

The use of artificial neural networks for predicting meat content in pig carcasses

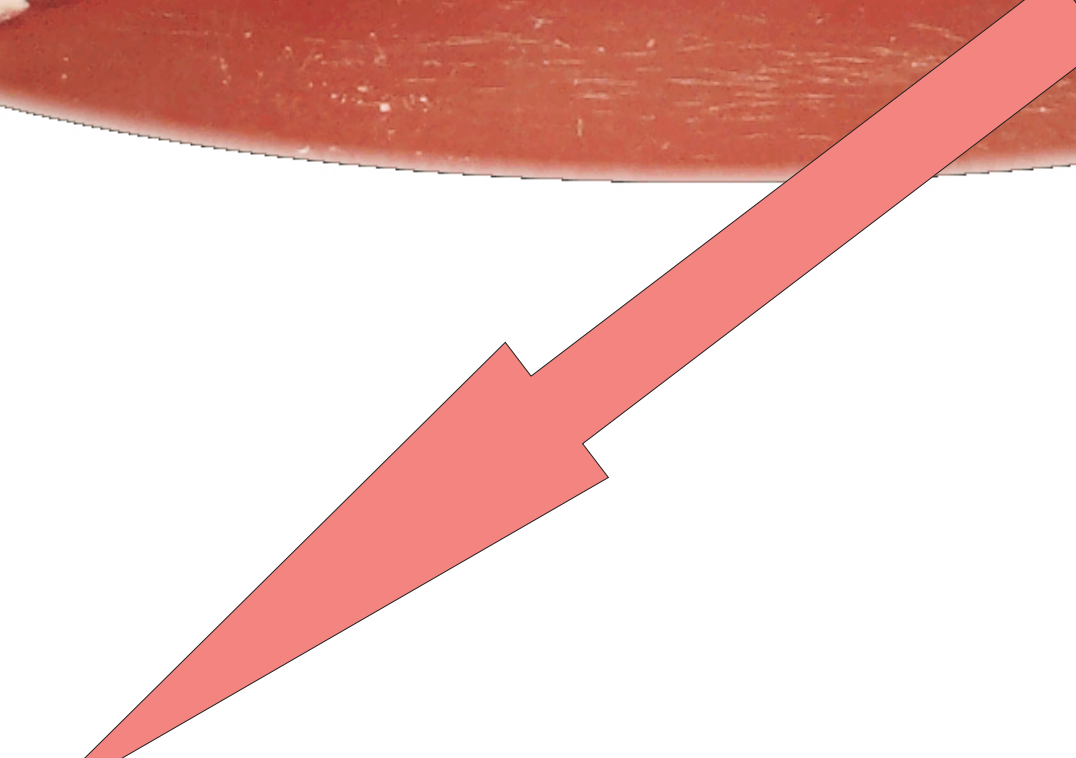
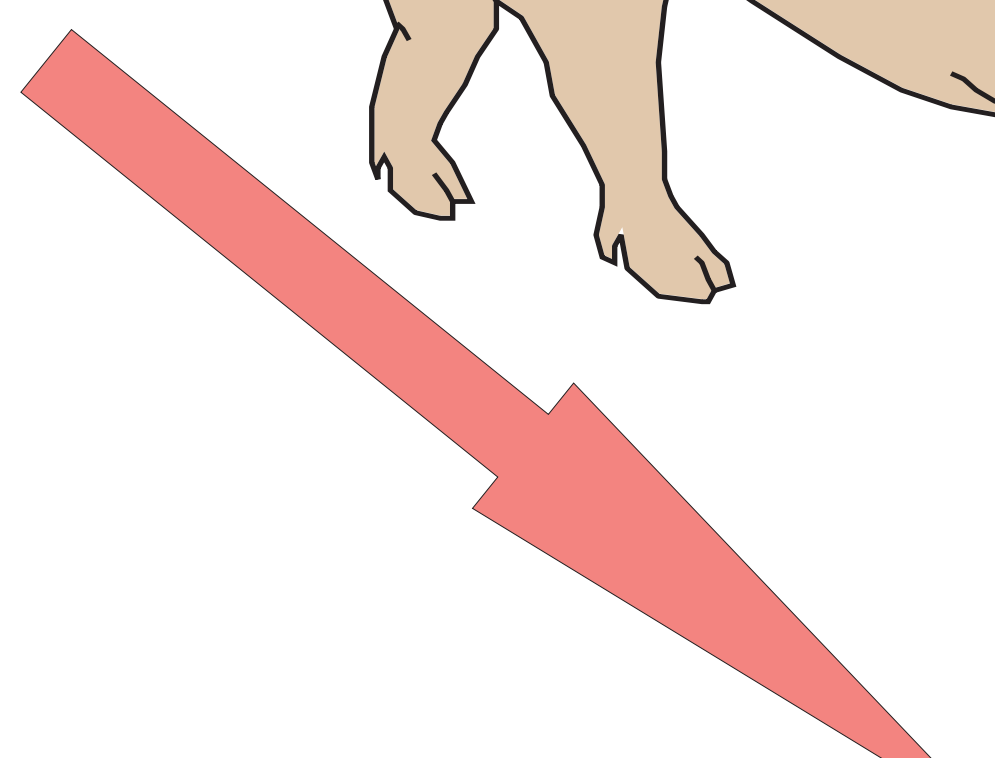
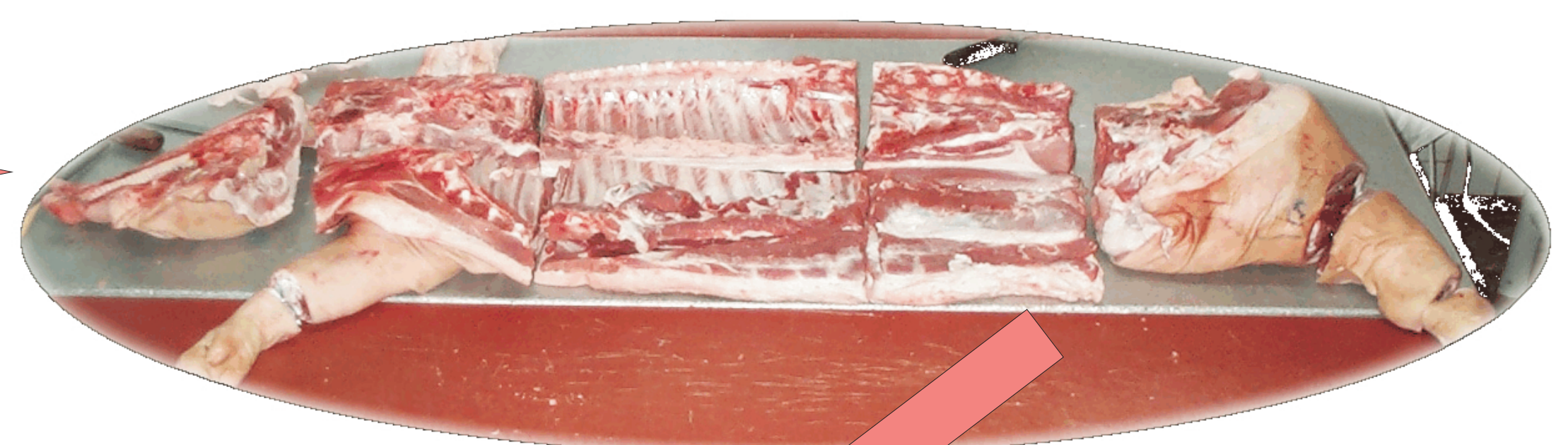
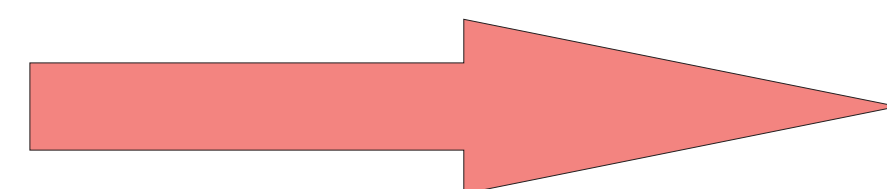
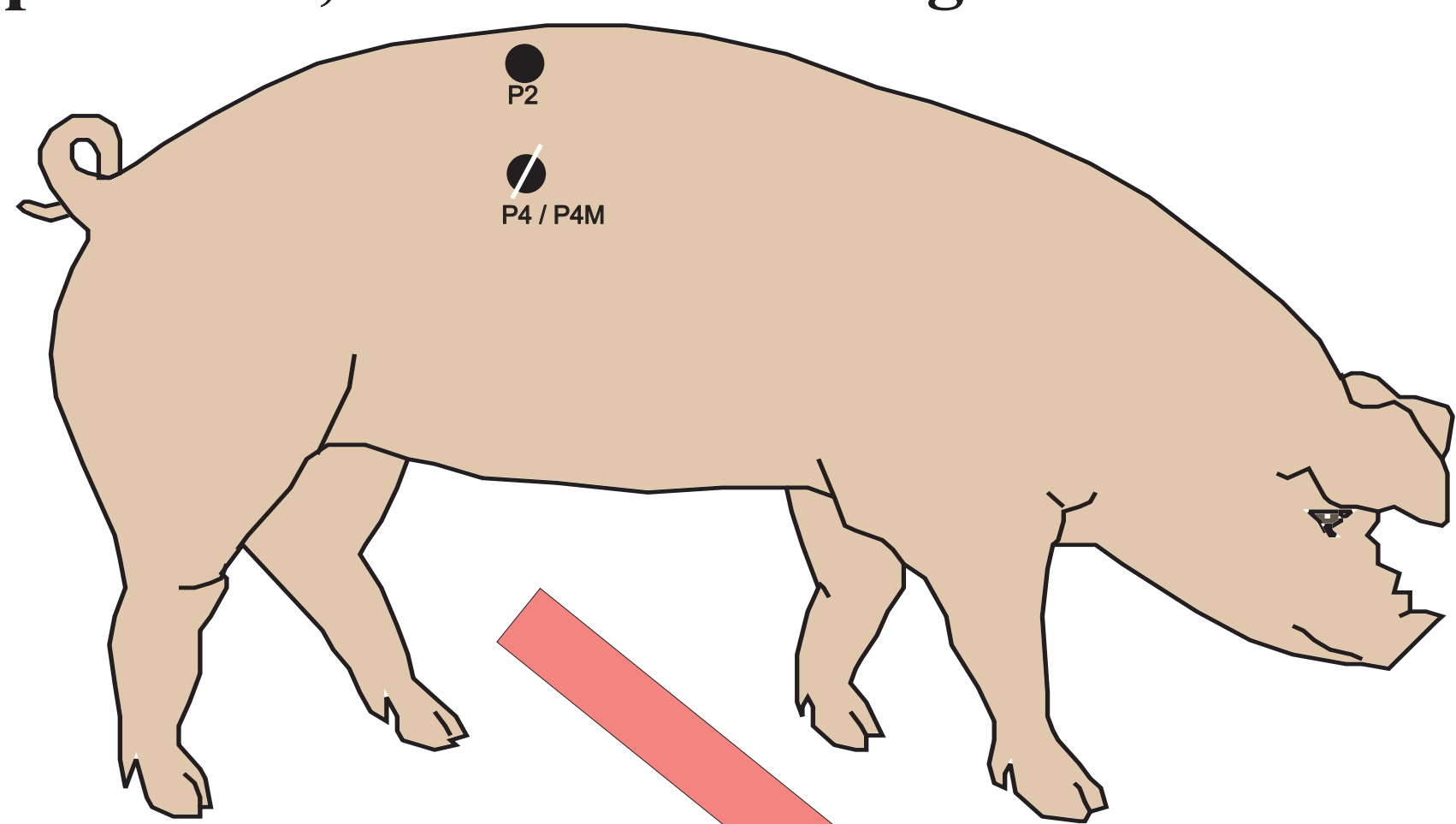


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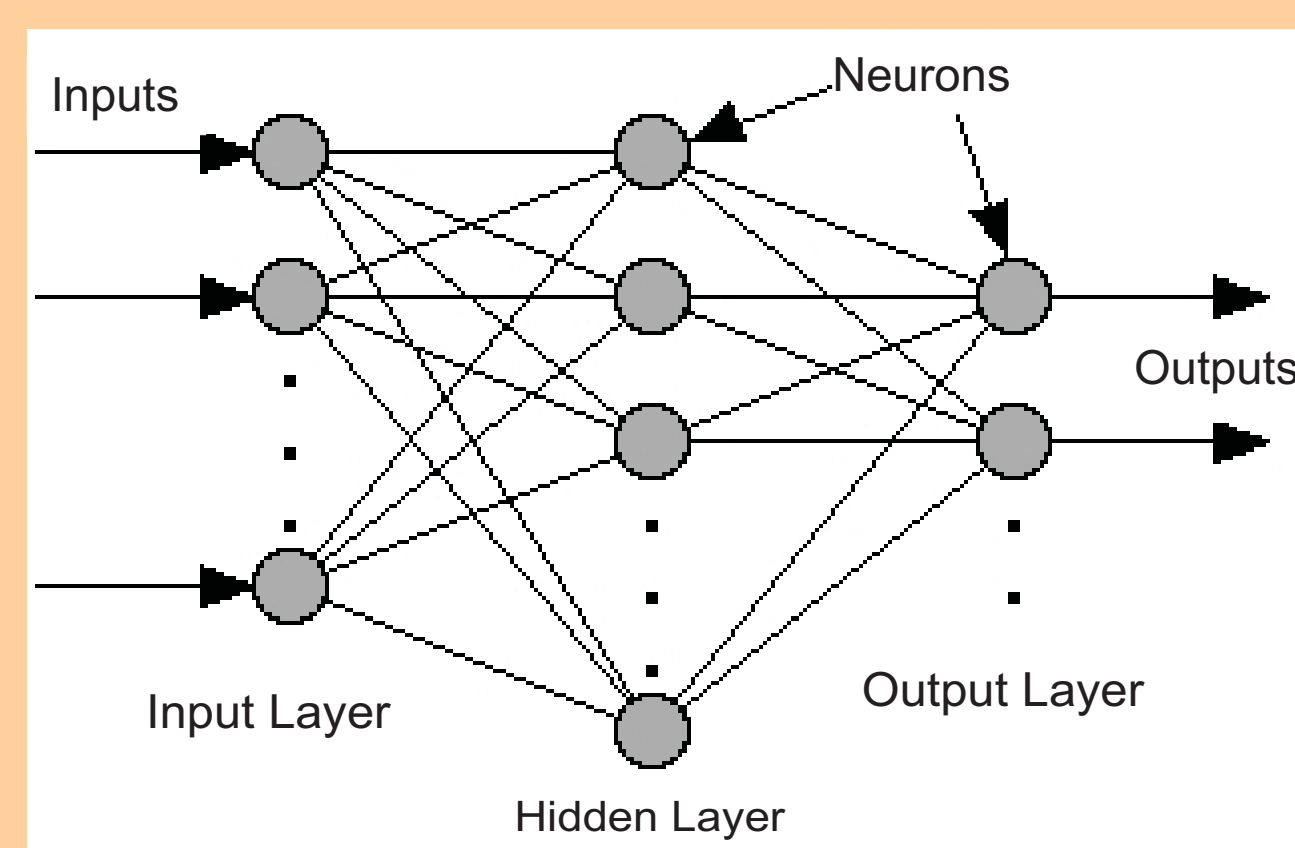
The Polish pig breeding program uses performance test results for animal evaluation and selection. This method is based on determining carcass meat content using ultrasonic measurements of backfat thickness and height of loin eye. Measurements are standardized for 110 kg of body mass and for the 180th day of life to compare between animals. For estimating carcass meat content a linear regression equation has been introduced in previous research achieving an error of 3.01%. The aim of the study was to evaluate Artificial Neural Networks (ANN) as an estimator for meat content in carcasses based on ultrasonic measurements on alive pigs.

live ultrasonic measurements of backfat thickness at points P2, P4 and of the longissimus muscle at the P4M point.

detailed dissection



Artificial Neural Networks (ANN)



The study included 628 pigs of different breeds. These animals were evaluated in the Polish Pig Testing Station (SKURTCh) during the period from 2008 to 2012. On the day of slaughter, live ultrasonic measurements of backfat thickness were taken at points P2, P4 and of the longissimus muscle at the P4M point. Then, animals were slaughtered and after a 24-h cooling period their right sides were divided into primal cuts and subjected to a detailed dissection. Among other things, gathered records include ultrasonic measurements and real meat contents in carcasses. A two-layer ANN architecture was used to predict carcass meat content with a breed indicator, P2, P4 and P4M measurements as inputs. A total of 100 training cycles were conducted and in each the data set was split into subsets for training (70% of samples), validation (15%) and testing (15%). The architecture contained 7 hidden neurons and was trained using the Levenberg-Marquardt algorithm. After training, 20 top networks were chosen as a representative sample of high performing models. The ANN model achieved an average testing error of 2.1% (with 0.78 correlation).

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