

A Fuzzy Combination of Skin and Facial Features Detectors to Face Detection in Complex Scenes

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Abstract

Face detection was studied extensively; the most serious drawbacks of existing methods are: complex environments, variable lighting conditions, computational time, computational complexity. Here we propose a new solution, based on the integration of two methods from the state-of-the-art, namely, a stage based on relations in the YCbCr color space for skin detection, and the other stage, based on a support vector machine classifier trained on a set of color features (extracted from several color spaces), able to detect some facial features (mouth, dark skin areas around eyebrows). Furthermore, we enhanced the performance of the skin detector by deriving and employing fuzzy relations in the YCbCr color space instead of crisp relations (as presented in the literature). The two stages give complementary decisions about the location of faces, therefore their joint use provides superior detection results than those provided by each of them individually. Furthermore, the operations performed are arithmetically simple.