

Face Detection for Football Supporters Crowd

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Abstract

Face detection and recognition are becoming extremely important and common in a wide range of fields ranging from civil and criminal investigation and surveillance. In addition the detecting and the analysis of supporter behaviors can help the violence investigation in football stadiums. The face detection is a better way to summarize and recognize the bad behaviors in the crowd. Herein, the primary focus of this study is to propose a dataset for football supporters crowds as well as an effective method of face detection in football supporters crowd. The proposed methods perform the detection of the face using the classical face algorithm for detecting faces in the normal scene with some person in it. For the stadium, the number of people in an Angle of view of a camera can be hundreds. The variation of the scale of faces can affect the accuracy of detecting all present faces in the scene. For that, a preprocessing is used for detecting the face in the crowd. At first, we use a skin segmentation function followed by a decomposition of the images on four regions and detect the face in each region. The obtained results are more improved comparing the existing methods.

Proposed Method

The use of faces is important for many applications including surveillance systems, human-machine interaction, and airports [1]. Considering the face is a unique identification for each human being, in addition to that humans are the most causing of insecurity in the society, the summarization via faces detection and then identification can be useful to identify the bad behaviors person in the stadium for example [2,3]. Further, the detection of the existing face in a stadium can help in the security agent also the manager of the security in the stadium.

In this work, a dataset of the football supporters crowd is presented as well as a method for detecting the face in this crowd. The dataset contain thousand images from internet for the most recognized football supporters in the world. All the images contains face with different situation and poses. In addition the number of face in each images can reach 2000 faces. Also in this paper, and in order to detect the faces in the crowded images, a method based on regular face detection algorithm and skin segmentation in proposed. The results of the proposed method are tested on the proposed datasets as well as the others datasets compared also with some existing face detection in the crowd works.

The datasets contain different types of face with different poses, expressions, illumination as well as the scale of the face. the following Table describes the characteristics of the dataset.

For testing the proposed method on the built dataset, which is a very challenging dataset, we illustrate some obtained results in Figure 1. from the showed results, the number of detected faces are acceptable regarding the variety of number of faces in the images with different poses, expressions, the scale and the occlusion of the faces.

Dataset	Image resolution	Total number of image	Number of face in each image
FSC dataset	960×640, 2000×1043, 2048×1368	2500	50 to 1000



Figure 1. Obtained results on FSC dataset

Conclusion

In this paper, a new dataset for face detection in football supporters crowd is presented. The pose of the face, illumination, the scale of the faces, and the distance of each face from the camera represents a challenging problem for face detection in uncontrolled environments like stadiums. In order to handle this issue, no public dataset available for training and testing the face detection approach. In this paper, a large scale dataset is built as well as a method for face detection using skin segmentation. The obtained results are compared with the state-of-the-art method. Also, the proposed approach is tested on the new dataset and some examples are presented. for the new dataset the results can be improved by analysis the others problem like deep face and the poses in the images.

References

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