

Data Sources and Examples of Modeling in Clinical Practice

MARS Petcare

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December 2, 2021



We are
100,000+

Mars Petcare Associates guided by our Purpose

working in **125+ countries**

across **50+ brands**

and **2,500+ hospitals**

That means we care for

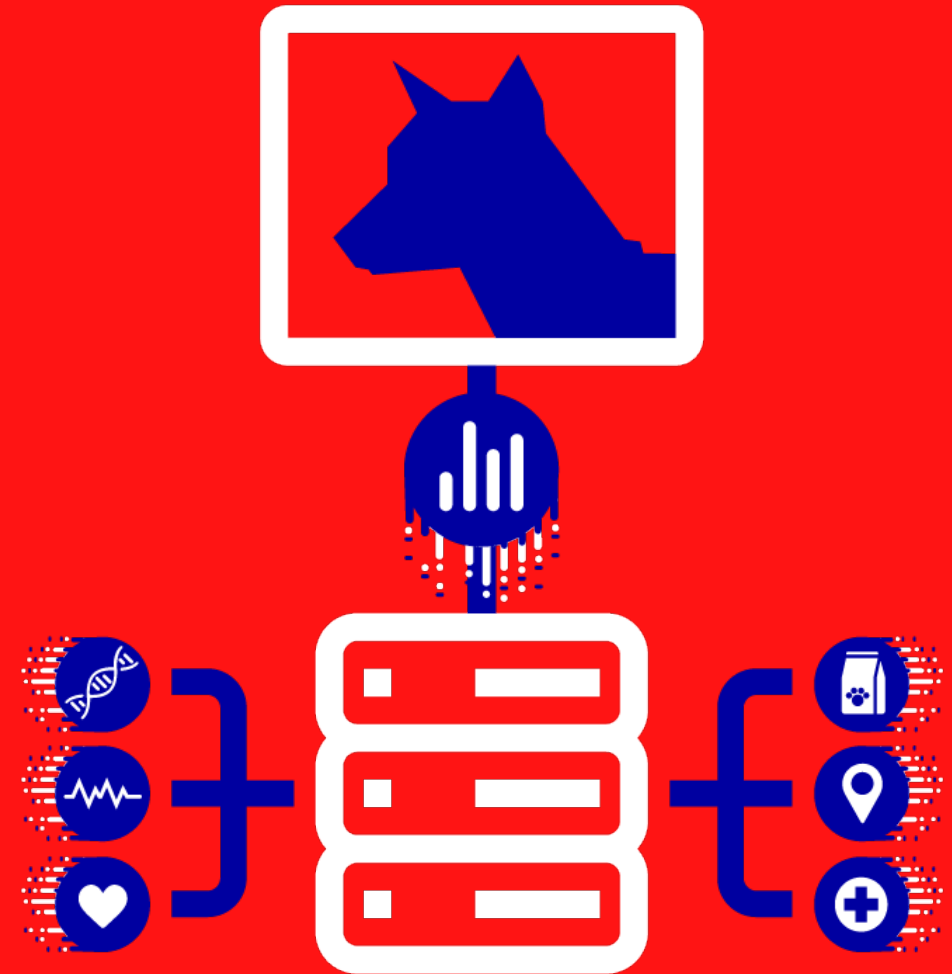
400+ million pets! every year





Petcare Science Engine: Enabling data science at scale.

Making anonymized data
from across Mars Petcare
accessible to our science and
R&D community to enable
real world science at scale
based on the pets we serve



The scale and granularity of the data across our businesses provide a phenomenal opportunity to generate insights that will help enable pets to live happier, healthier lives.



Creating value from unstructured medical notes

STRUCTURED DATA

Pet name	Rover
DOB	01-Jun-17
Species	Dog Cat Fish Lizard

UNSTRUCTURED DATA

Notes

Rover presented with excessive scratching and redness in the inguinal areas bilaterally, suspect atop dermatitis. Prescribed topical soothing spray to help alleviate itching and recommended next step to assess dietary triggers. Up to date with flea treatment. Overweight 7/9 BCS



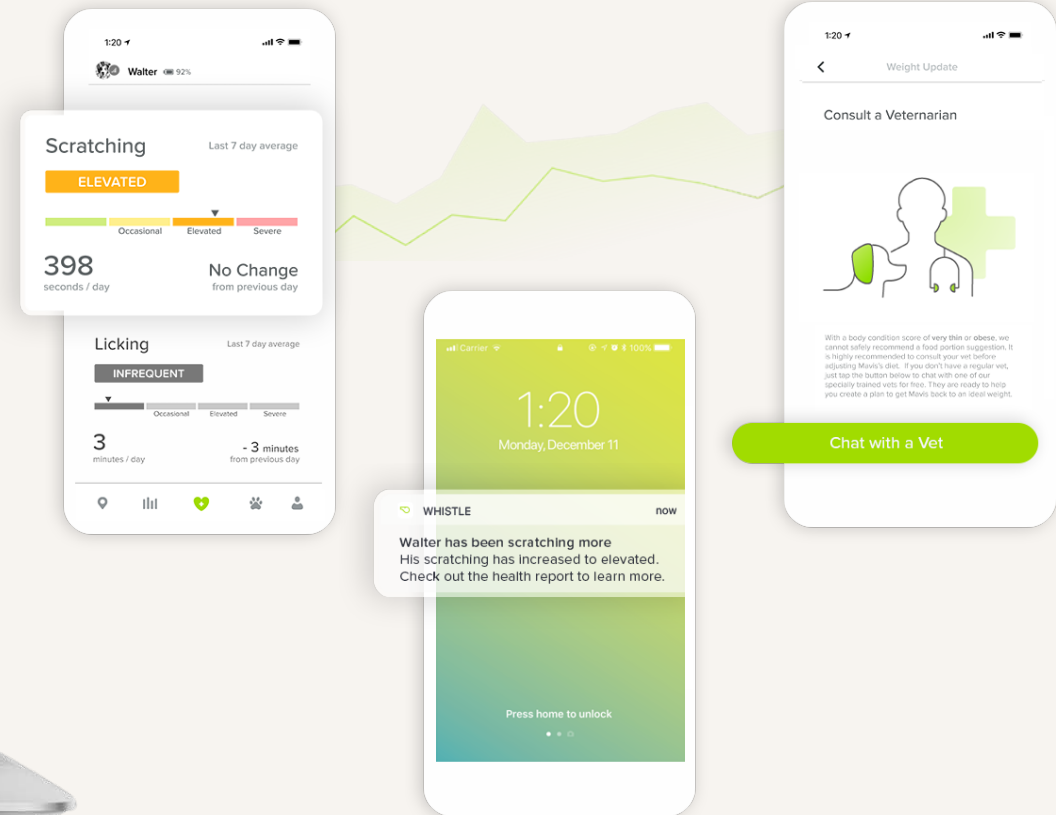
Symptom	Scratching Redness
Diagnosis	Atopic dermatitis
Treatment	Soothing spray
Care pathway	Diet assessment
Considerations	Flea Treated Overweight

DW_PET_VST_ID	RECOVERY
173225814	12:36P T-97.9 P-72 R-16
	1:50P T-97.9 P-180 R-28
	1:00P T-98.3 P-160 R-32
	1:05P T-98.3 P-140 R-28 AFTER WALK AROUND PETSMART
	1:25P T-98.6 P-140 R-24
	2:49 T-99.1 P-138 R-28
	3:36 T-100 P-120 R-32
	4:27 T:99 P:120 R:32 discharged catheter removed



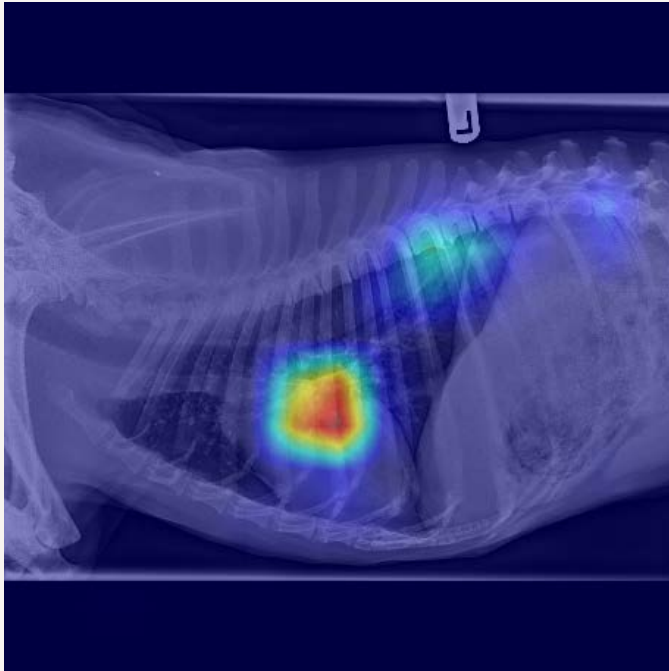
DW_PET_VST_ID	Time	Temp	Pulse	RR
173225814	12:36	97.9	72	16
173225814	01:50	97.9	180	28
173225814	01:00	98.3	160	32
173225814	01:05	98.3	140	28
173225814	01:25	98.6	140	24
173225814	02:49	99.1	138	28
173225814	03:36	100	120	32
173225814	04:27	99	120	32

Data is enabling us to detect unseen behavior patterns, and notify pet owners of potential changes in their pet's health



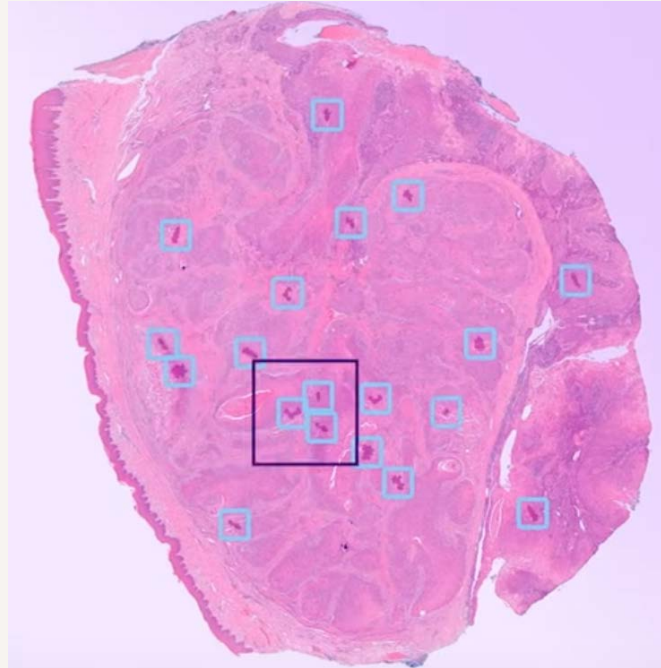
Using AI & ML to analyze large data sets

AI as an initial
assessment of a
pet x-ray



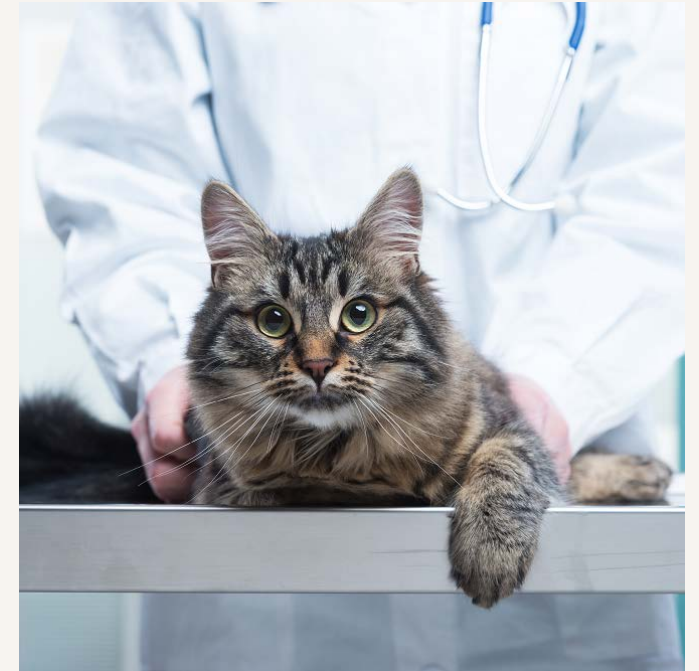
Fitzke *et al.*, preprint on ArXiv

Faster, more reliable
cancer grading
leveraging AI



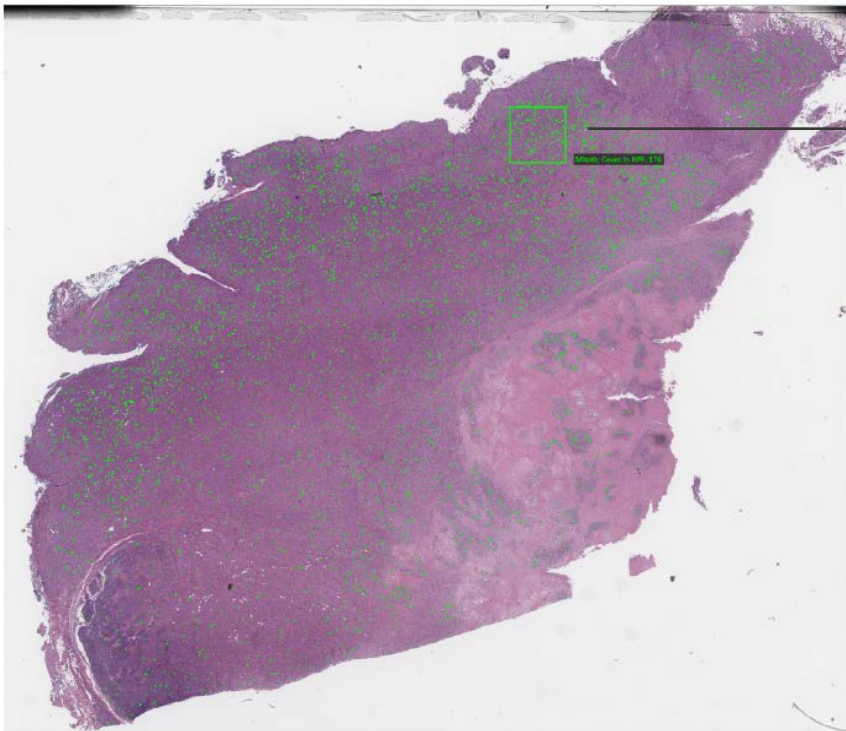
Fitzke *et al.*, preprint on ArXiv

Predicting feline CKD
up to two years before
clinical signs

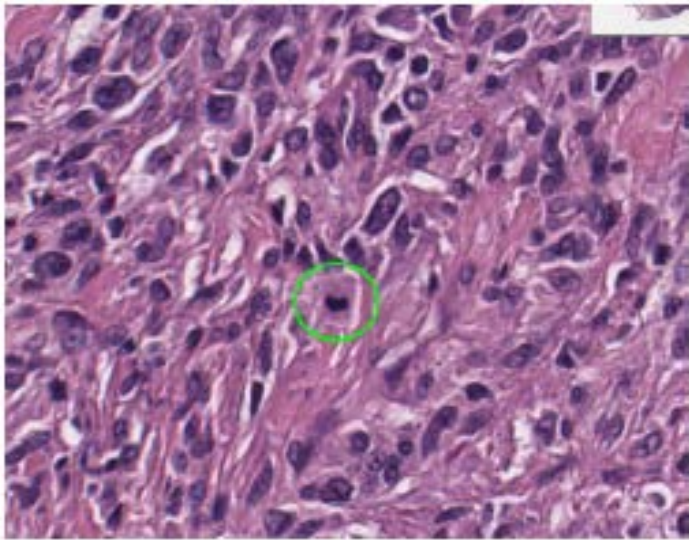


Bradley *et al.*, 2019

AI Mitotic Figure Analysis



Fully annotated whole slide image on the pathologist's viewer



Zoomed-in view of an annotated whole slide image

Case #	Tumor Type	Non-AI assisted MC	AI-only MC	AI Assisted MC	Change in Grade
3	Mammary carcinoma, feline	30	129	117	2 → 3
13	Mammary carcinoma, canine	11	34	25	1 → 2
28	Mammary carcinoma, canine	8	17	13	2 → 3
32	Mast cell tumor, canine	4	26	13	Low → High
7	Soft tissue sarcoma, canine	3	15	11	1 → 2
39	Soft tissue sarcoma, canine	3	90	69	2 → 3
40	Soft tissue sarcoma, canine	3	63	43	2 → 3

Acknowledgements

Mars Digital Technologies

Michael Fitzke
Fernando Rodrigues Jr
Vladimir Fadeev
Chris Carter

Conrad Stack
Andre Dourson
Rodrigo M. B. Santana

Antech Diagnostics

Derick Whitley
Wilson Yau
Jeffrey Edwards
Cindy Bacmeister

Mark Parkinson
Diane Wilson
Lisa Ziemer
Paul Fisher

Waltham Petcare Science Institute

Richard Bradley
Phil Watson

Geert De Meyer
Sophie Bradley

Process Integration and Predictive Analytics

Theodoros Panagiotakos
Minseung Kim

Yiannis Kokkinos
Ilias Tagkopoulos

Pet Insight Project

Robert Chambers
Nathanael Yoder
Aletha Carson
Christian Junge
David Allen

Garrett Wymore
Laura Prescott
Kevin Lloyd
Scott Lyle

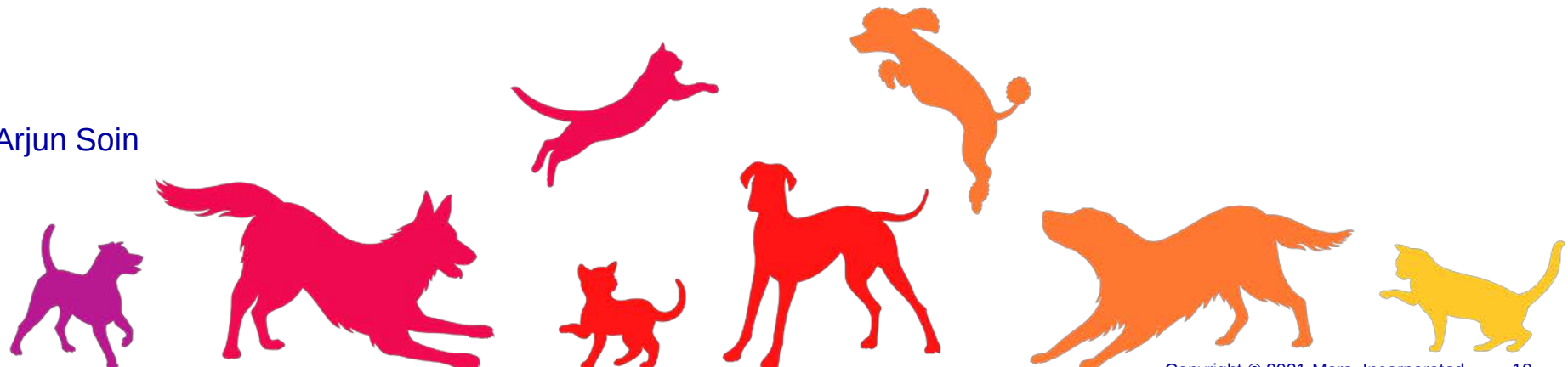
Royal Veterinary College

Jonathan Elliott

Stanford University

Matthew P. Lungren

Arjun Soin



MARS
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| *A Better  World For Pets*

Thank you!