## Abstract

Recent advancement of computer vision technology has led to the progress in the computer-aided diagnosis (CAD). In the present study, a diagnostic system based on an automated image analysis of swine lung lesions was developed and its features were evaluated. By gross and histopathologic examinations as standard diagnostic tool, the lung lesions were classified as bronchopneumonia, interstitial pneumonia, pleuritis, and pleuropneumonia. The lung lesions were photographed and computerized features of the gross pictures were extracted using the Scale-invariant feature transforms, a methodology of image analysis. To classify the extracted features, k-nearest neighbor was adopted as a method of machine learning. Multiple CAD models were established based on various training sets that are organized according to the characteristics of image and the size of group. From each group of images, a randomly selected 10% testing subsets was used to verify the reliability of the models. As a result, a training set that consists of both of complete and close-up lung images showed better performance among the other training sets. The classification performance of bronchopneumonia had high sensitivity of 96.7%, and the specificity and accuracy was 72.3% and 82.0%, respectively. In classification of interstitial pneumonia, specificity was high as 94.4%, and sensitivity and accuracy was 75.8% and 87.4%. This is a first approach to adopting image-based machine learning for organ inspection. Although still a prototype, but the data presented in this study provide insight into the applicability of CAD to slaughter check system that predicts histopathological diagnosis, and give a direction for further study to enhance performance of image-based organ inspection.