Skin-Tone and Viola-Jones based Face Detection

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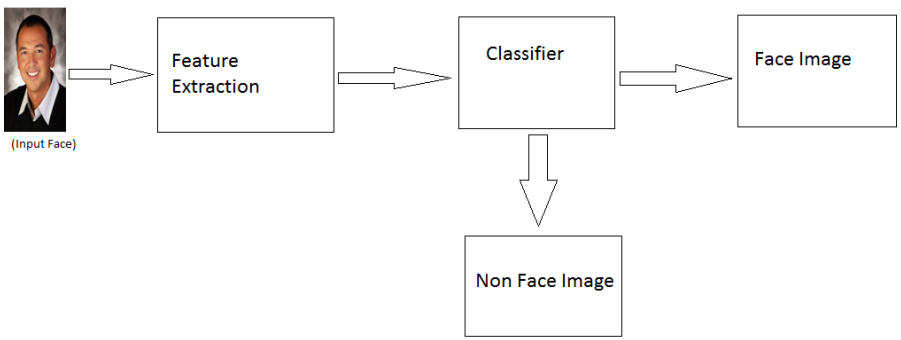
Introduction

- FACE DETECTION is a computer technology that identifies human faces in digital images.Face Detection is a fundamental task for applications such as face tracking , red-eye removal , face recognition and face expression recognition.
- The process of face detection can be split in to three main phases.There are face representation (as input image) ,feature extraction and classification by classifier.
- A model for face detection.



Skin Tone Based Face Detection Algorithm

- Steps in Skin-Tone based algorithm [1] is shown below:

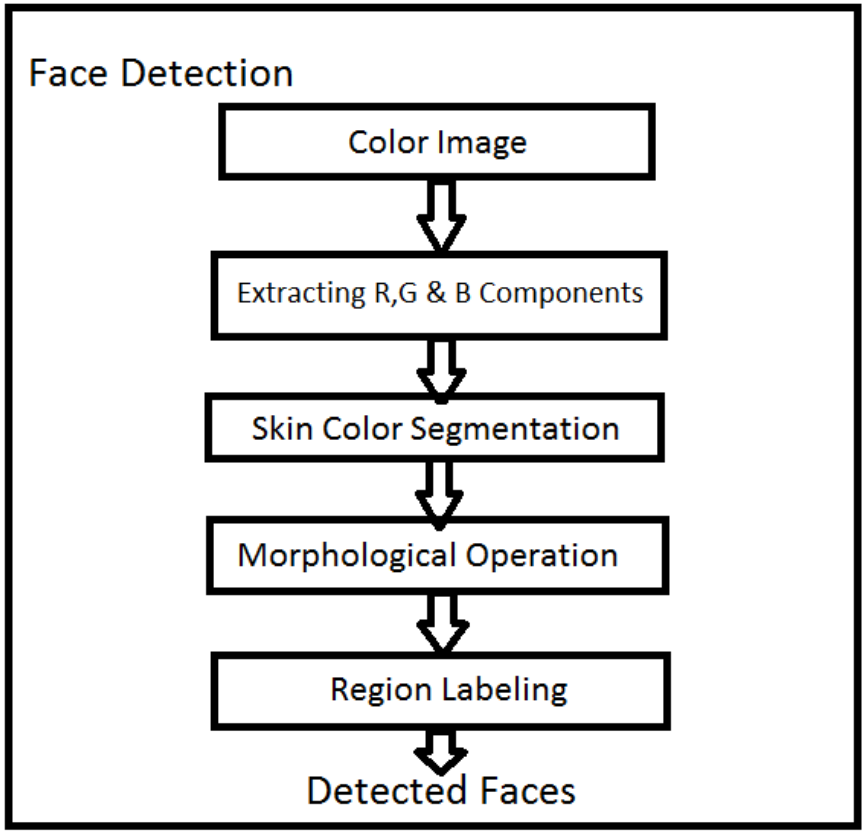


Figure : Skin-Tone Based Face Detection Algorithm

Skin Detection using RGB Colour Space

- Goal of skin color detection is to build a decision rule, that will discriminate between skin and non-skin pixels.
- Decision rule [2], [3] for skin color at uniform daylight illumination is defined as

$$(R > 95 \& G > 40 \& B > 20 \& R > G) \&$$

$$(R > B \& \mid R - G \mid >= 15)$$

Result and Interpretation

Figure : Face Detected using Skin-Tone based Algorithm

Result and Interpretation

Figure : Face Not Detected using Viola Jones Algorithm

Result and Interpretation

Figure : Face Detected using Skin-Tone based Algorithm

Result and Interpretation

Figure : Face Detected using Viola-Jones Algorithm

Comparitivie Analysis

- We have implemented Skin-Tone based as well as Viola Jones Algorithm[4] for face detection.
- The face detection is performed using MATLAB 2014b tool and result is generated using system Intel(R) Core(TM) i5-2430M CPU @ 2.40 GHz having 8.00 GB RAM.

Algorithm	Multiple Faces	Side Faces	False +ve	False –ve	Time Taken
Skin Based	Yes	Yes	Yes	Yes	1.544 sec/frame
Viola Jones	Yes	No	Yes	Yes	2.531 sec/frame

Figure : Comparative Analysis using Skin based and Viola Jones algorithm

References

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