



18. Blockchain Is Blockchain the Answer for your Data Security and Data Exchange

Title presentation

The US Dairy Brain Project: Data Integration and Data Applications for Improved Farm Decision-Making

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Abstract

Data pervades the dairy farming industry. However, specific data streams are most often ad-hoc and poorly linked to each other and to decision making processes. Dairy farms have embraced large and diverse technological innovations such as sensors and robotic systems, and can now stream vast amounts of data, but they have not been able to integrate all these data effectively to improve whole-farm decision making. Consequently, the benefits of the new smart dairy are not being fully realized. In order to address this it is imperative to develop a system that can collect, integrate, manage, and analyze on- and off-farm data in real-time for practical and relevant analyses that can be used to improve on-farm decision making. Hence, we are developing a real-time, data-integrated, data-driven, continuous decision-making engine: The Dairy Brain by applying Precision Farming, Big Data analytics, and the Internet of Things. This is a trans-disciplinary research and extension project that engages multi-disciplinary scientists, dairy farmers, and industry professionals. We are using the state-of-the-art database management system from the University of Wisconsin-Madison Center for High Throughput Computing to develop our Agricultural Data Hub that connects and analyzes cow and herd data on a permanent basis. This involves cleaning and normalizing the data as well as allowing data retrieval on demand. We have a four-part strategy: (1) Create a Coordinated Innovation Network (CIN) to shape data service development; (2) Create a prototype Agricultural Data Hub (AgDH) to gather/disseminate multiple data streams relevant to dairy operations; (3) Build the Dairy Brain – a suite of analytical modules that leverages the AgDH to provide insight to the management of dairy operations and serve as an exemplar of an ecosystem of connected services; and (4) Design and execute an innovative Extension program. We illustrate our Dairy Brain concept with a practical application that predicts CM onset. The application uses machine learning algorithms to identify cows at higher risk of contracting CM seven milkings before the onset. The application integrates data from management software and data from the milking parlor. Our preliminary results indicate that our predictions are 72% accurate. Integration of more data streams and incorporating larger historical datasets will improve accuracy even further. We demonstrate that it is possible to develop integrated continuous decision-support tools. Tomorrow's dairy industry will be built on the effective capture and integration of more data streams, not fewer. This is a critical moment to develop the structures that can move the industry towards modernized data exchange. This is an ongoing innovative project that is anticipated to transform how dairy farms operate.