Face Recognition Using Laplacian Completed Local Ternary Pattern (LapCLTP)

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Abstract

Nowadays, the face is one of the typical biometrics that has high-security technology in the biometrics field. In face recognition systems, feature extraction is considered as one of the important steps. In feature extraction, the important and interesting parts of the image are represented as a compact feature vector. Many features had been proposed in the image processing fields such as texture, colour, and shape. Recently, texture descriptors are playing an important and significant role as a local descriptor. Different types of texture descriptors had been proposed and used for face recognition task, such as Local Binary Pattern (LBP), Local Ternary Pattern (LTP), and Completed Local Ternary Pattern (CLTP). All these texture features have achieved good performances in terms of recognition accuracy. In this paper, we propose to improve the performance of the CLTP and use it for face recognition. A Laplacian Completed Local Ternary Pattern (LapCLTP) is proposed in this paper. The image is enhanced using a Laplacian filter for pre-processing image process before extracting the CLTP. JAFFR and YALE standard face datasets are used to investigate the performance of the LapCLTP. The experiment results showed that the LapCLTP outperformed the original CLTP in both datasets and achieved higher recognition accuracy. The LapCLTP achieved 99.24%, while CLTP achieved 98.78% with JAFFE dataset. IN YALE, the LapCLTP achieved 85.13%, while CLTP, only 84.46%.

Keywords

Face recognition Completed local ternary pattern (CLTP) Laplacian filter (LAPCLTP) Image classification Face database