

Face Detection

A Survey

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Introduction

- ▶ A face detector has to tell whether an image of arbitrary size contains a human face and if so, where it is.
- ▶ One natural framework for considering this problem is that of binary classification, in which a classifier is constructed to minimize the min classification risk.
- ▶ The algorithm must minimize both the false negative and false positive rates in order to achieve an acceptable performance.
- ▶ The challenges associated with face detection are: Pose, Presence or absence of structural component, Facial expression, Occlusion, Image orientation, Imaging conditions

Methods

Face Detection methods can be classified in two approaches

- ▶ Featured based Approach
- ▶ Image Based Approach

Featured based Approach

- ▶ Edges
- ▶ Gray-Level
- ▶ Color
- ▶ Motion
- ▶ Feature searching
- ▶ Snakes
- ▶ Deformable Templates






Image Based Approach

Neural Networks

Viola Jones Face Detection Algorithm

- ▶ Haar Features:-Haar features are used to detect the presence of particular feature in the given image. Each features resulting a single value which is calculated by subtracting the sum of pixels under white rectangle from the sum of pixel under black rectangle.
- ▶ Integral Image:-Rectangle features can be computed very rapidly using an intermediate representation for the image which we call the integral image.
- ▶ Adaboost:-Adaboost is machine learning algorithm which helps in finding only the best features among all.
- ▶ Cascading:-Images with multiple faces would suffer from multiple false alarming of face detected. Cascading helps to remove non-face sub-windows to increase detection rate.

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