Three-dimensional Imaging of Pigs

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Introduction

The aim of this project is to develop objective ways of making shape measurement of live pigs. Three pairs of high-resolution digital cameras have been configured to capture the images of pigs, and then stereo photogrammetry has enabled us to extract the 3D-shape information of pigs. A model-based approach has been developed to allow meaningful interpretation of the data, where some useful measurements can be estimated from those 3D data. We will also access how reliable and useful these information may be in achieving good husbandry and in selecting breeding stock.

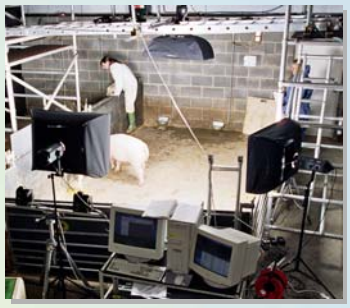
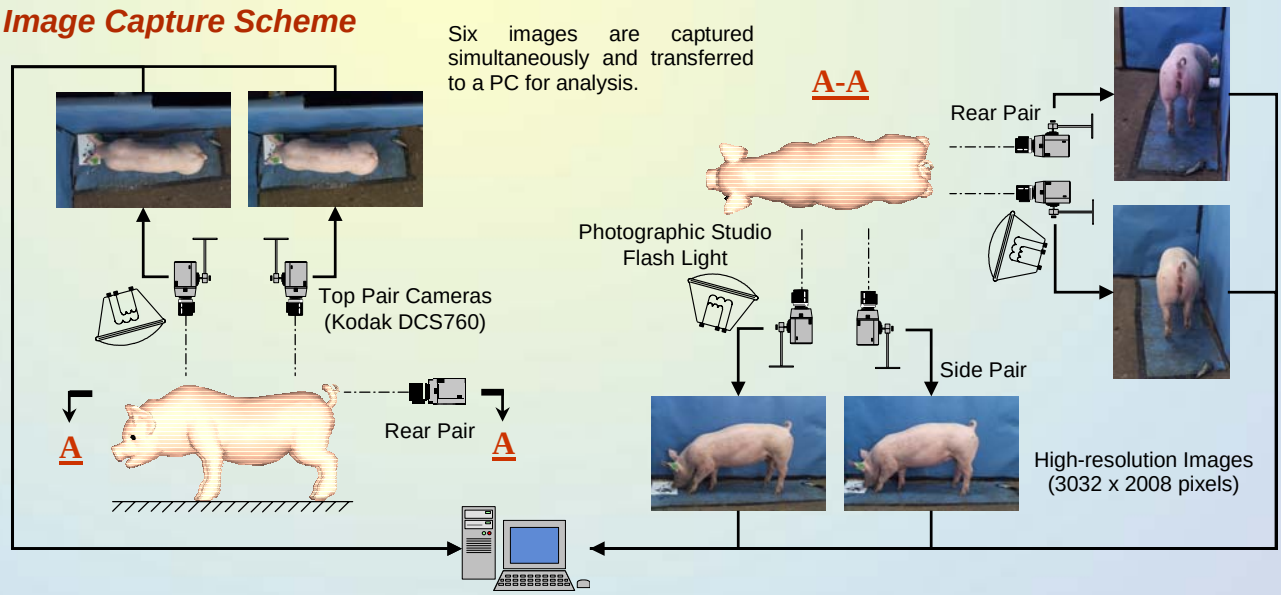
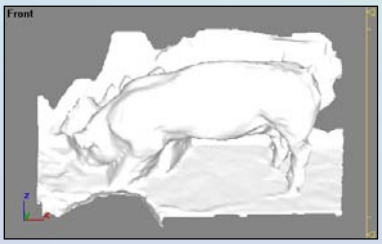


Image Capture Scheme





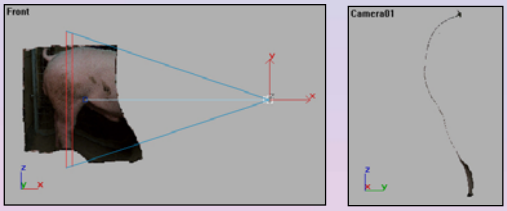
Recovering A 3D Surface of Live Pig

Stereo photogrammetry is used to calculate the 3D position of features in the images. The camera system must first be calibrated. We have found that high-resolution cameras (3032 x 2008 pixels) give sufficient detail of surface features such as hairs and wrinkles to allow good recovery of the 3D surface.

Model Fitting

We want to fit a model to the raw data so that it can be corrected for variations in posture. In this example we indicated key landmark points on the raw data (a) and on the model (b) manually and then deformed the model to fit the raw data (c).

(a) (b) (c)



Measurement of Shape

Key measurements such as the width, height and volume of the ham can be extracted from the shape data.

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