

The Internet of Things enhancing animal welfare and farm operational efficiency

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SUPPLEMENTARY FILE

Figure legends:

Figure S1:

Rumination signature measured using a neck mounted accelerometer (top) and a pressure halter monitoring jaw motion (bottom). There are four rumination episodes in this example, each lasting around 45 secs. The slight offset observed in the signals is due to small differences in time synchronisation. The spread of accelerations due to the neck motion (top trace) ranges over 100 mg shown on the right hand ordinate while the jaw motion, detected by the pressure sensor is recorded in mbar (left hand ordinate).

Figure S2:

Estimation of feed intake using accelerometer data to determine time spent feeding. Errors in estimating Feed Intake using Equation 1: Top: CONC diet, Bottom MIXED diet.

Figure S3:

The performance of the SVR model compared to actual intake.

Figure S4:

Feed Conversion Ratio, Actual versus Estimated $R^2 = 0.92$

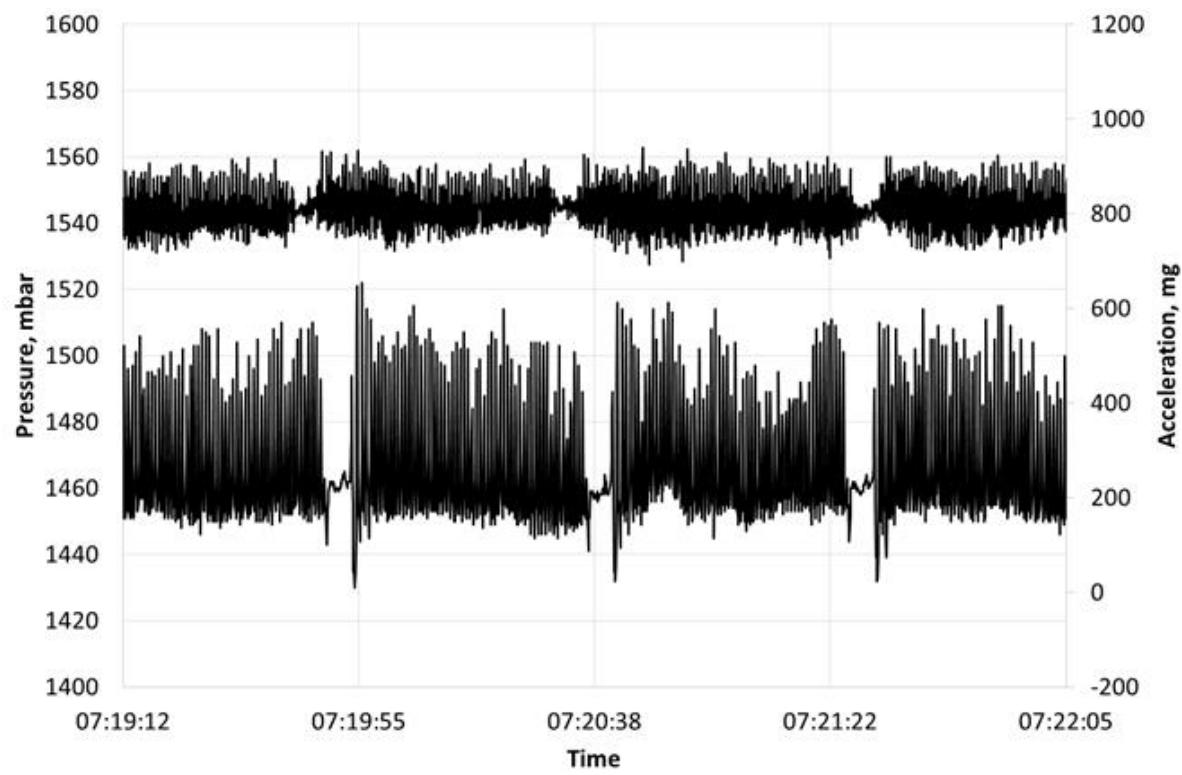


Figure S1

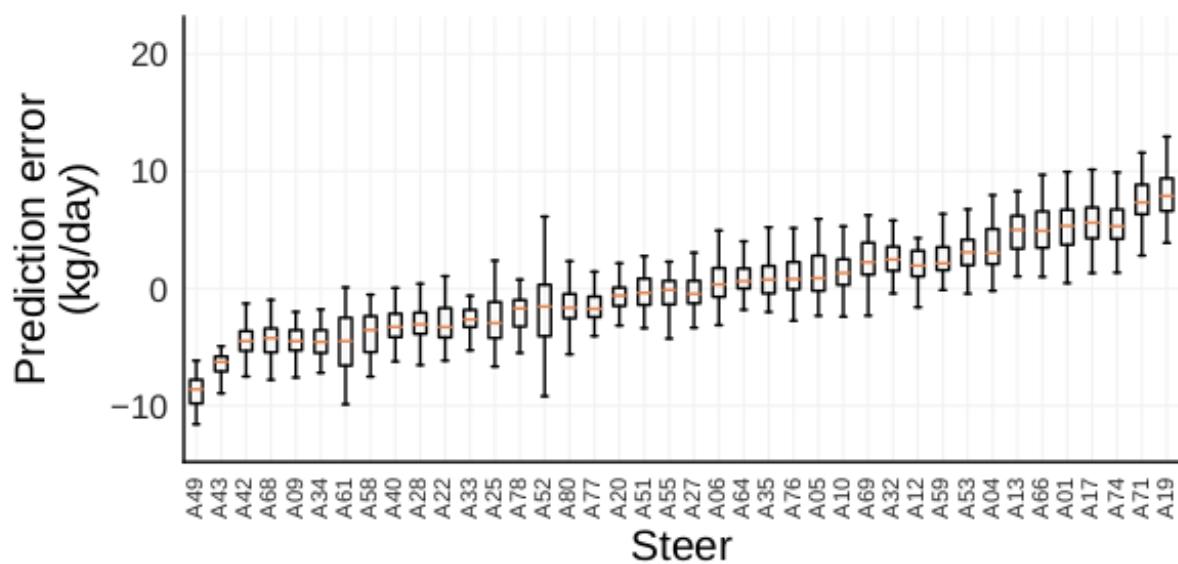
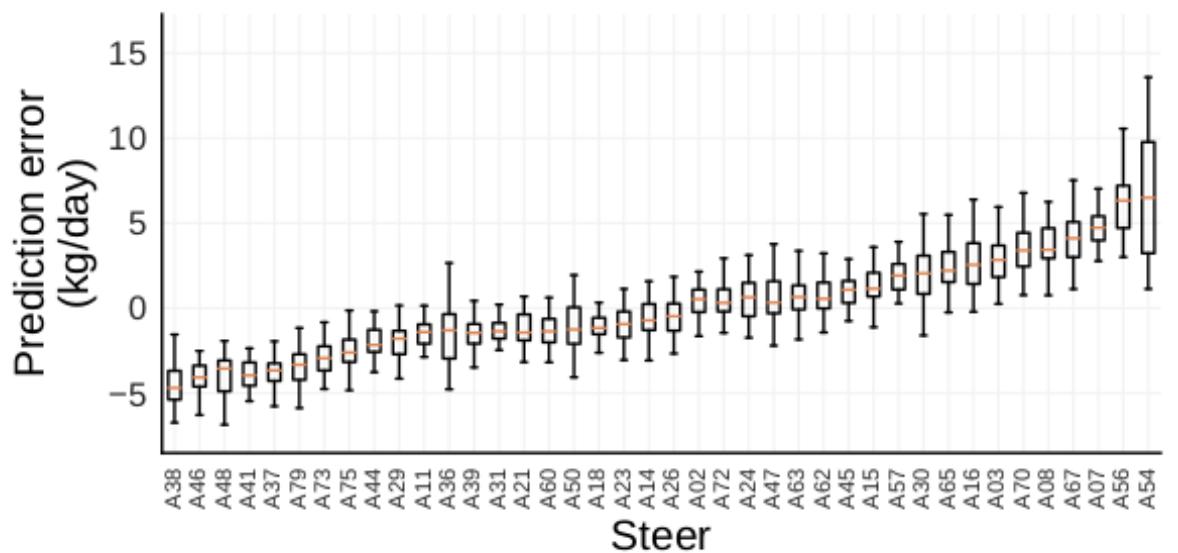


Figure S2

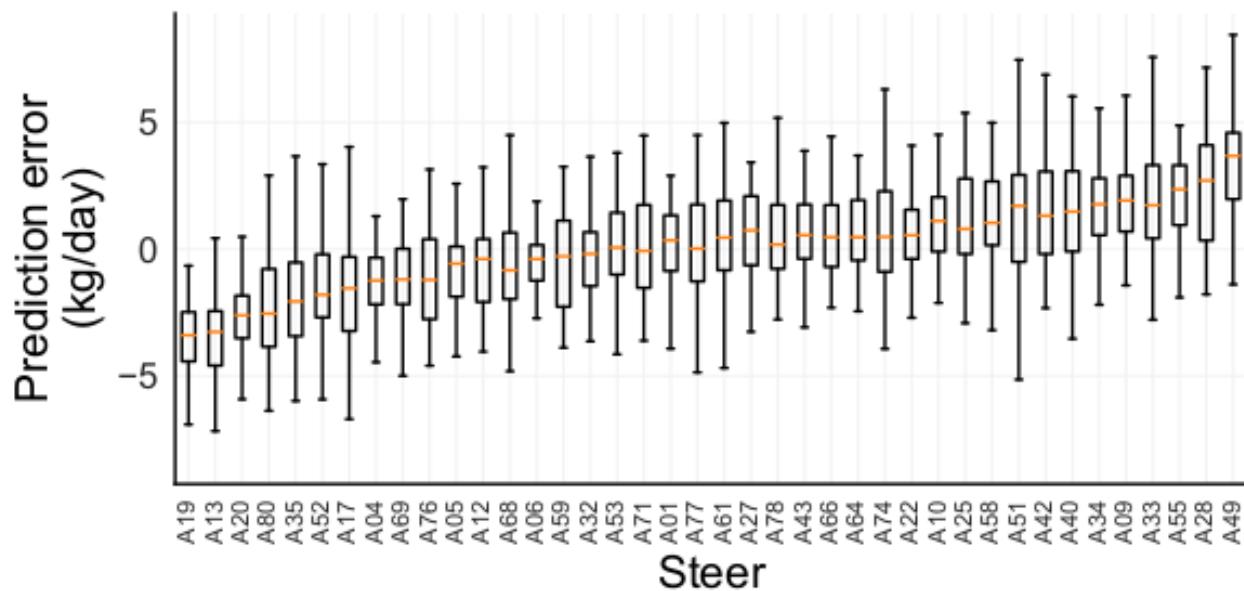
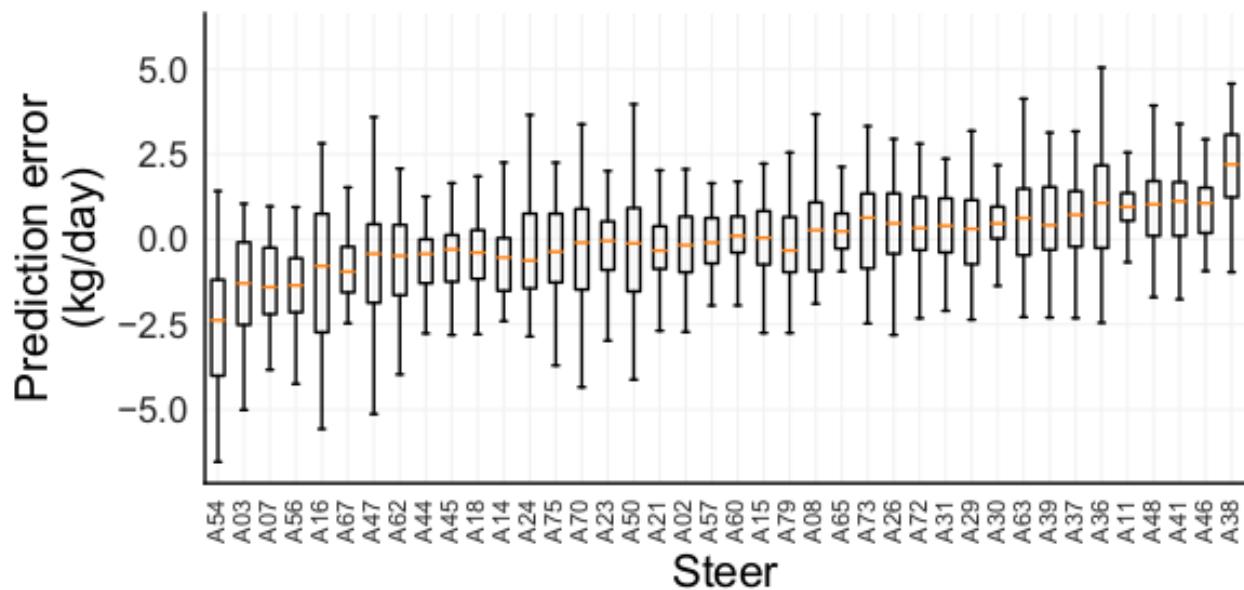


Figure S3

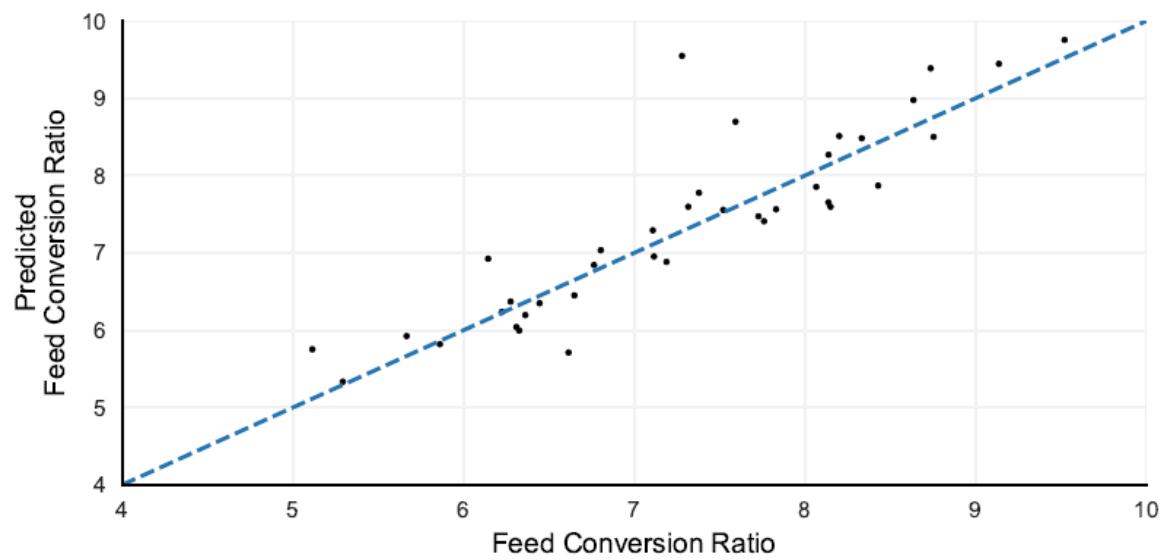


Figure S4

Measurement	Alert > 1 day before farmer	Alert before or same day as farmer
Feeding	74%	90%
Rumination	68%	84%
Conductivity	25%	48%
Fat/Protein	13%	38%
Lactose Drop	6%	25%
Milk time	19%	48%

Table S1:

A summary of the timing of the generation of an automatic alert relative to human observation.

FCR Performance		Predicted Performance from Feeding Time		
		Top	Middle	Bottom
Relative FCR Performance from Feed Intake	Top	11	2	-
	Middle	2	11	1
	Bottom	-	1	12

Table S2:

Confusion Matrix for prediction of top, middle and lower grouping of FCR