

主 論 文 要 旨

論文題名

Classifying Human Attribute and Action Using Biometrical Feature

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主論文要旨

The goal of our study is to develop security cameras that can mimic human guards by detecting suspicious activities. This paper describes our works that are classifying (1) human attributes focused on “face” (2) actions focused on “body motion”.

The classification of human attributes deals with age, gender, and facial expressions with facial images. First, for estimating age and gender, Local Gabor Directional Pattern Histogram Sequence (LGDPHS) is devised. This local feature extracts periodic information of a face, and selects components in only important directions. Then, a method using the local feature together with a global feature normalizing a facial image with Generic Active Appearance Model (GAAM) is proposed. Thus, the conventional problems which are sensitive to illuminance variations and positional error are solved. In the experiment, the performance is 6.2 years on a Mean Absolute Error about age, and 89.4% on a classification rate (CR) about gender, thus is superior to the recent studies. Next, the proposed method for classifying facial expressions (FEs) is robust against positional error caused by different FEs and subjects, since it extracts the normalized LGDPHS which is obtained from facial key parts. We experimentally classify seven FEs and achieve CR of 100% about “Anger”, “Disgust”, “Neutral”, and “Sad”.

The classifying action focuses on historical monuments. The proposed method is robust against spatial and temporal variations owing to the multi-scale application of (1) an approximate Gaussian filter on the spatial axis and (2) a Gabor filter on the temporal axis, also improves performance against complex actions particular to the sites by decomposing an action into some simple types and learning the order. We experimentally classify six actions including three suspicious achieving CR of 60.2%. This represents an improvement of up to 10% over the conventional methods, thereby confirming the effectiveness of our method.