

# Developing a multi-Kinect-system for monitoring in dairy cows: object recognition and surface analysis using wavelets – Supplementary Figures S 1

J. Salau, J.H. Haas, G. Thaller, M. Leisen, W. Junge

Corresponding author: J. Salau, e-mail: jsalau@tierzucht.uni-kiel.de, phone: +49 431 8802572  
Institute of Animal Breeding & Husbandry, Kiel University, Olshausenstraße 40, 24098 Kiel, Germany

In a QQ-plot (quantiles-quantiles-plot) two distributions are compared by plotting their quantiles against each other. The plot will be close to a straight line, if the samples originate from equal distributions. The sample data is displayed with the blue symbol '+'. Additionally, the plot shows a dashed red line. It is a robust linear fit of the order statistics of the two samples and joins the first and third quartiles of the distributions. This line helps to evaluate the linearity of the data.

This supplementary material depicts QQ-plots regarding the details from two different decomposition levels of two dimensional wavelet transforms applied to images recorded by a Microsoft Kinect. Those details were the subject of the present study and were centered and

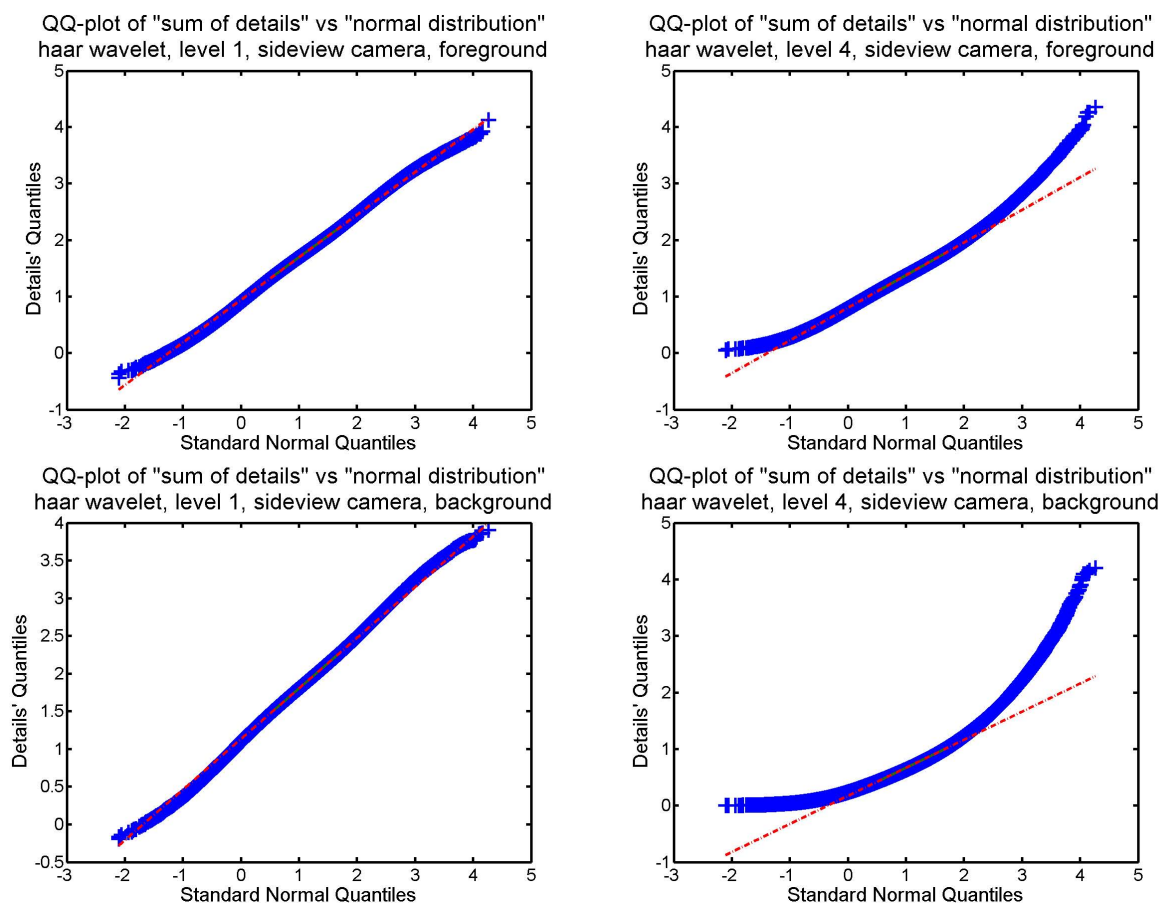


Figure S1.1: QQ-plots of the haar wavelet details vs standard normal distribution. The details originate from a wavelet transform on images recorded by a Kinect in sideview position. The first row's QQ-plots are based on details calculated from the image foreground, and the second row's QQ-plots are based on details calculated from the image background. The left column shows QQ-plots for decomposition level 1 and the right column shows QQ-plots for decomposition level 4.

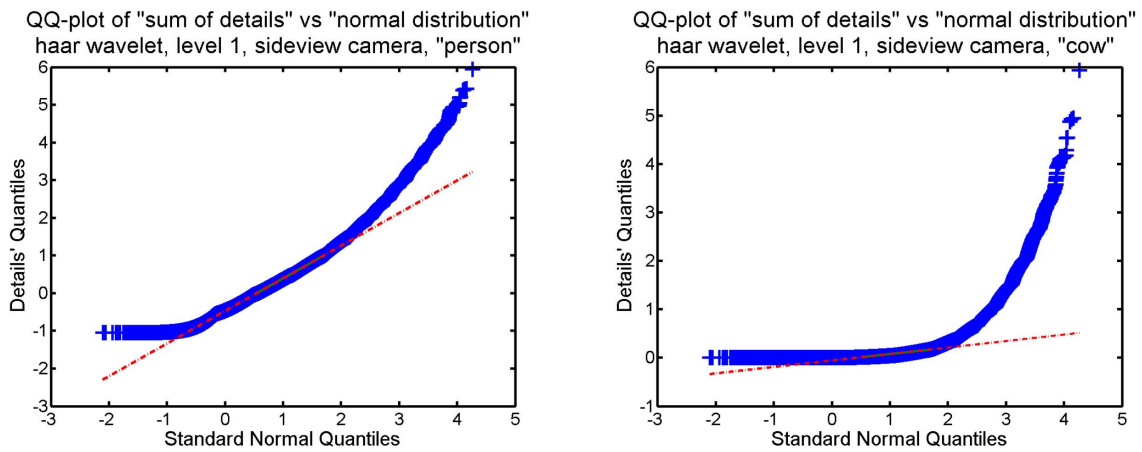


Figure S1.2: QQ-plots of the haar wavelet details vs standard normal distribution. The details originate from a level 1 wavelet transform on images recorded by a Kinect in sideview position. On the left side the details calculated from the part of the image that showed the cow are presented. On the right side the details calculated from the part of the image that showed the leading person are presented.

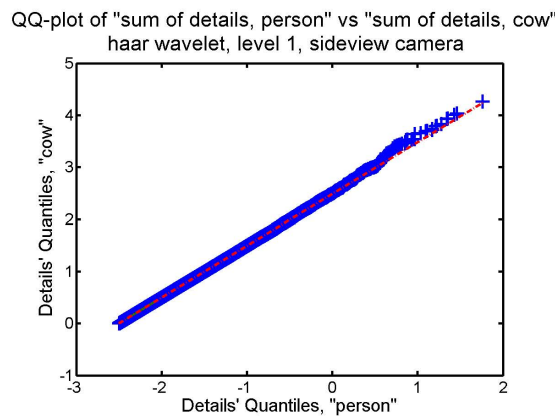


Figure S1.3: QQ-plot of the haar wavelet details calculated from the part of the image that showed the cow vs the details calculated from the leading person. The details originate from a level 1 wavelet transform on images recorded by a Kinect in sideview position.

scaled to match mean and variance of the standard normal distribution. As an example, details calculated using the haar wavelet at decomposition levels 1 and 4 from images recorded by a sideview camera were chosen. Figure S1.1 illustrates, that the details in both image fore- as well as background are close to normally distributed when calculated on decomposition level 1, but that their distributions differ from the normal distribution with higher decomposition levels.

Figure S1.2 proves, that the foreground details separated into the details on the cow and the details on the leading person are no longer normally distributed, whereas Figure S1.3 indicates, that the distribution of details from the parts of the image showing the cow or the leading person coincide.