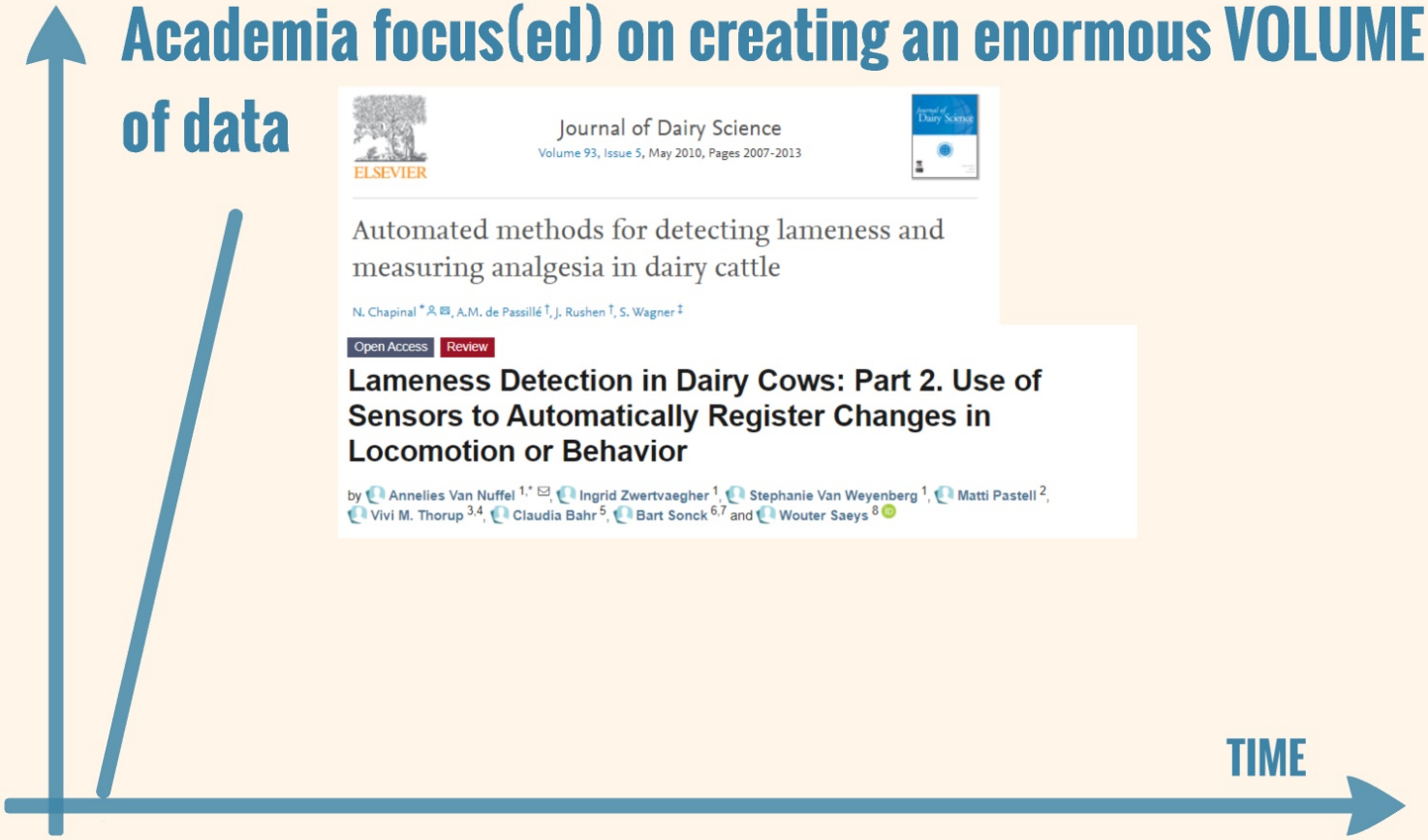


Journal of Dairy Science
Volume 93, Issue 5, May 2010, Pages 2007-2013

Automated methods for detecting lameness and measuring analgesia in dairy cattle

N. Chapinal *, A.M. de Passillé †, J. Rushen †, S. Wagner ‡

Academia focus(ed) on creating an enormous VOLUME of data



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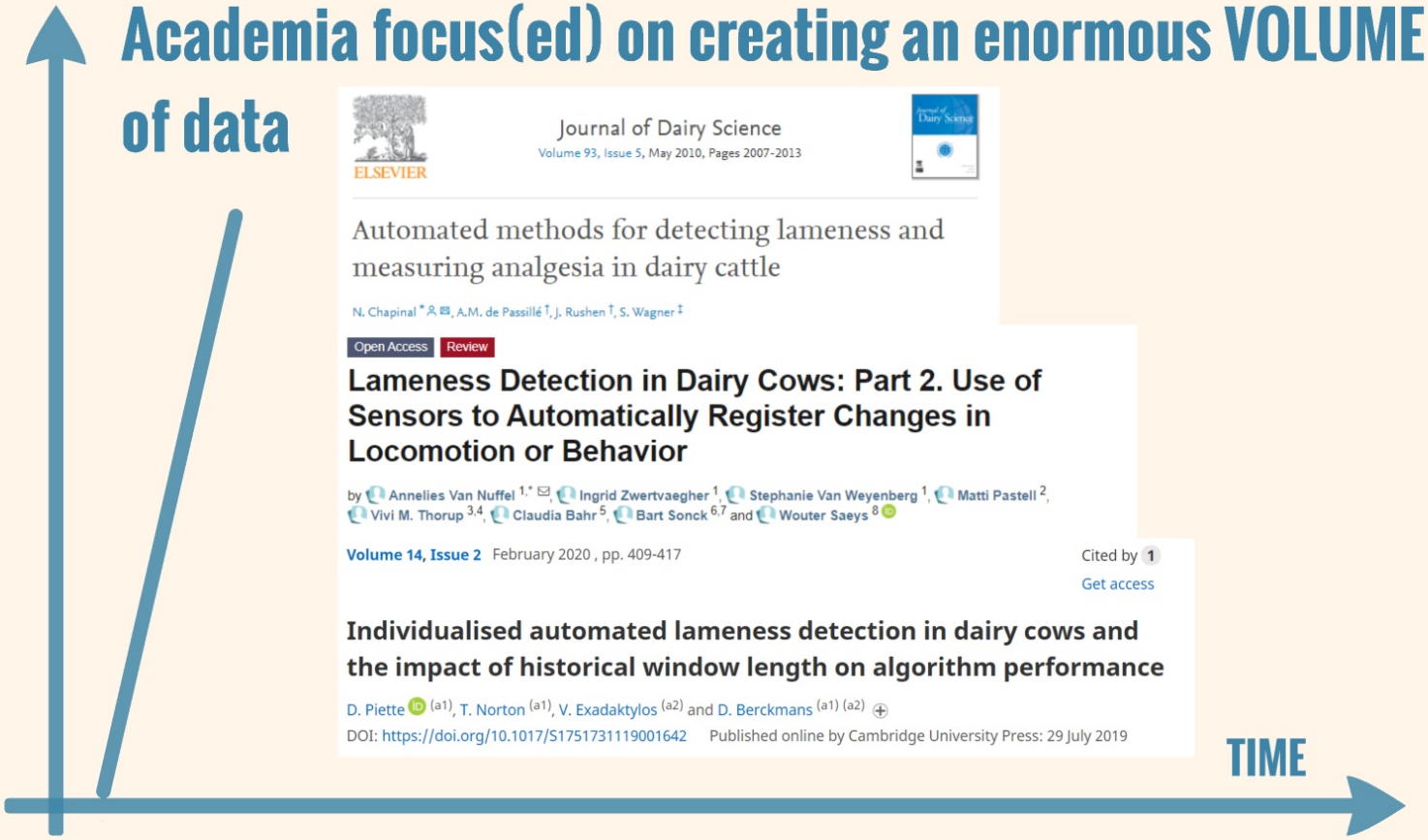

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ELSEVIER

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Open Access Review

Lameness Detection in Dairy Cows: Part 2. Use of Sensors to Automatically Register Changes in Locomotion or Behavior

by Annelies Van Nuffel [1,*], Ingrid Zwertvaegher [1], Stephanie Van Weyenberg [1], Matti Pastell [2], Vivi M. Thorup [3,4], Claudia Bahr [5], Bart Sonck [6,7] and Wouter Saeys [8]

Volume 14, Issue 2 February 2020 , pp. 409-417

Cited by 1

Get access

Individualised automated lameness detection in dairy cows and the impact of historical window length on algorithm performance

D. Piette (a1), T. Norton (a1), V. Exadaktylos (a2) and D. Berckmans (a1) (a2)

DOI: https://doi.org/10.1017/S1751731119001642 Published online by Cambridge University Press: 29 July 2019

TIME

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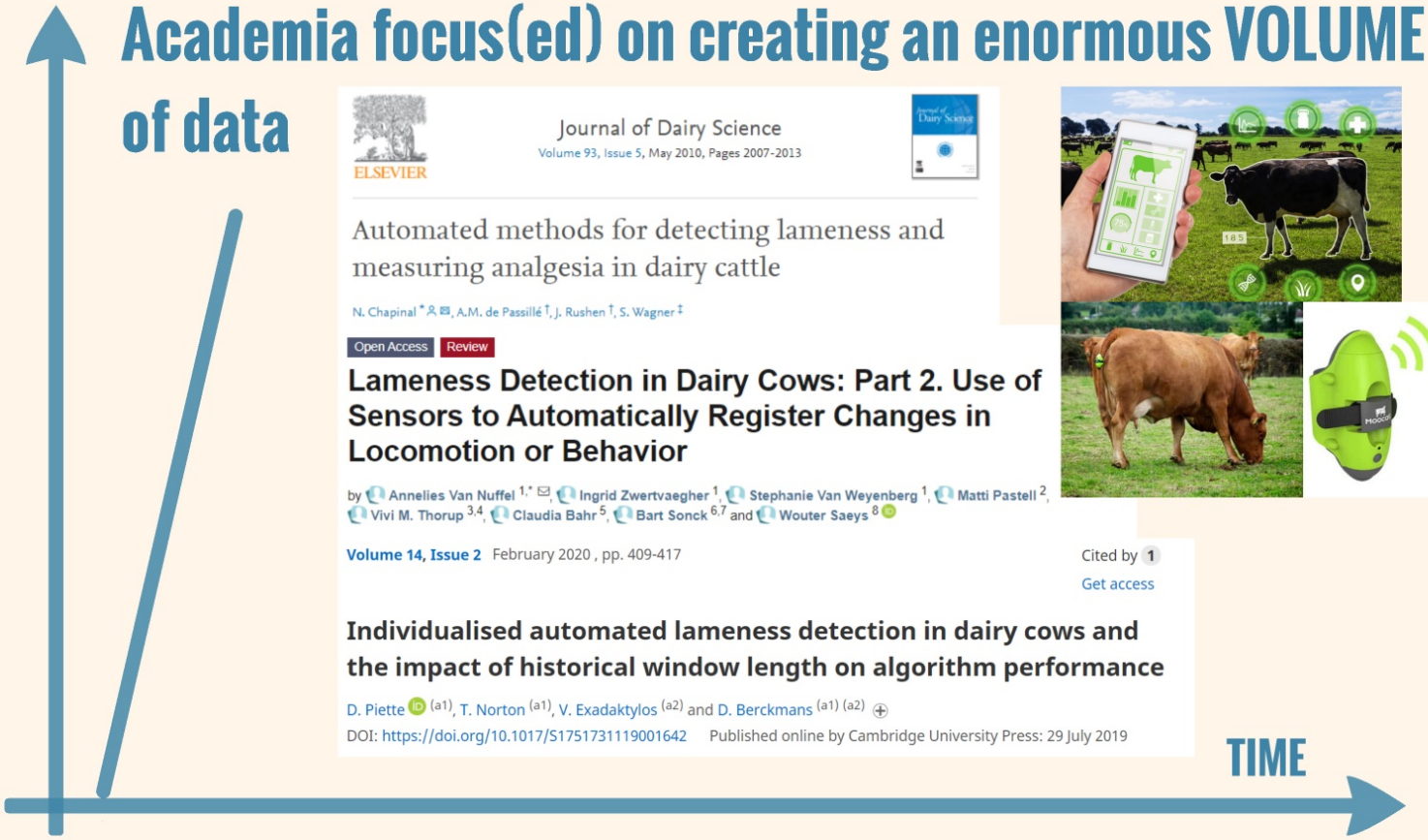

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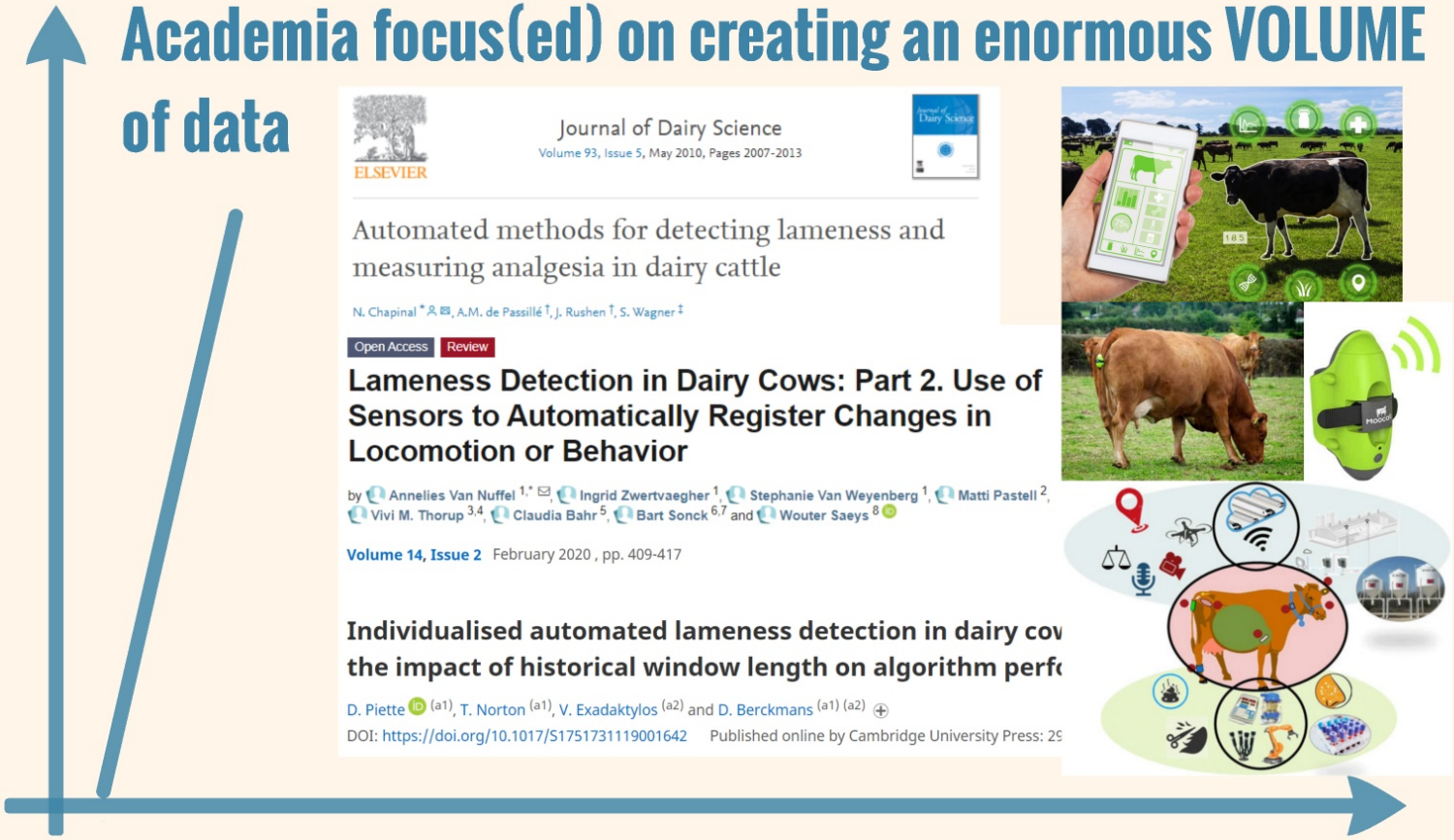

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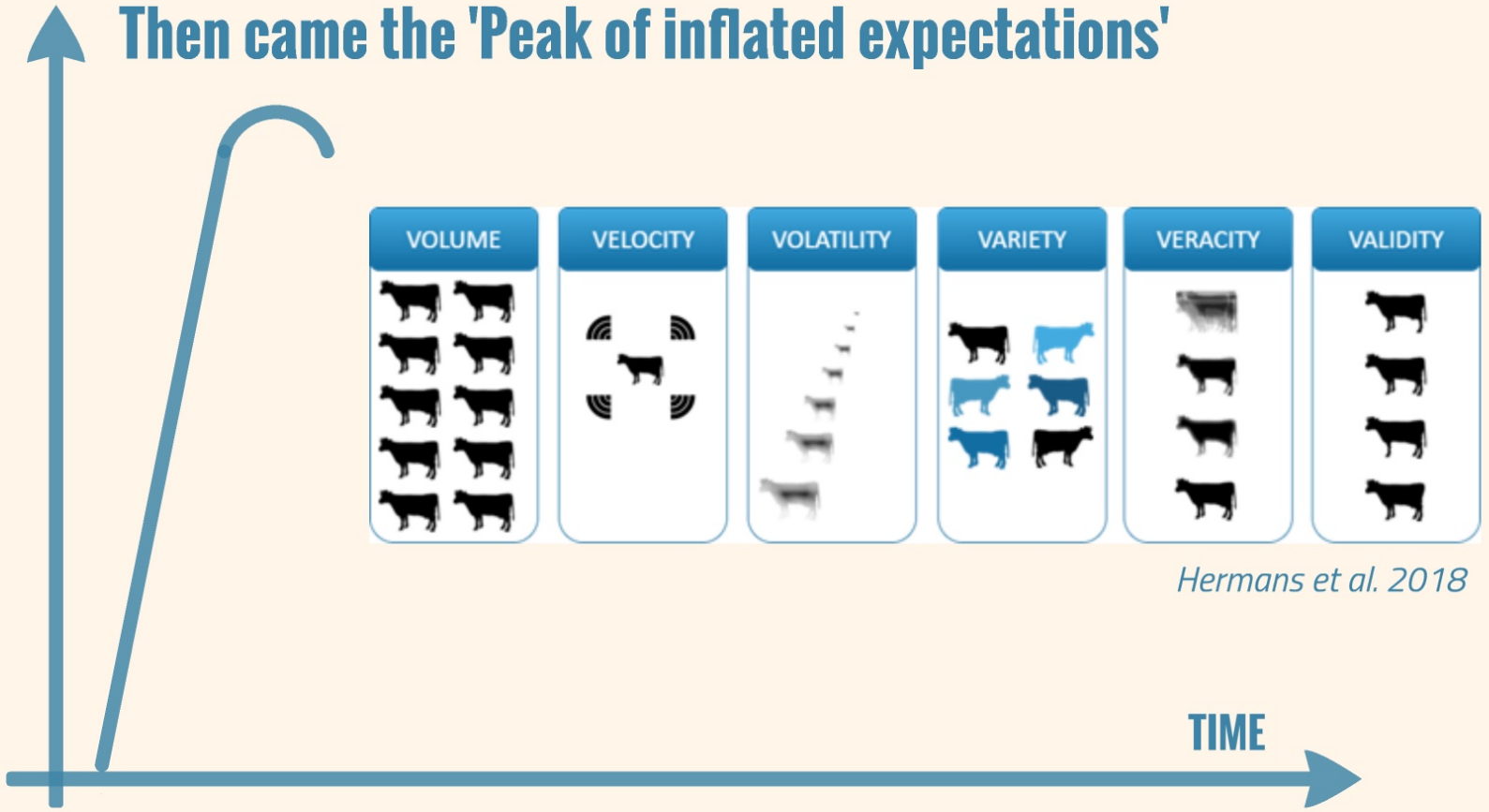
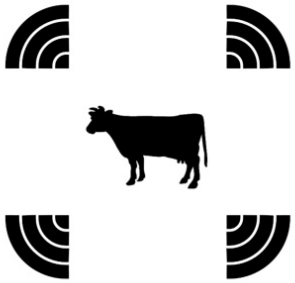
Then came the 'Peak of inflated expectations'



Hermans et al. 2018

VELOCITY

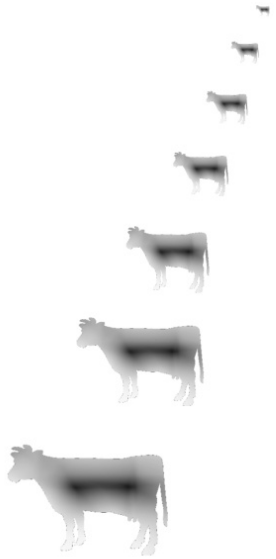


'Hey Miel, here is another update of the data'

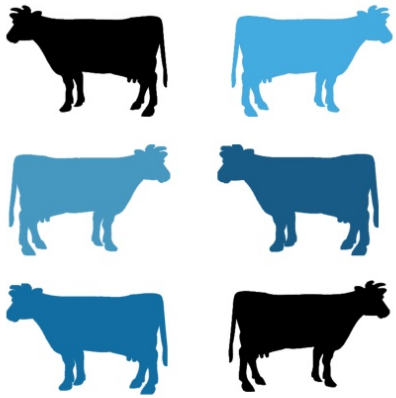
'In general, data is believed to exist for 5 year, before it starts vanishing'

'who will pay the bill to keep all that data alive?'

VOLATILITY

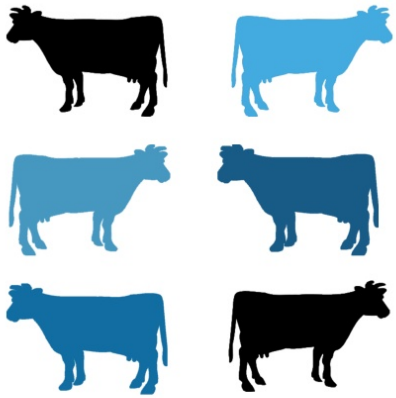


VARIETY



Structural database heterogeneity, syntax heterogeneity, implementation heterogeneity and semantic heterogeneity hold this agricultural and veterinary data to get properly utilized.

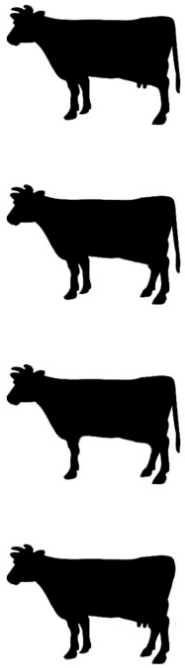
VARIETY



Structural database heterogeneity, syntax heterogeneity, implementation heterogeneity and semantic heterogeneity hold this agricultural and veterinary data to get properly utilized.

- In datasources
- In data dimensions
- In people
- In budgets
- In statistical-programming languages
- In spoken languages

VALIDITY



Allthough positive animal/case identification might seem obvious, real-world evidence is filled with dirty data

VALIDITY

J. Dairy Sci. 100:1–12
https://doi.org/10.3168/jds.2016-11896

Novel approaches to assess the quality of fertility data stored in dairy herd management software

K. Hermans,*[1] W. Waegeman,† G. Opsomer,* B. Van Ranst,* J. De Koster,* M. Van Eetvelde,* and M. Hostens*
*Faculty of Veterinary Medicine, Department of Reproduction, Obstetrics and Herd Health, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium
†Faculty of Bioscience Engineering, Department of Mathematical Modelling, Statistics and Bioinformatics, Ghent University, Coupure Links 653, 9000 Ghent, Belgium

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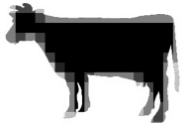
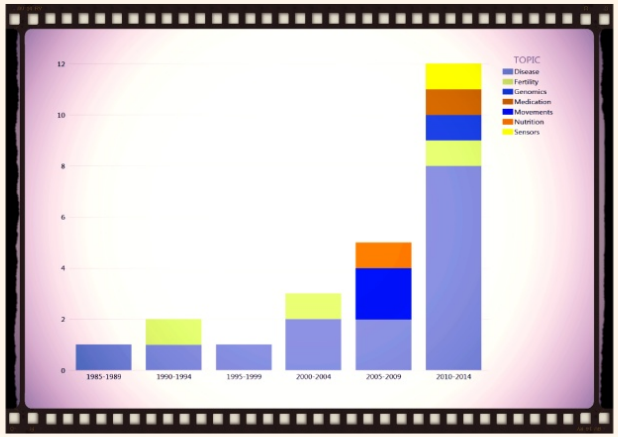
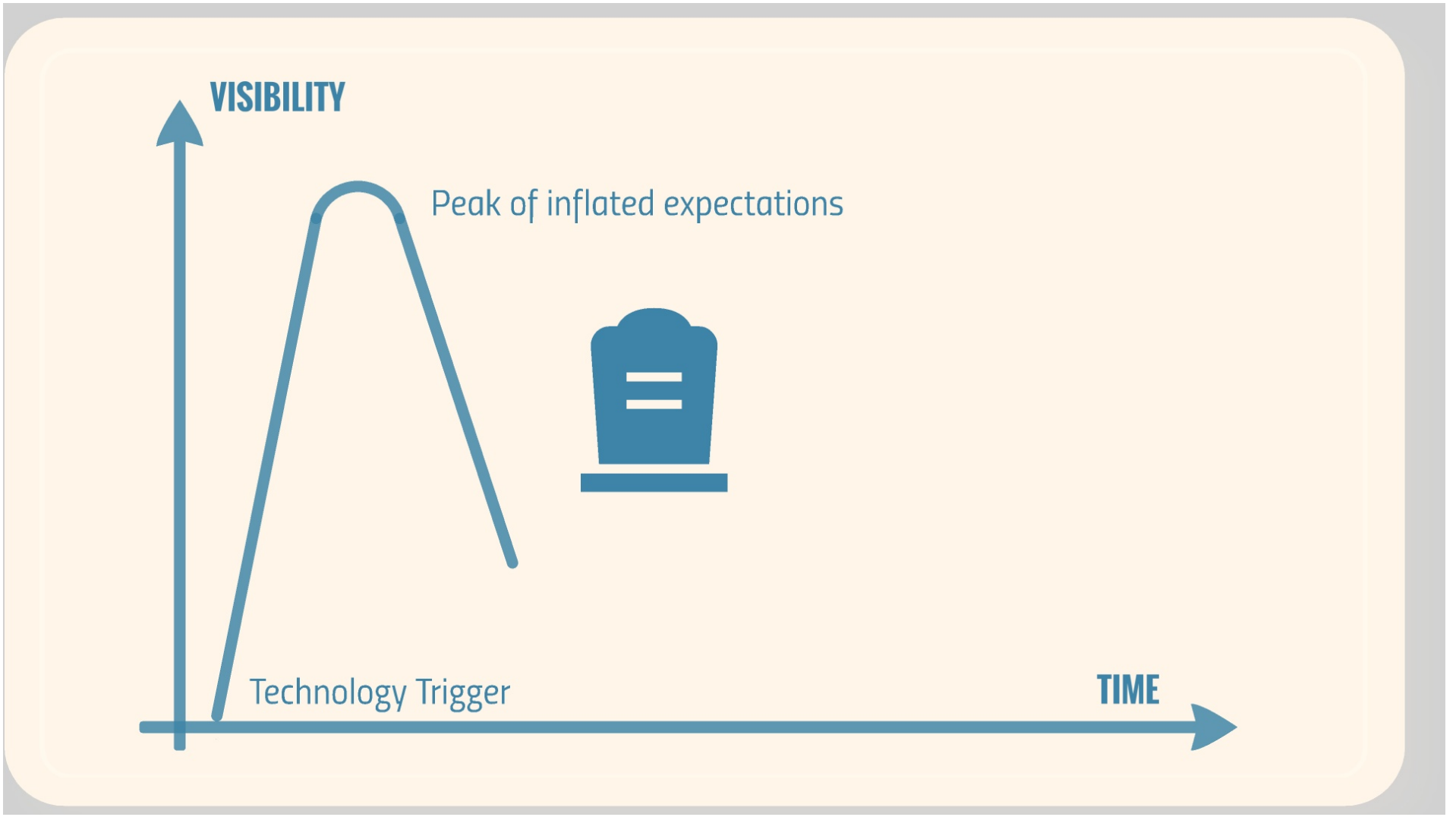
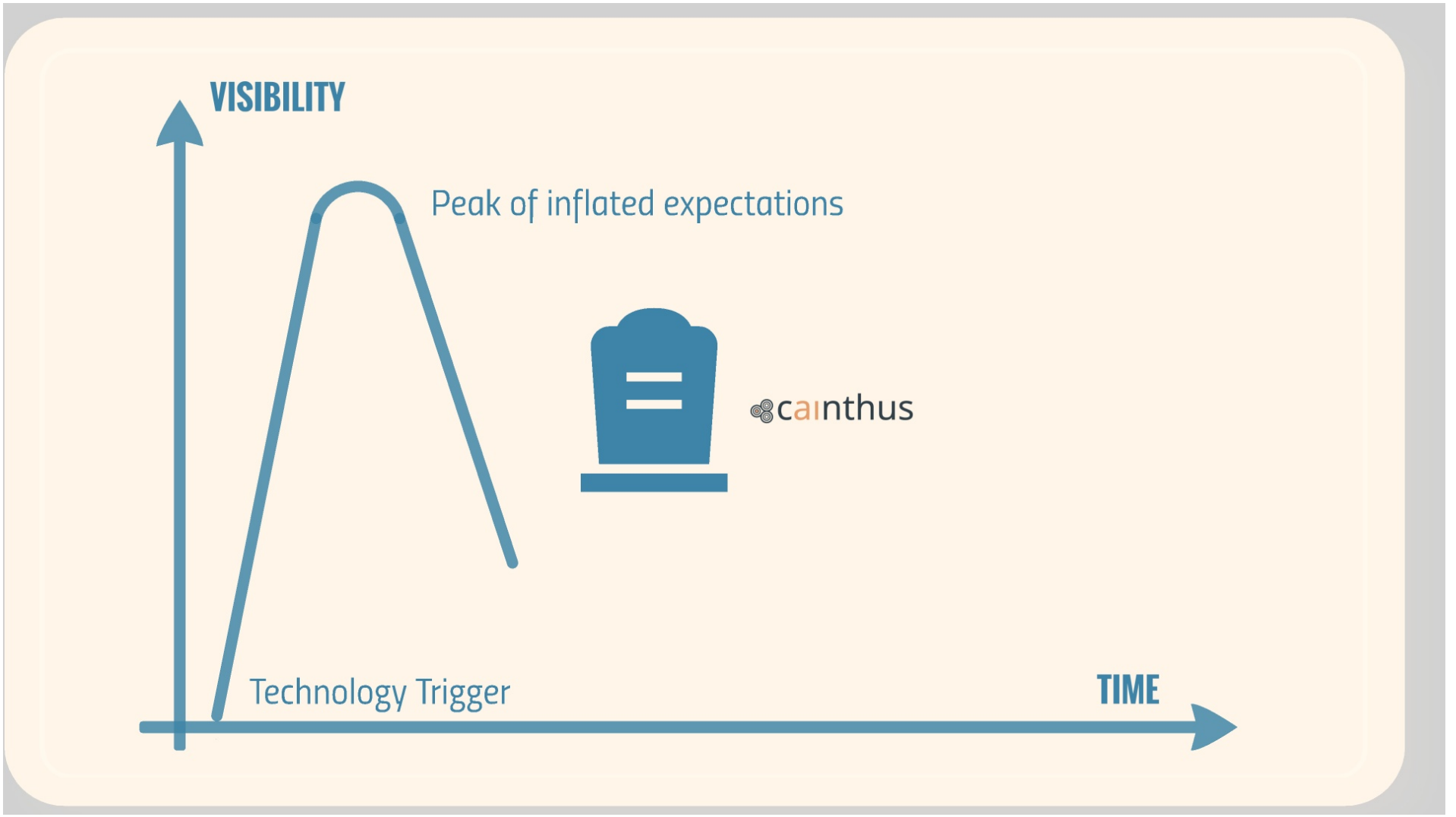
VERACITY



- Which refers to the biases, noise and abnormality in data.
- Rarely seen in animal & veterinary science to report data quality!
- Be honest about what you report, and especially not report
- Focus on QUALITY not QUANTITY of output




VISIBILITY
Peak of inflated expectations
Technology Trigger
TIME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cainthus
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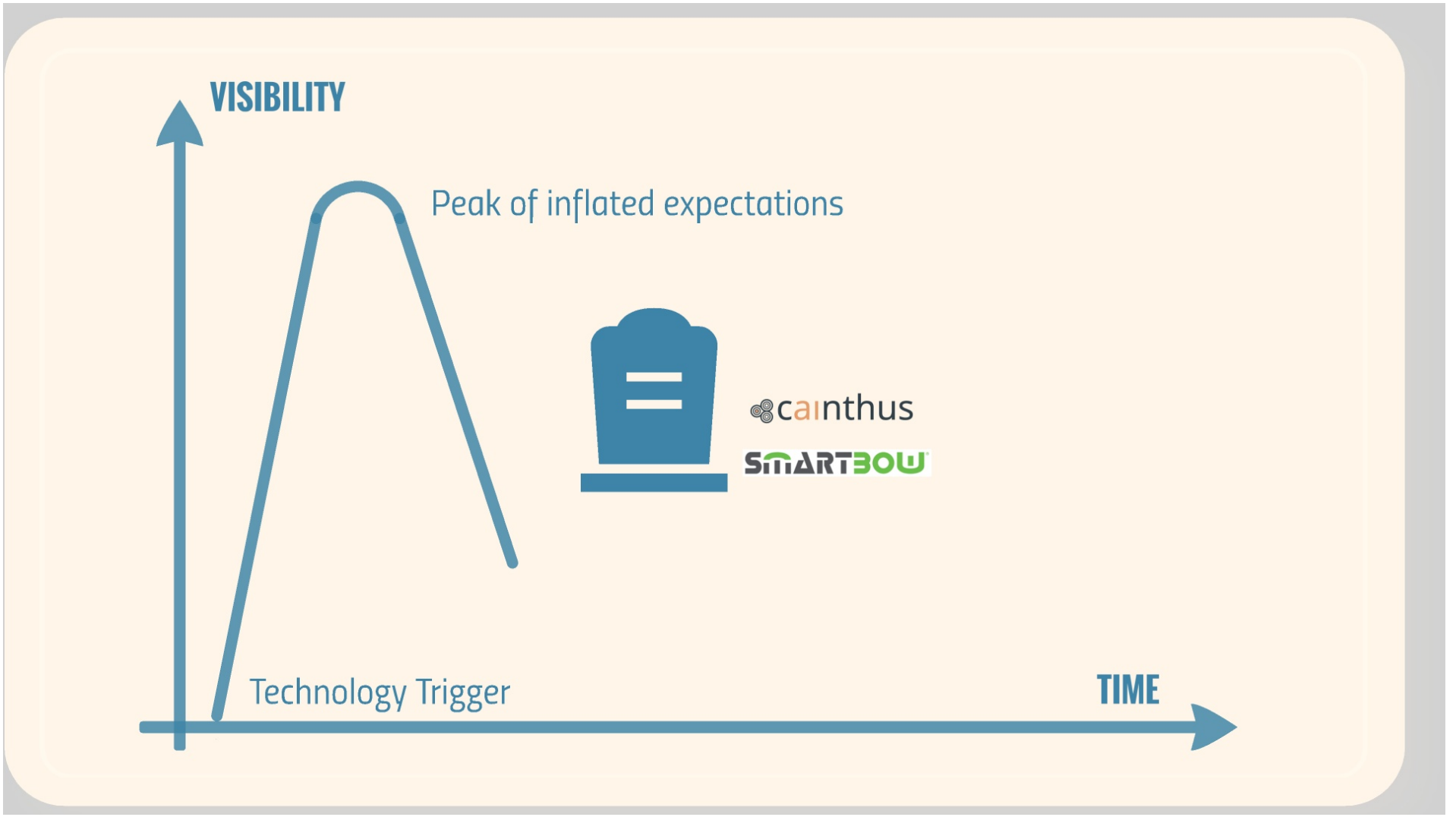
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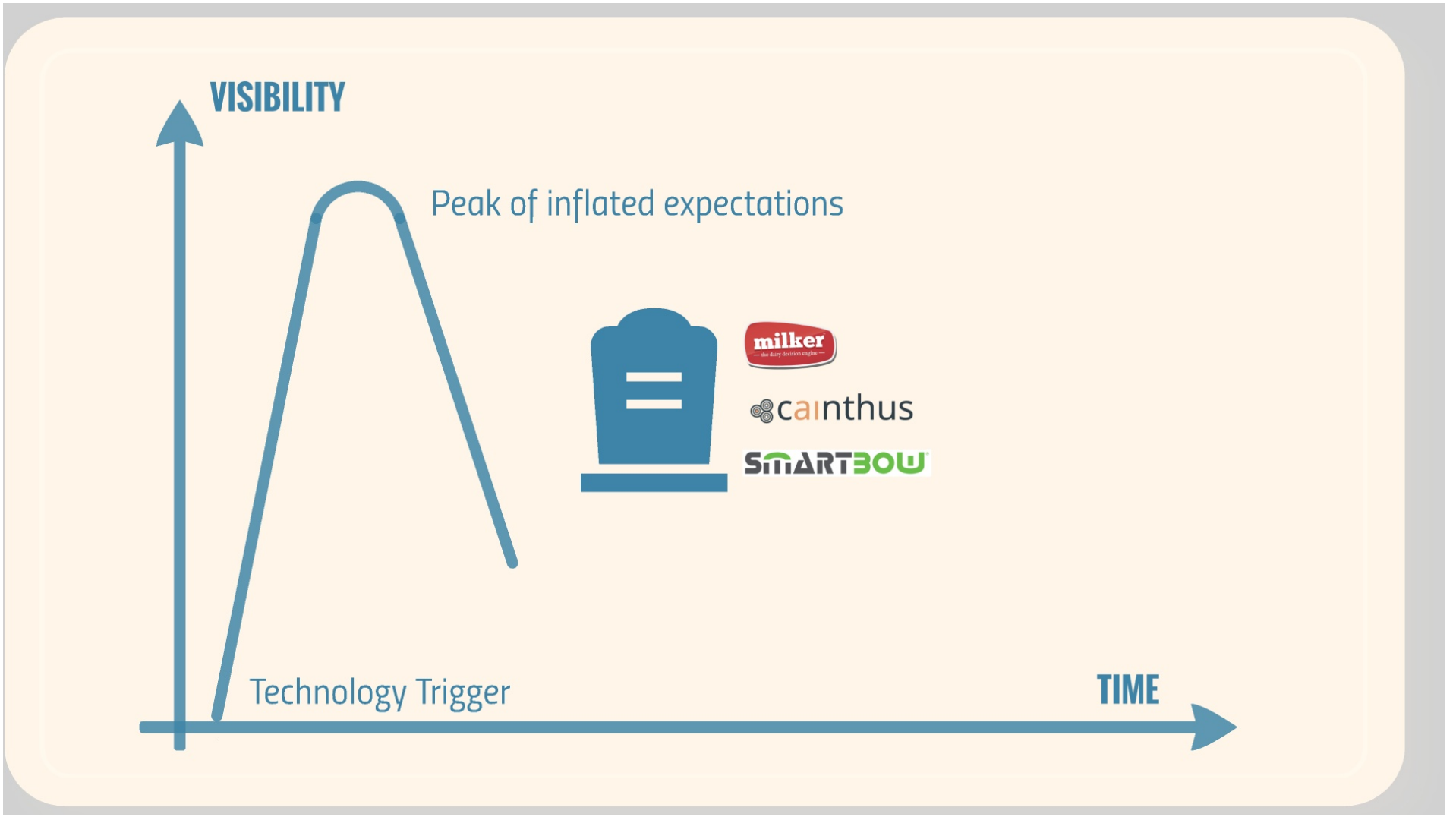
VISIBILITY
Peak of inflated expectations
milker
cainthus
SMARTBOW
Technology Trigger
TIME

Industry reality

Industry reality

Scientific reality

J. Dairy Sci. 104:4746–4763
https://doi.org/10.3168/jds.2020-19200

Associations between body condition score, locomotion score, and sensor-based time budgets of dairy cattle during the dry period and early lactation

P. R. Hut,[1]* M. M. Hostens,[1,2] M. J. Beijaard,[1] F. J. C. M. van Eerdenburg,[1] J. H. J. L. Hulsen,[3] G. A. Hooijer,[1] E. N. Stassen,[4] and M. Nielen[1]

[1]Department of Population Health Sciences, Division of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, PO Box 80151, 3508 TD Utrecht, the Netherlands
[2]Department of Reproduction, Obstetrics and Herd Health, Ghent University, Salisburylaan 133, Merelbeke 9820, Belgium
[3]Vetvice/Cowsignals, 4614 PC Bergen op Zoom, the Netherlands
[4]Adaptation Physiology Group, Department of Animal Sciences, Wageningen University & Research, PO Box 338, 6700 AH Wageningen, the Netherlands

Scientific reality

J. Dairy Sci. 104:4746–4763
https://doi.org/10.3168/jds.2020-19200

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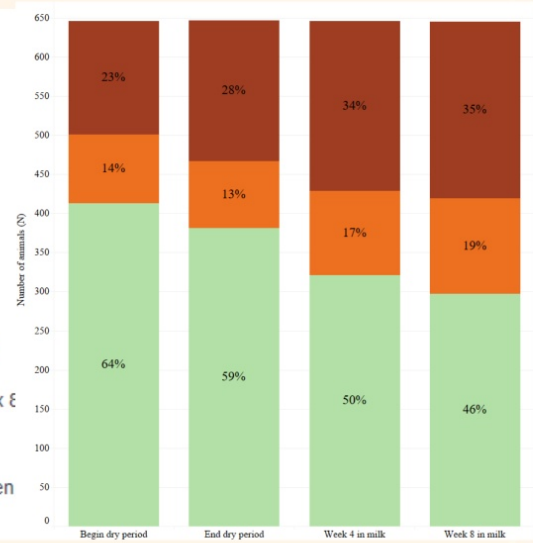


Political reality

KRINGLOOP WIJZER

Political reali

KRINGLOOP WIJZER

Milk pigs Agriculture Grains & Raw Material quotes LIVE food business

NEWS MILK

ZuivelNL secretly passes on data to CBS and RIVM

Today 12:00 pm - Klaas van der Horst - 1 comment

Since 2019, the ZuivelNL sector organization has been supplying all company data from individual dairy farms in a traceable form to CBS and thus also to RIVM. This is done without asking for the necessary permission or informing those involved. This is apparent from documents in the hands of Boerenbusiness.

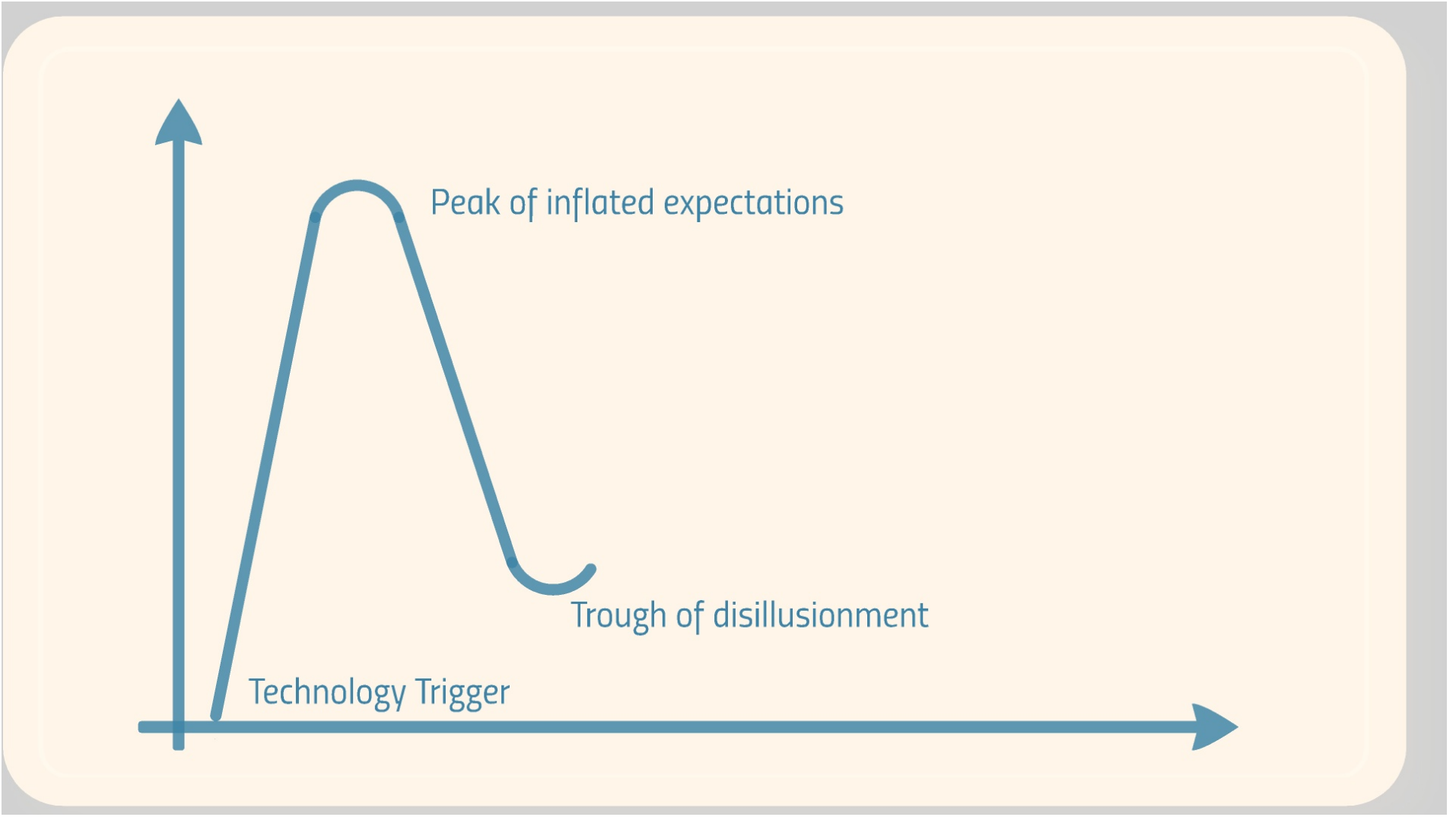
Do you have a tip, suggestion or comment regarding this article? Let us know

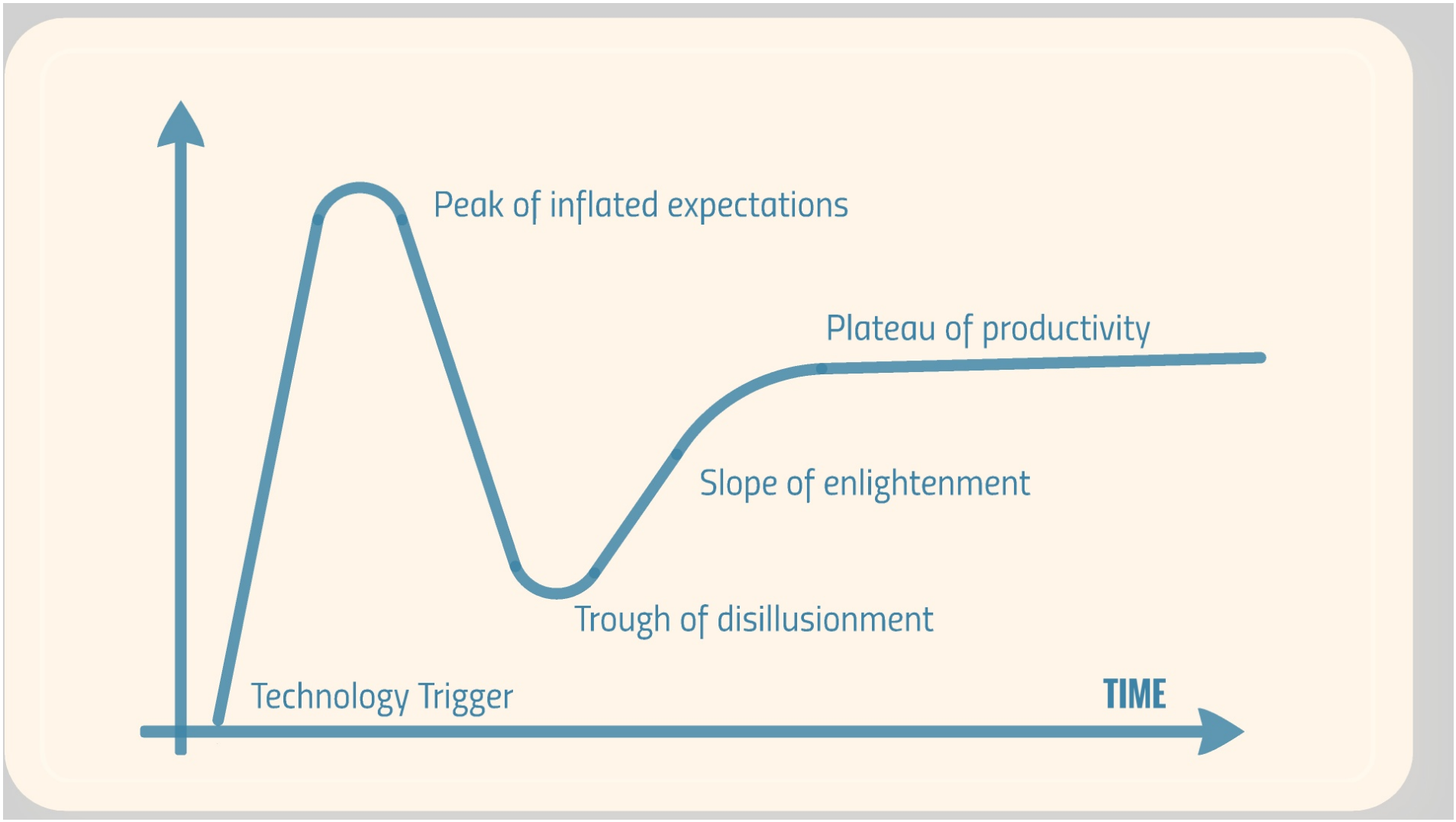
Academic - Veterinary reality

Academic - Veterinary reality

- Most EU curricula mainly oriented towards veterinary clinicians

- Veterinarians will not be replaced by PLF and AI, but the one who is not making use of it will be replace by the one who does

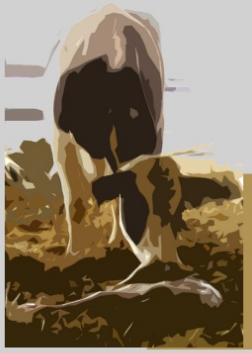

Peak of inflated expectations
Trough of disillusionment
Technology Trigger


Peak of inflated expectations
Plateau of productivity
Slope of enlightenment
Trough of disillusionment
Technology Trigger
TIME

BOVI-ANALYTICS

Universiteit Utrecht

Faculteit Bio-ingenieurswetenschappen
Faculty of Bioscience Engineering



Veterinary Big Data Stakeholder Meeting

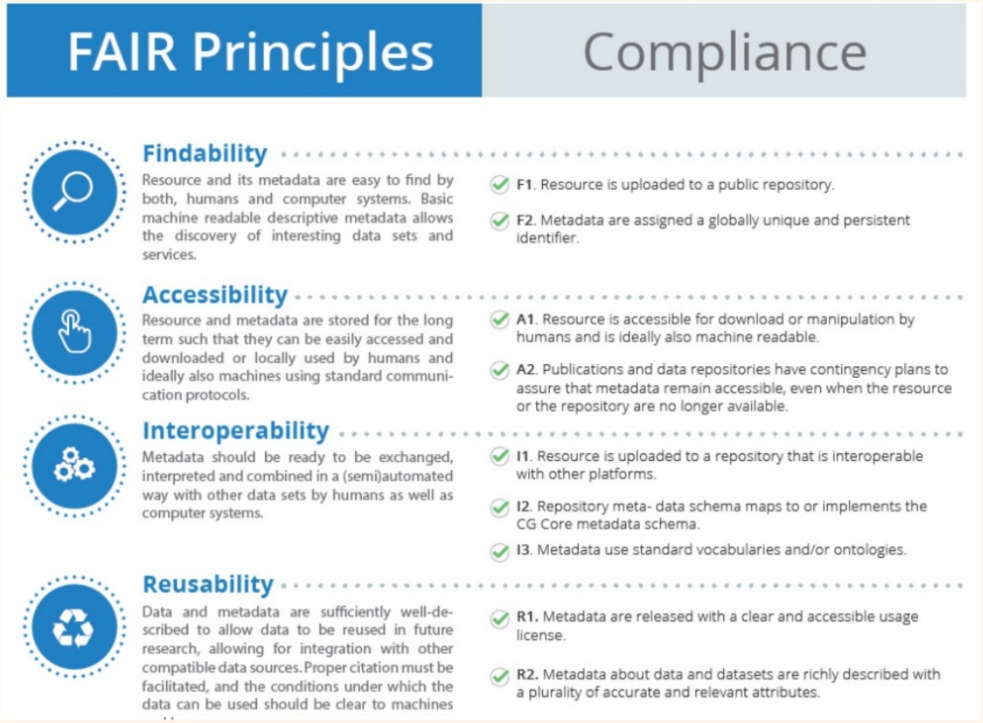
Once upon a time

Data

FAIR

Future

Are we 'researchers' setting the correct example?



'What if all Journal of Animal Science, Veterinary Journal became FAIR?'

Full transparency in data and methods

Are we 'researchers' setting the correct example?

Conclusions:

- **None** of the datasets assessed in this study **met all the requirements** set by the FAIR principles.
- **Interoperability**, in particular, requires specific skills in data management which may **not yet be broadly available** in the epidemiology community.
- Overall, although **many initiatives to improve data access** have been started in the research community, their impact on the availability of datasets underlying published articles remains unclear to date

Meyer et al. BMC Veterinary Research (2021) 17:270
https://doi.org/10.1186/s12917-021-02971-1

BMC Veterinary Research

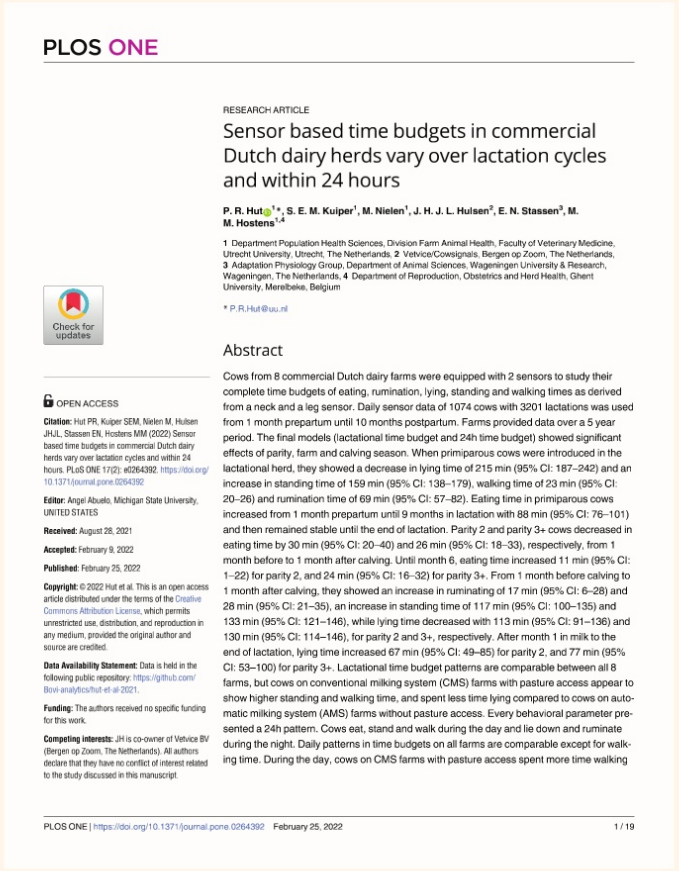
RESEARCH Open Access

Systematic review of the status of veterinary epidemiological research in two species regarding the FAIR guiding principles

Anne Meyer[1,2*], Céline Faverjon[1], Miel Hostens[2], Arjan Stegeman[2] and Angus Cameron[1]

How can you start yourself ...

Findable



PLOS ONE

RESEARCH ARTICLE

Sensor based time budgets in commercial Dutch dairy herds vary over lactation cycles and within 24 hours

P. R. Hut[1]*, S. E. M. Kuiper[1], M. Nielen[1], J. H. J. L. Hulsen[2], E. N. Stassen[3], M. M. Hostens[1,4]

1 Department Population Health Sciences, Division Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands, **2** Vetvice/Cowsignals, Bergen op Zoom, The Netherlands, **3** Adaptation Physiology Group, Department of Animal Sciences, Wageningen University & Research, Wageningen, The Netherlands, **4** Department of Reproduction, Obstetrics and Herd Health, Ghent University, Merelbeke, Belgium

* P.R.Hut@uu.nl

Abstract

Cows from 8 commercial Dutch dairy farms were equipped with 2 sensors to study their complete time budgets of eating, rumination, lying, standing and walking times as derived from a neck and a leg sensor. Daily sensor data of 1074 cows with 3201 lactations was used from 1 month prepartum until 10 months postpartum. Farms provided data over a 5 year period. The final models (lactational time budget and 24h time budget) showed significant effects of parity, farm and calving season. When primiparous cows were introduced in the lactational herd, they showed a decrease in lying time of 215 min (95% CI: 187–242) and an increase in standing time of 159 min (95% CI: 138–179), walking time of 23 min (95% CI: 20–26) and rumination time of 69 min (95% CI: 57–82). Eating time in primiparous cows increased from 1 month prepartum until 9 months in lactation with 88 min (95% CI: 76–101) and then remained stable until the end of lactation. Parity 2 and parity 3+ cows decreased in eating time by 30 min (95% CI: 20–40) and 26 min (95% CI: 18–33), respectively, from 1 month before to 1 month after calving. Until month 6, eating time increased 11 min (95% CI: 1–22) for parity 2, and 24 min (95% CI: 16–32) for parity 3+. From 1 month before calving to 1 month after calving, they showed an increase in ruminating of 17 min (95% CI: 6–28) and 28 min (95% CI: 21–35), an increase in standing time of 117 min (95% CI: 100–135) and 133 min (95% CI: 121–146), while lying time decreased with 113 min (95% CI: 91–136) and 130 min (95% CI: 114–146), for parity 2 and 3+, respectively. After month 1 in milk to the end of lactation, lying time increased 67 min (95% CI: 49–85) for parity 2, and 77 min (95% CI: 53–100) for parity 3+. Lactational time budget patterns are comparable between all 8 farms, but cows on conventional milking system (CMS) farms with pasture access appear to show higher standing and walking time, and spent less time lying compared to cows on automatic milking system (AMS) farms without pasture access. Every behavioral parameter presented a 24h pattern. Cows eat, stand and walk during the day and lie down and ruminate during the night. Daily patterns in time budgets on all farms are comparable except for walking time. During the day, cows on CMS farms with pasture access spent more time walking

OPEN ACCESS

Citation: Hut PR, Kuiper SEM, Nielen M, Hulsen JHJL, Stassen EN, Hostens MM (2022) Sensor based time budgets in commercial Dutch dairy herds vary over lactation cycles and within 24 hours. PLoS ONE 17(2): e0264392. https://doi.org/10.1371/journal.pone.0264392

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Data Availability Statement: Data is held in the following public repository: https://github.com/Bovi-analytics/hut-et-al-2021.

Funding: The authors received no specific funding for this work.

Competing interests: JH is co-owner of Vetvice BV (Bergen op Zoom, The Netherlands). All authors declare that they have no conflict of interest related to the study discussed in this manuscript.

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130 min (95% C
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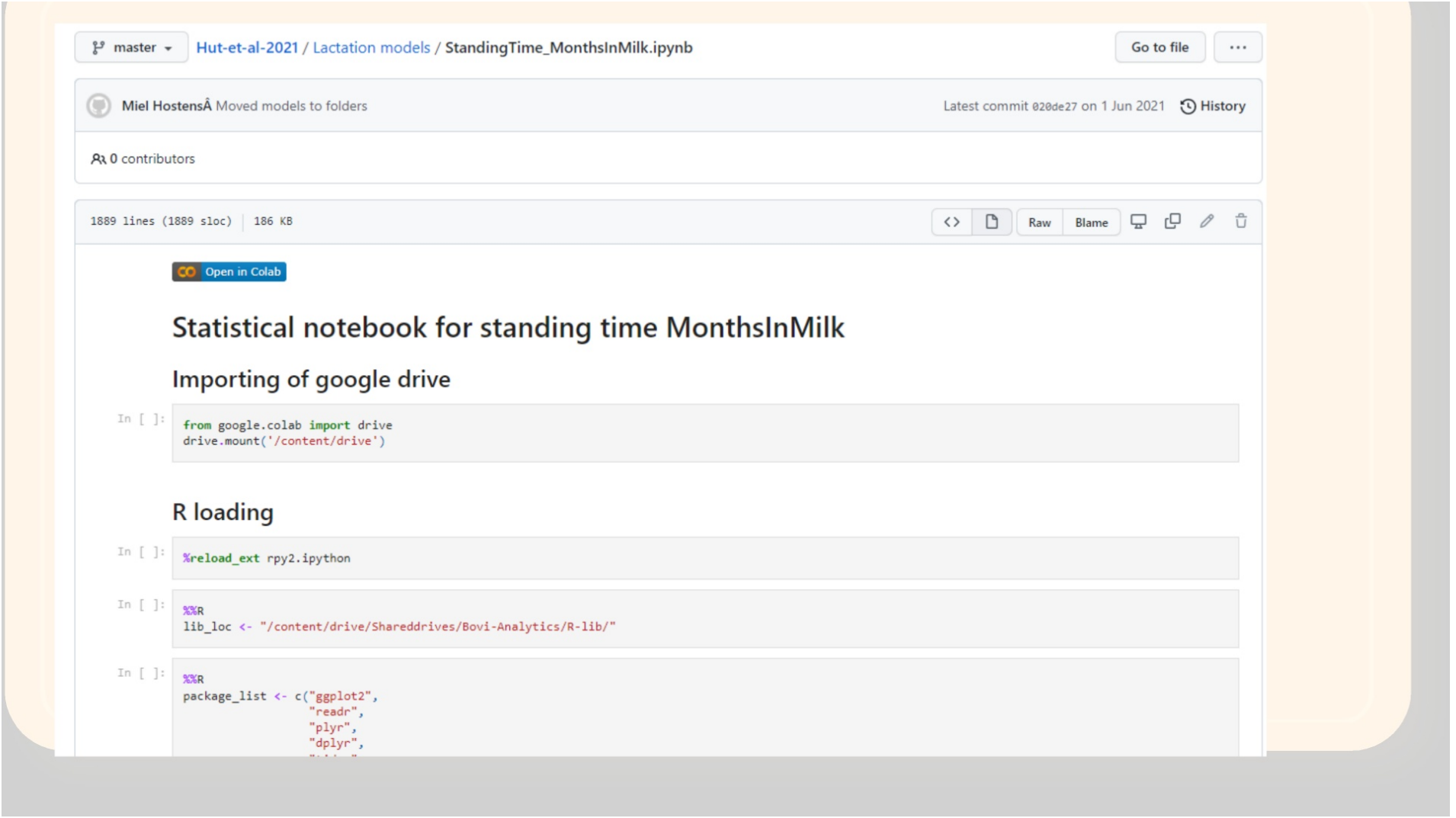

master
Hut-et-al-2021 / Lactation models / StandingTime_MonthsInMilk.ipynb
Go to file
Miel HostensÂ Moved models to folders
Latest commit 020de27 on 1 Jun 2021
History
0 contributors
1889 lines (1889 sloc)
186 KB
Raw
Blame
Open in Colab
Statistical notebook for standing time MonthsInMilk
Importing of google drive
In [ ]:
from google.colab import drive
drive.mount('/content/drive')
R loading
In [ ]:
%reload_ext rpy2.ipython
In [ ]:
%%R
lib_loc <- "/content/drive/Shareddrives/Bovi-Analytics/R-lib/"
In [ ]:
%%R
package_list <- c("ggplot2",
"readr",
"plyr",
"dplyr",

Accessible

A

What if the data is owned by multiple (industry) partners?

First of all
Don't let AVG/GDPR
limit your brain

Interoperable

SUMmarizing antiMicrobial transmission data to Enable data Reanalysis and predictions by FAIR data use (SUMMER-FAIR)

ZonMw

SUMmarizing antiMicrobial transmission data to Enable data Reanalysis and predictions by FAIR data use (SUMMER-FAIR)

Typically data sets on antimicrobial transmission experiments move towards the researcher

Goal is to estimate basic (R)eproduction number for AMR

ZonMw

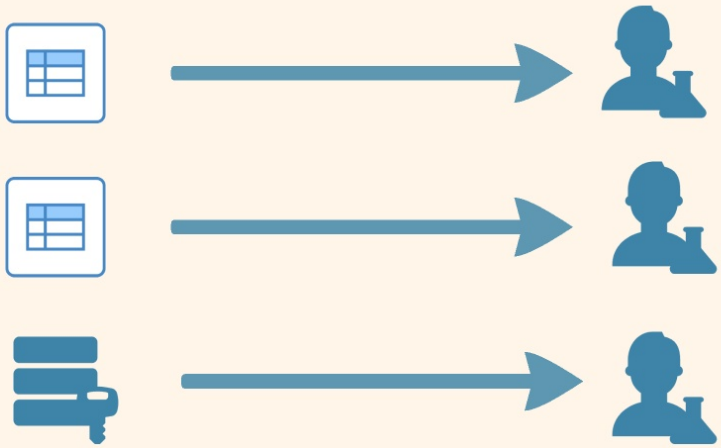
What if we would be able to combine all these experiments?

Even from privacy-sensitive human data

ZonMw

What if we would be able to combine all these experiments?

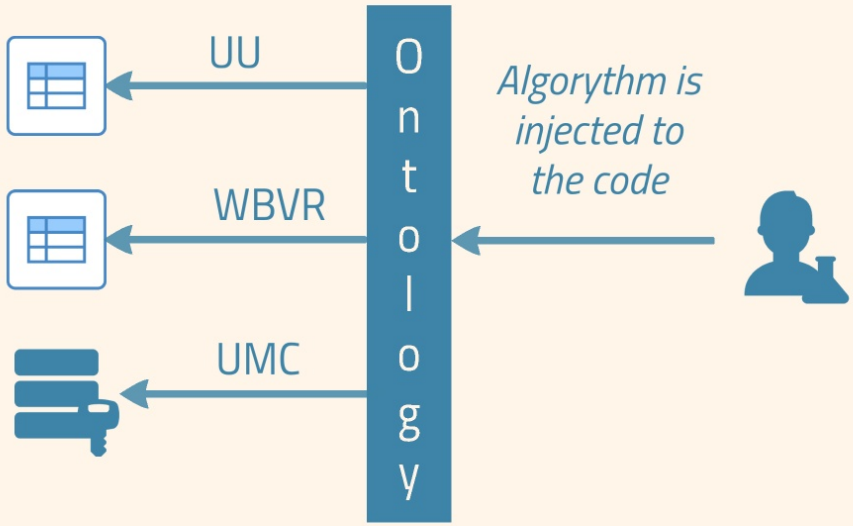
Even from privacy-sensitive human data



Data always moves to the code

ZonMw

SUMmarizing antiMicrobial transmission data to Enable data Reanalysis and predictions by FAIR data use (SUMMER-FAIR)



ZonMw

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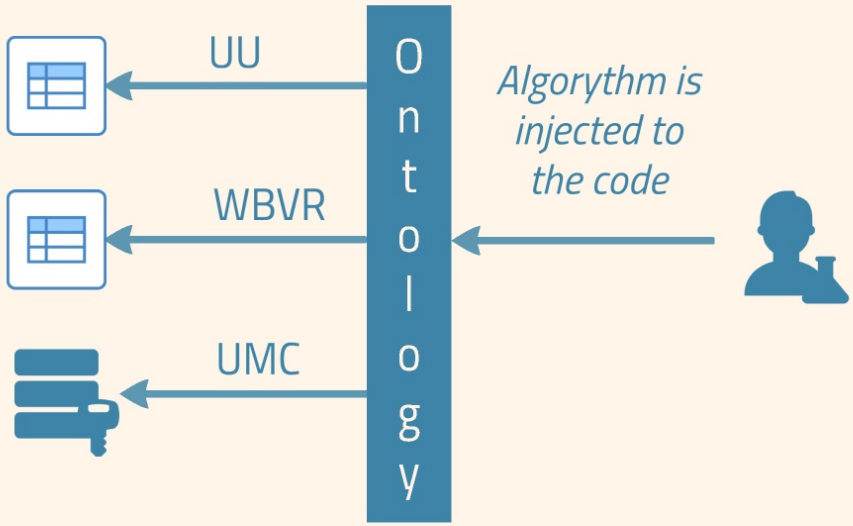

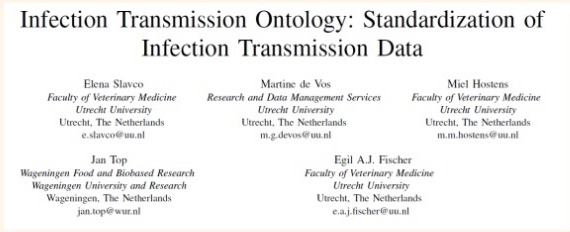

Infection Transmission Ontology: Standardization of Infection Transmission Data

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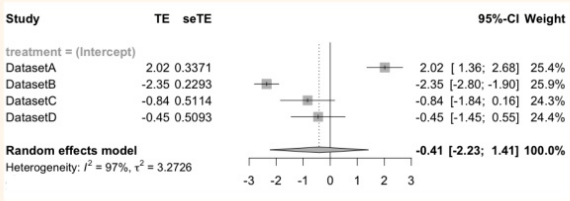

Study	TE	seTE	95%-CI	Weight
treatment = (Intercept)				
DatasetA	2.02	0.3371	2.02 [1.36; 2.68]	25.4%
DatasetB	-2.35	0.2293	-2.35 [-2.80; -1.90]	25.9%
DatasetC	-0.84	0.5114	-0.84 [-1.84; 0.16]	24.3%
DatasetD	-0.45	0.5093	-0.45 [-1.45; 0.55]	24.4%
Random effects model			**-0.41 [-2.23; 1.41]**	**100.0%**

Heterogeneity: I^2 = 97%, τ^2 = 3.2726

-3 -2 -1 0 1 2 3

https://github.com/UtrechtUniversity/summer-fair/wiki

Slavco et al., 2022, IEEE

ZonMw

Re-usable

R

REUSE existing data

Re-using existing data using new data science techniques

Effect of transition disease on

- Milk production (Hostens et al. 2010)
- Reproduction (Bogado et al., 2020)
- Culling (Probo et al., 2018)
- GWAS (Atashi et al., 2019)

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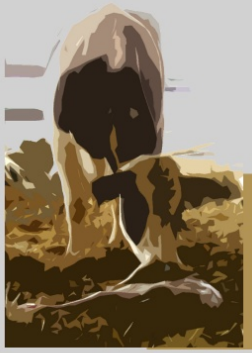
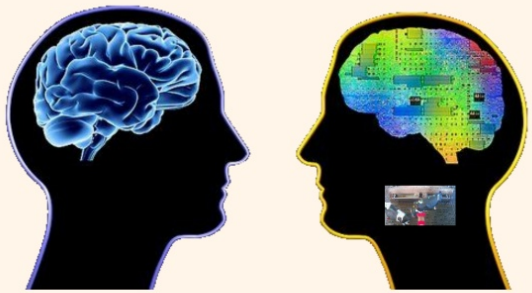


Veterinary Big Data Stakeholder Meeting

- Once upon a time
- Data
- FAIR
- Future

We need to integrate both worlds ...

We need to integrate both worlds ...



Embrace technology, but keep using the human neural network called domain knowledge


2022-10-11 10:01:16
CAM01

In summary

We need methodological federated frameworks for heterogenous FAIR data based on all potential data sources that can address

- (1) access to valuable data residing at different locations such as research institutes, commercial parties, governmental organisations,
- (2) the heterogeneous aspect of the data at different locations through federated definitions and ontology mapping, especially in the case where aggregation of data into a single database is infeasible or undesirable due the scale or data privacy concerns

Connect / more info / presentations

- www.uu.nl/staff/MMHostens/
- github.com/Bovi-analytics/

Always looking for motivated MSc/PhD students vet/dairy/data science

BOVI-ANALYTICS

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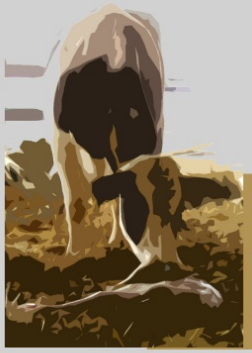

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Once upon a time

Data

FAIR

Future