Lip detection by the use of neural networks

Abstract

Lip detection is used in many applications such as face detection and lip reading. In this article, a method for lip detection in color images in a normalized RGB color scheme is presented. In this method, MLP neural networks are used to perform lip detection on segmented skin regions. Several combinations of chrominance components of the normalized RGB color space were used as the input to the neural networks. Two methods were used for obtaining the normalized RGB components from the RGB color scheme. These are called the maximum and intensity normalization methods, respectively. The method was tested on two Asian databases. The number of neurons in the hidden layer was determined by using a modified network-growing algorithm. It was found that the pixel intensity normalization method gave lower lip detection error than the maximum intensity normalization method regardless of the database used, and for most of the combinations of chrominance components. In addition, the combination of the g and r/g chrominance components gave the lowest lip detection error when the pixel intensity normalization method was used for both databases. The effects of the scale and facial expression on lip detection was also studied. It was found that the lip detection error decreased as the scale factor increased. As for facial expression, a laughing facial expression gave the highest lip detection error, followed by smiling and neutral expressions.