

BouMatic / HERDLINE

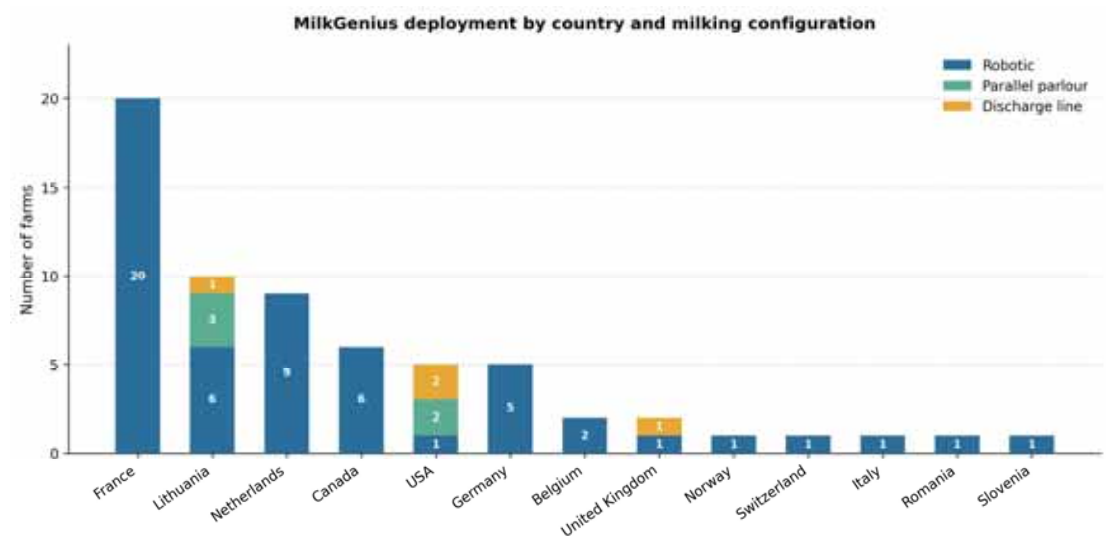


Field Implementation of an Inline Milk Composition Analyzer and Cloud Analytics System in Dairy Herds

Laima Andruliene, BouMatic HerdLine

MilkGenius + BouMatic HerdLine: Field Deployment

- 64 commercial dairy farms across 13 countries in Europe and North America.
- 15,588 monitored animals & over 5.2 million fat, protein and lactose measurements collected.



MEASURES



Fat



Protein



Lactose



Milk spectrum



Temperature

How Many Data Points Do You Actually Get?

- A farm that has 2 BouMatic robots, 2 MilkGenius sensors and milks ~100 cows daily:
 - Slightly more than 300 milkings a day;
 - 99% of milkings have fat, protein and lactose concentrations;
- Within a month, this farm is expected to have $300 * 30 * 0.99 =$ **8910 measurements** for fat, protein and lactose.

BHL Animal Health Models

The amount of reliable data from the sensor creates a strong training background for our machine learning models.

We are able to track individual animals through their lactation, compare them to the herd and see health warning signs early.

Further steps of combining this data with other sensors will only improve the accuracy of the models.

MilkGenius and BouMatic HerdLine in Robotic Farms

Herd level – Group level – Individual animal



Early detection of health disorders

- Negative energy balance
- Milk fat depression
- Acute cases



Optimize feeding

- Efficient feed usage
- Milk quality improvement
- Herd health monitoring



Improve reproductive performance

- Cow selection
- Improved insemination rates

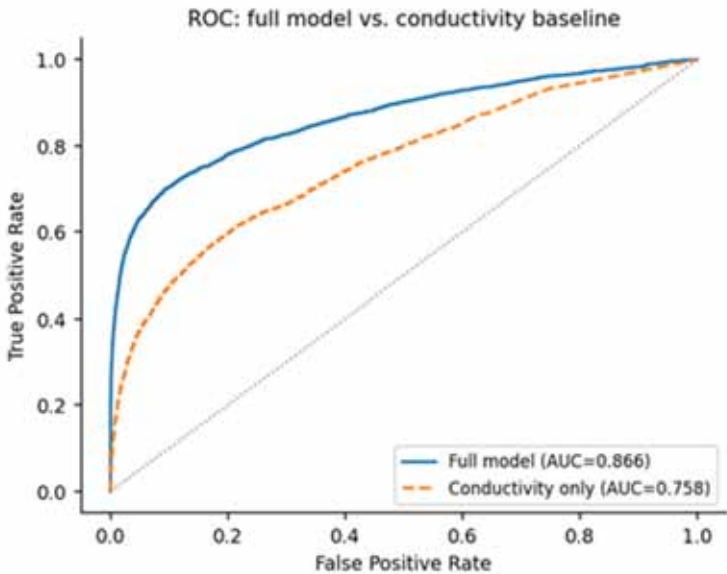


Mastitis Detection: Machine Learning Model

- The mastitis model was trained on nearly 400 thousand milkings from 700 lactations in robotic farms.
- Two-stage approach: (1) detect any health event vs. baseline; (2) classify as mastitis vs. other condition.
- Features: fat, lactose, conductivity, yield — fat changes are the strongest early indicator.
- Fat deviations precede conductivity rises by 1–2 days.

Performance vs. Conductivity-Threshold Baseline

- ROC-AUC: 0.866 (multi-signal model) vs. 0.758 (conductivity-only)
- At default threshold: 73% of episodes detected at 73.8% precision.



User view

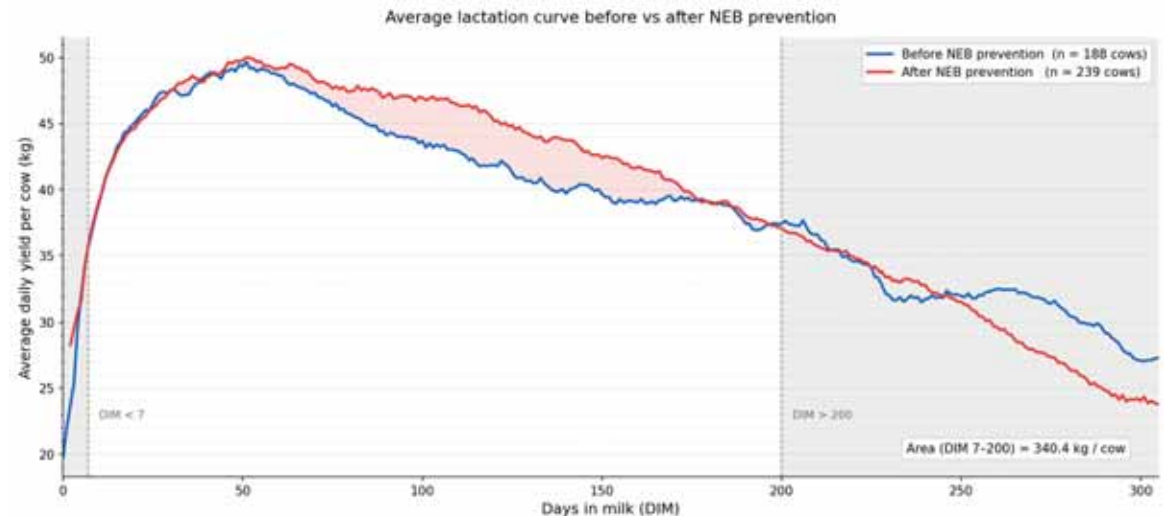
HEALTH WARNING	ANIMAL NO.	LACT. NO.	DIM	REASONS			
Mastitis (very likely)	2709	2	223	F/P	YIELD		
Mastitis (likely)	4078	2	119	F/P	YIELD		
Mastitis (likely)	2354	3	112	F/P	YIELD		
Mastitis (likely)	4489	1	98	F/P	YIELD		
Mastitis (likely)	5078	6	74	F/P	YIELD		

NEB Management: Controlled Trial & Automated Supplementation via Robot

Nearly every dairy cow experiences a **Negative Energy Balance (NEB)** around calving. It occurs when the energy required for milk production and maintenance exceeds the energy intake from feed.

In some cases, NEB causes sub-clinical ketosis, which is difficult to detect because your cow doesn't show obvious clinical signs. But the condition can have several significant impacts.

BHL models track each individual animal and are able to automatically administer liquid energy supplements through BouMatic robots.



THE COST OF THE WORLD'S TOP-5 DAIRY DISEASES

Sub-clinical ketosis - \$18 billion

Clinical mastitis - \$13 billion

Sub-clinical mastitis - \$9 billion

Lameness - \$6 billion

Metritis - \$5 billion

***Source: www.dairyherd.com/news/dairy-production/cost-worlds-top-12-dairy-diseases



THANK YOU!

