

Title            Potential of Artificial Neural Networks in Varietal Identification using Morphometry of Wheat Grains  
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Citation       Biosystems Engineering, Volume 95, Issue 1 , September 2006, Pages 61-67  
Keywords      wheat; morphometry

### **Abstract**

The shape, size and colour of grains are normally employed to identify wheat varieties. Use of computer-based image analysis is a good alternative to visual identification. Artificial neural networks (ANNs), when combined with digital imaging, may have potential for varietal identification. Grain shape and size, though heritable characters, are influenced by changes in environment, especially during grain filling. Three bread wheat varieties were grown in different environments to create variation in the grain shape and sizes to cover the range of variations encountered in reality. Morphometric features of these grains were quantified using a software named 'comprehensive image processing software'. Data on 45 morphometric features were used to train and test ANNs with different combinations of nodes and iterations. A commercial and an in-house developed ANN software packages were used in this study. Best results were obtained with the resilient back propagation architecture for both these software packages. Classification accuracy was about 88% for all the grains together and ranged from 84% to 94% for individual varieties. The results showed that the ANN, combined with image analysis has excellent potential for wheat varietal identification.