Assessing the potential of photogrammetry to monitor feed intake of dairy cows

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SUPPLEMENTARY FILE

Table S1. Values of the controlled factors in different experiments

Factors / Experiment	Camera Type	Lighting Conditions	Distance	Number of Images
Camera Type	Nikon, GoPro, HikVision	FL[1]	1mm/pixel	16im
Lighting Conditions	Nikon	FL, S[2], SS[3]	2m	16im
Display Resolution	Nikon	FL	2m, 3m, … 8m	16im
Number of Images	Nikon	FL	2m	8im, 10im, 12im, 16im, 32im
Laboratory Cowshed	Nikon HikVision	FL SS	2m 2m	16im 30im

[1] FL is Fluorescent Lamp lighting

[2] S is Sun lighting

[3] SS is Sun with Shadow lighting

Table S2. Feed components

Components	%	Components	%	Components	%
Ground Corn Grain	15.6	Wheat Hay	8	Rapeseed Meal	4.8
Barley Grain	1.6	Wheat Silage	32.2	Sodium Bicarbonate	0.6
Wheat Grain	3.5	Corn Silage	9.5	Calcium Carbonate	0.5
Calcium Salt	0.7	Corn Distilled Dry Grain	6.4	Gluten Feed	10.5
Sunflower Meal 37%	0.8	Calcium salts & Fatty Acids	0.8	Lactose waste	4.5

Table S3. Results of the display resolution experiment

Distance [m]	2	3	4	5	6	7	8
Display resolution [mm/pixel]	1.5	2	2.6	3.1	3.6	4.1	4.7
SD [liter]	0.72	0.63	0.59	2.6	1.9	2.1	2.2
RSD [%]	1.8	1.6	1.5	6.5	5.1	5.7	6.4
Mean [liter]	40.1	40	38.6	39.3	37.2	37	35.1

Table S4. Results of the number of images experiment

Number of images	8	10	12	16	32
SD [liter]	0.37	0.57	0.59	0.16	0.23
RSD [%]	2.7	4	4.3	1.2	1.7
Mean [liter]	13.63	14.05	13.86	13.44	13.78

Figure S1:

Feed heap models based on images from different cameras: Nikon, GoPro and HikVision. The GoPro camera yields an image that cannot be used to calculate volume.

Nikon   GoPro   HikVision