

## **Image skin segmentation based on multi-agent learning Bayesian and neural network**

### **ABSTRACT**

Skin colour is considered to be a useful and discriminating spatial feature for many skin detection-related applications, but it is not sufficiently robust to address complex image environments because of light-changing conditions, skin-like colours and reflective glass or water. These factors can create major difficulties in face pixel-based skin detectors when the colour feature is used. Thus, this paper proposes a multi-agent learning method that combines the Bayesian method with a grouping histogram (GH) technique and the back-propagation neural network with a segment adjacent-nested (SAN) technique based on the YCbCr and RGB colour spaces, respectively, to improve skin detection performance. The findings from this study have shown that the proposed multi-agent learning for skin detector has produced significant true positive (TP) and true negative (TN) average rates (i.e. 98.44% and 99.86% respectively). In addition, it has achieved a significantly lower average rate for the false negative (FN) and false positive (FP) (i.e. only 1.56% and 0.14% respectively). The experimental results show that multi-agent learning in the skin detector is more efficient than other approaches.

**Keyword:** Skin detector; Bayesian method; Neural network