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Session 02: Carcass and meat quality: from measurement to payment

EVALUATING A NEW NUMERICAL APPROACH FOR CARCASS LEAN MEAT YIELD DETERMINATION

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CARCASS CLASSIFICATION

Allows rank carcasses according to one o various quality parameters, usually overall carcass lean content.

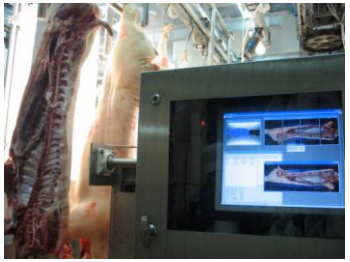
To improve market transparency

To provide price recording

CARCASS CLASSIFICATION

Carcass yield is measured with different type of devices based on different technologies and with more or less degree of automation.

Usually: fat and muscle thickness measures.



CALIBRATION DEVICES

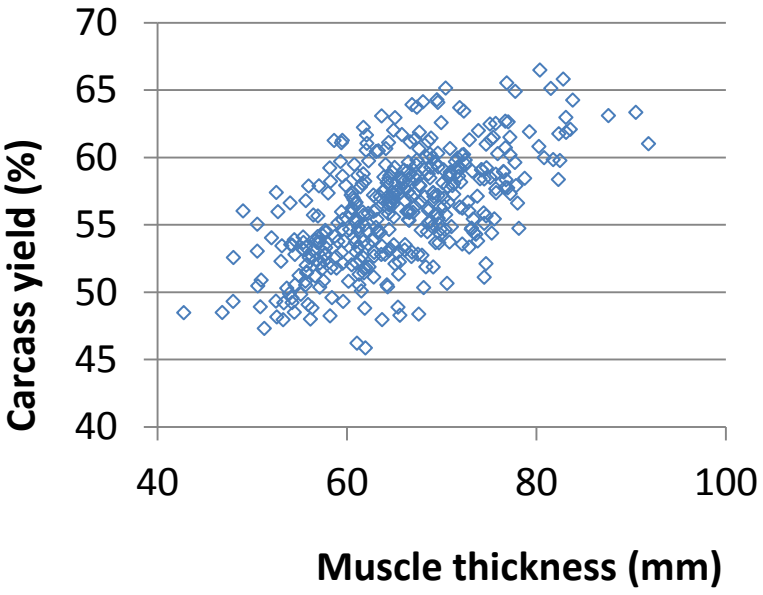
‘Lean’ weight

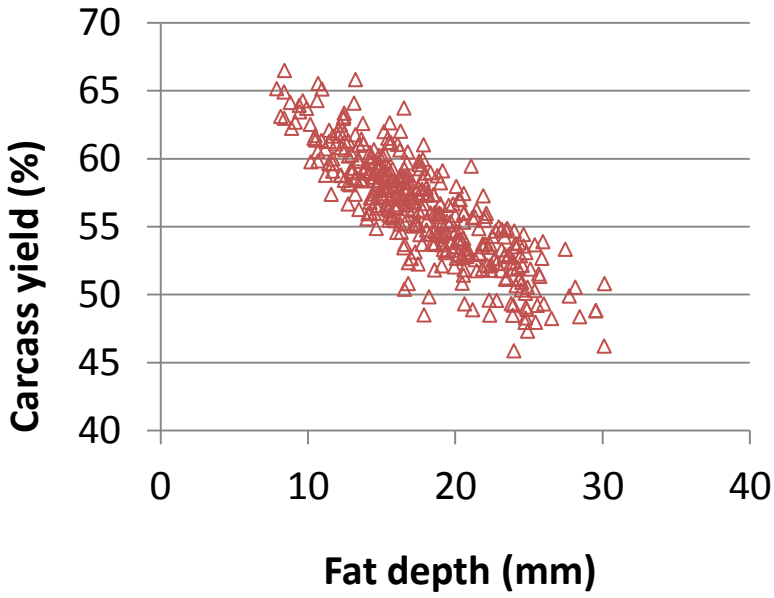
Carcass lean yield

Device measure

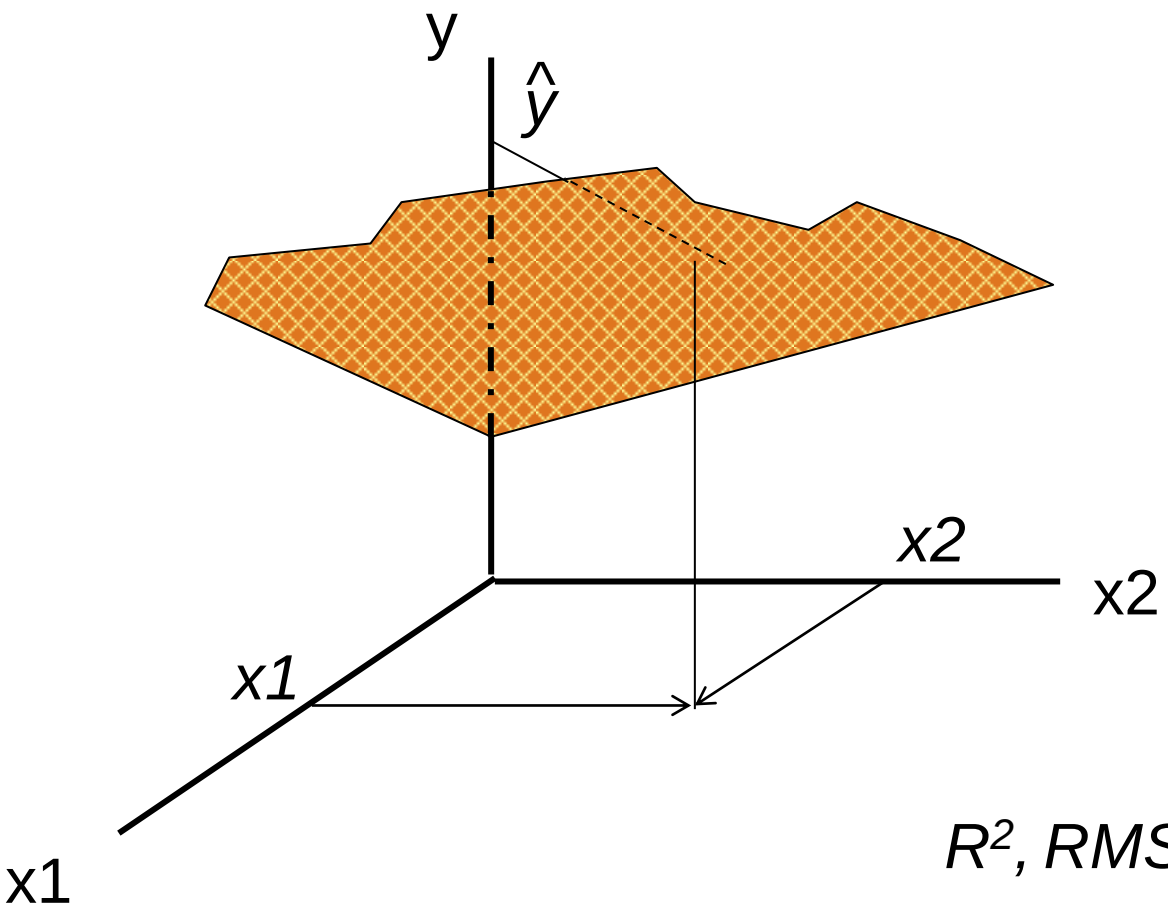
Prediction Equation (RMSEP)

FAT AND MUSCLE THICKNESS *vs* CARCASS YIELD





LINEAR REGRESSION

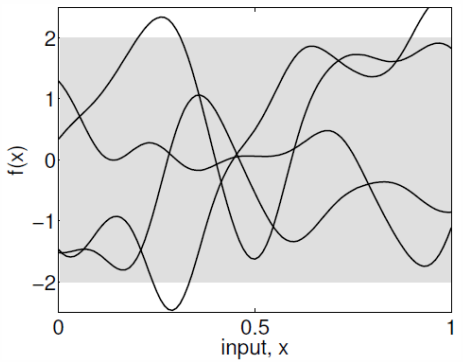


R^2, *RMSE, RMSEP*

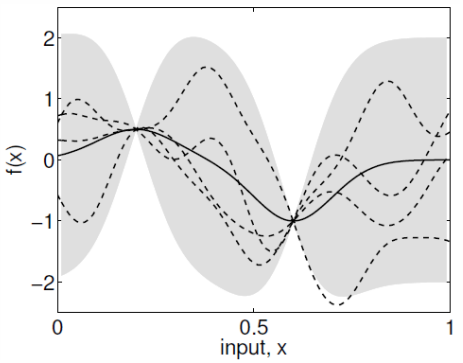
GAUSSIAN PROCESSES (GP)

GP is a Bayesian alternative that allows expression priors over the shape of the unknown predictive function we are trying to uncover.

Uses covariance function or kernels, which can be linear on non linear. A non-linear kernel yields a non-linear predictor.



(a), prior



(b), posterior

Rasmussen & Williams, 2006

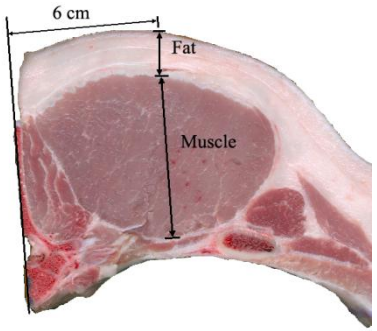
OBJECTIVE

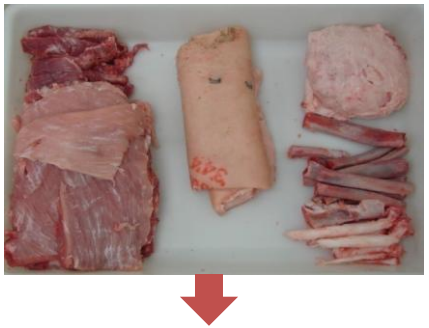
The aim of the present work is to study the potential of Gaussian processes to predict carcass lean yield compared with multiple linear regression approach.

MATERIALS & METHODS

n=395 carcasses

Fat and muscle thickness at 6 cm and parallel to the midline, 3-4th last ribs





Carcass lean yield

n=263 calibration (training)

n=132 validation (evaluation)

RMSEP

LR and GP

RESULTS

	Variable	Mean	Std Dev	Minimum	Maximum
Calibration n= 263	Weight	39.64	3.98	32.43	54.25
	Fat thickness	18.33	4.81	8.15	33.38
	Muscle depth	65.42	7.75	42.77	91.82
	Lean yield	56.04	4.00	45.87	66.49
Validation n= 132	Weight	38.89	3.45	32.86	52.59
	Fat thickness	17.90	5.17	7.88	37.09
	Muscle depth	65.49	7.94	47.98	90.48
	Lean yield	56.38	3.94	47.96	65.15

RESULTS

	Variable	Mean	Std Dev	Minimum	Maximum
Calibration					
n= 263	Weight	39.64	3.98	32.43	54.25
	Fat thickness	18.33	4.81	8.15	33.38
	Muscle depth	65.42	7.75	42.77	91.82
	Lean yield	56.04	4.00	45.87	66.49
		LR	RMSEP	2.02	
		GP	RMSEP	1.86	
Validation					
n= 132	Weight	38.89	3.45	32.86	52.59
	Fat thickness	17.90	5.17	7.88	37.09
	Muscle depth	65.49	7.94	47.98	90.48
	Lean yield	56.38	3.94	47.96	65.15
		LR	RMSEP	2.16%	
		GP	RMSEP	2.10%	

GP : matern32 covariance function

CONCLUSIONS

Small improvement of RMSEP in GP compared with LR.

It suggests that relationships between fat and muscle depths and carcass lean yield could be better modeled using a non-linear predictor.

Since fat and muscle depth only can explain part of the variance observed in carcass lean yield, the inclusion of other predictor variables should be evaluated, trying to decrease the prediction error.

THANK YOU FOR YOUR ATTENTION

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