

Using Automated Internet Systems in Milk Quality Monitoring

Mark L. Kinsel¹ and Jeffrey K. Reneau²

¹AgriMetrica LLC, Ellensburg, Washington, USA

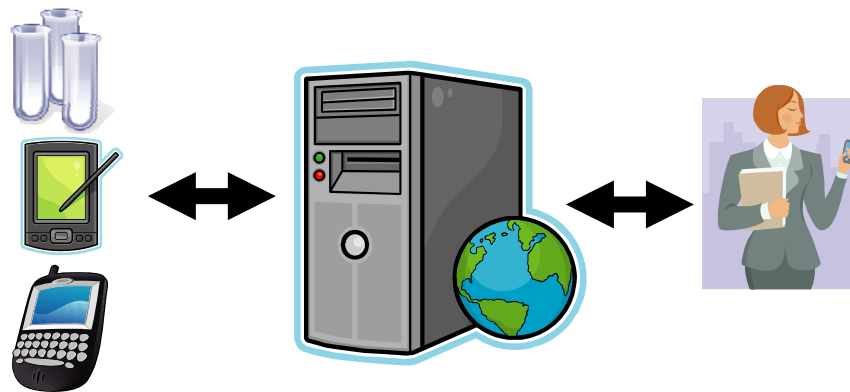
²University of Minnesota, St. Paul, Minnesota, USA

Introduction

Farm managers and advisors have restricted their analysis of milk quality parameters to limited comparisons of time-insensitive metrics. One reason for this limited analytical approach has been the difficulty in gathering, processing, and presenting results in a timely manner. Recent advances in Internet and mobile communications technology have provided an opportunity to address these difficulties and allow farm advisors to automate much of the information generation process from on-farm data to useful analytical reports. Coupled with recent advances in application of analytical methods such as statistical process control (1), farm managers and advisors have a new arsenal of tools for rapid detection of impending milk quality problems.

Description Of Example Data System

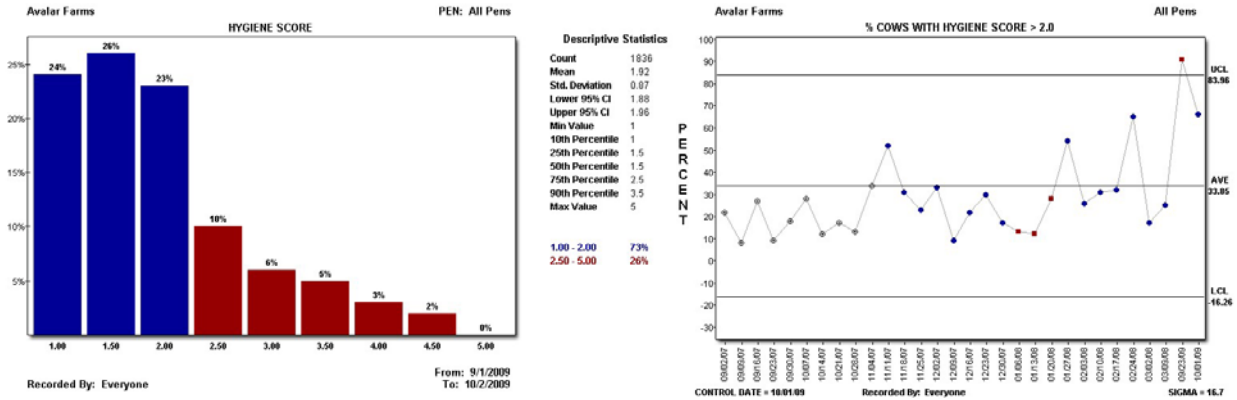
The example data system used in this paper has been previously described (2). The general layout is shown in the figure below:



This data system allows users to install a small computer program on their Microsoft Windows Mobile-based device, either a smartphone or personal digital assistant (PDA) that interacts directly with an Internet server through a live connection such as a cellular phone signal or a wireless connection. Once a farm is created on the Internet server with its associated pens and parlors, settings are synchronized with the mobile device such that data collection is as simple as tapping buttons on the device to input observations, record the data to a file, and upload the data to the server. Associated data from other sources such as testing laboratories can be easily integrated into one data set. Once received by the server, the data is automatically processed into information such as histograms and statistical process control charts in a matter of seconds, without any manipulation by the person collecting the data. Significant changes in performance trends can automatically trigger e-mail alerts that can be sent to the dairy manager and the farm advisors of their choice, dramatically reducing the response time to an impending change.

Example Output

Two general types of reports that can currently be autogenerated by the server are: 1) data snapshots, and 2) data trends. The figure on the left shows an example of a data snapshot represented as a histogram of the current udder hygiene scores for a dairy:



The figure on the right shows an example of a data trend report represented by a statistical process control chart for the percentage of cows with a hygiene score > 2.0 for the last 12 months. This type of report can be coupled with e-mail alerting features to warn of a significant change in performance.

Future Developments

The use of the Internet and the automated data processing technology holds great promise for monitoring dairy performance. In the future, data collection may be performed using voice processing such the farm advisor may record their findings hands-free by talking while working. The autoreport generation capability can be expanded such that users can customize their report template for a farm including which graphics or reports to display and how they should be organized. Data from previous visits or other farms can be integrated to provide real time benchmarks of performance. This allows users to focus on just getting the raw data into the system and then spending their time interpreting the results of the analysis packaged from a wide variety of sources and times, greatly reducing the time, cost, and effort needed to provide big picture solutions to current or impending problems.

References

- Reneau, J.K., & J.M. Lukas. 2006. Using Statistical Process Control to Improve Herd Performance. *Veterinary Clinics of North America: Food Animal Edition*. WD Saunders.
- Reneau, J.K. 2009. New Technologies for On-Farm Milk Quality Monitoring. Proc. 48th Annual Meeting of the National Mastitis Council, pp. 38-39.