

Tech, artificial intelligence will change dairy industry in next 50 years

By Julie Baillargeon, agr.
Research Project and Technology
Transfer Coordinator

Anne-Marie Christen
Project Manager, R & D, Valacta

What innovations will revolutionize the way we do things over the next 50 years? Our multi-disciplinary research and development team explored the question.

The smart cow

A significant proportion of dairy production data currently derives from the milk recording program, which continues to be the most comprehensive and reliable tool available to support herd management decisions. In the long term, the milk recording program could shift towards a broader milk management concept. This new vision could lead us to collect data in real time, and on a continuous basis rather than at test time, as is currently the case.

Likewise, the Internet of Things promises an exponential increase in the amount of data available for analysis. We're talking about linking the internet to physical objects, like a cow. Yes, the cow of the future will be well connected.

We're already familiar with motion detectors and rumination monitoring systems. It is, therefore, reasonable to expect the cow of the future to be equipped with a variety of sensors, both internal and external, that will provide us with even more information.

Who knows, the milk analysis lab may one day be housed in the cow's udder!

Artificial intelligence

Given the data, the real challenge will be to ensure that we are able to benefit from it. How will we manage to understand and gain from the information? That's where artificial intelligence comes into play. Sophisticated algorithms that process huge volumes of data will provide us with complex, real-time information for herd management, information well beyond basic individual data. We can imagine, for example, counting on an intelligent system to let us know, in real time, that a cow's milk production is dropping due to ketosis.

In other words, it will no longer be necessary to consider individual milk weights and then rifle through

all the other data, which might lead to an investigation of the possibility of ketosis. Maybe one day we'll no longer even be talking about curative treatments for health and reproductive problems, because all the precision tools and automated equipment in place will have identified and corrected most potential problems before they reach a pathological stage.

Moreover, a revolution in algorithm design will soon enable these systems to do far more than simply analyze data. Thanks to what scientists call "deep learning," we'll soon see new devices and software that are able to think and learn by themselves, a little like the human brain.

Voice recognition systems are one example of such recent developments. Imagine a super-robot, equipped with sophisticated sensors, circulating continuously throughout the barn to collect data to feed its decision algorithms and herd management program. Besides pushing the ration, analyzing its forage content, and learning to recognize the newborn heifer by its physical appearance, the robot could also order an insemination for a cow in heat (with a choice of sires).

It is also entirely possible that we'll one day see every farm equipped with a made-to-measure herd management robot.

Will humans be replaced by robots?

Undeniably, some tasks will be done just as well by algorithms. Within the next 10 to 20 years, there is a 70-percent probability that a farm labourer's job will be automated. That said, nothing will ever be able to replace the experience and intuition of humans. Rather, it's by combining our strengths with those of the new technologies that we'll be able to maximize the benefits for our dairy industry. So the dairy adviser is not an endangered species, but rather a changing one.

There will always be a need for a qualified person outside the farm to deal with a more specific issue or complex situation. And robots will never be able to replace a "real" person when it comes to sharing the joy of success and demonstrating sensitivity in more trying circumstances.

For dairy producers and industry stakeholders alike, the challenge will be to understand and master all

these new technologies. Likewise, both the jobs and the skills required to do them will differ from those of today. Programs of study will also need to be adapted to ensure that the next generation of dairy producers and service providers are adequately trained. The role of the service provider will likely change as well, as new tools will be used to interact with dairy producers.

Whether to respond to economic considerations, react quickly or save time, or even reduce our carbon footprint, remote intervention is an avenue worth exploring. We already have a variety of such resources at our disposal. In time, virtual and augmented reality will revolutionize the ways in which we intervene remotely.

For example, we can imagine bringing a real-time 3D image of a barn to an adviser's office so that he or she can assess a problem in the stalls.

Whatever the changes and challenges the future might hold for the dairy industry, we must anticipate the future with confidence and enthusiasm. Our passion to do more, and do it differently, will lead the way for generations to come.

