



10. Data Analytics What Can New Analyses Techniques Bring for Better Farm Results 2

Title presentation

Identification of cows and individual feed intake records using a 3D camera system in commercial farms

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Abstract

A system has been developed to make identification of cows and individual feed intake records in commercial farms using a 3D camera system. Cameras are installed in the lock after milking where the RFID eartag is identified and images of the cows back is stored to generate reference images. These reference images are used to predict a given cow when she is eating. Individual feed intake is estimated at any visit during the day. The last image of the feed before a visit is stored together with the first image of the feed after a visit. These 2 surfaces is subtracted to estimate an intake for a visit. Based on feed density the volume is transformed to kilos. All visits are summed to daily intake and later on to weekly mean of daily intake and reported throughout lactation. The system is installed in 5 herds (3 Jersey, 1 Holstein and 1 Red dairy cows) measuring in 697 Jersey, 431 Holstein and 212 Red Dairy cows in a two year period.

Mean daily feed intake measured was 54.7 kilo for Jersey, 61.4 for Holstein and 59.6 for Red dairy cattle. Corresponding standard deviation was 8.1, 10.9 and 9.3 kilos respectively.

A mixed linear model was used to analyse the data for each breed separately. The model contained a fixed effect of herd (for Jersey), week of year, week in lactation, year, a random effect of animal and a residual term. Repeatabilities (animal variance divided by total variance) of daily individual feed intake as a weekly mean were moderate to high across the three breeds. For Jersey repeatability was 56%, for Holstein 60% and for Red Dairy cattle 61%.

The results suggests that data from 3D cameras can be used to make large-scale individual records for feed intake in indoor-housed dairy cattle. This data can be used to make genetic evaluations and management decisions. Further data over a longer time period and from more herds is needed to confirm these results. Therefore the system will be installed in new herds in 2021 and more than 3000 cows will be added to the CFIT registration system.

The data is measured throughout lactation, which opens up for estimation of genetic correlation between efficiency and health traits in early lactation. Using 3D camera data opens up for individual measures of other phenotypes. This includes weight but also health, welfare and behavioral traits.