SYSTEM REQUIREMENT SPECIFICATION

Bhavas Classification using CNN

OVERVIEW & PURPOSE :

The purpose of developing this system “Bhavas Classification” is to create a methodology to identify 9 bhaavas in the classical Indian dance forms, i.e, Shringara, Hasya, Karuna, Raudra, Veera, Bayanaka, Bibhatsya, Adbutha and Shantha using CNN architecture. This project is useful for anyone who is willing to recognize these bhavas.

PROPOSED SYSTEM :

1. In “Bhavas classification using CNN”, we present an application to identify the bhavas from the given input image using CNN.
2. FER to classify image type is complicated, especially under unfavourable conditions, such as if the input image is blur or shady.
3. Using CNN architecture and dataset we can train the system to classify them to bhavas

EXISTING SYSTEM :

The existing systems are only for classifying the emotions. By changing the data set used and improving the feature extraction process, our system will be able to classify the bhavas of the classical dance form.

PROJECT SCOPE :

Using Facial expression recognition many projects are there for detecting emotions, neurological disorders, etc.. Our project aims to classify bhavas according to the image that has been given as input. Until now, there is no other system used for this purpose, so the scope of the system is high. This application allows the normal users (Other than dancers) to easily understand the bhavas.

SYSTEM FEATURES :

CNN FOR FACIAL COMPONENT SEGMENT :

1. The first CNNs are trained to segment eye, lips and the cheeks regions from facial images because of the importance of these regions to recognize the bhavas.
2. Using these CNN outputs, the proposed system forms a face-iconized image that is used by the fourth CNN as input.
3. Every image block is classified as eye, lips and the cheeks versus background.
4. Then the training masks are generated by detecting and localizing facial landmarks on a face image.
5. Training masks are used for determining majority and mixed classes in the facial component segmentation step.

TESTING OF TRAINED SET -

1. After training, testing is applied using the whole image.
2. The fully connected layers of the first three CNN networks have two channel scores:
    a. For the first CNN ; eyes versus background
    b. For the second CNN ; lips versus background
    c. For the third CNN ; cheeks versus background scores.
3. 3 component-segmented images are obtained from the first three CNNs according to the higher component scores in the fully connected layers.

SEGMENTATION REFINEMENT :

1. After obtaining component-segmented images, an empty matrix is created with the component-segmented image size.
2. All the component-segmented images are passed to the empty matrix and intermediate mask generated.

CNN FOR FACIAL EXPRESSION RECOGNITION :

1. The last CNN structure in the proposed architecture uses the final-iconize image with the corresponding raw facial images.
2. The first three CNN structures operate on 16 × 16 blocks from the facial images, and the last CNN uses a resized whole face image as the input.

3. This CNN architecture contains the following layers:
    a. Five convolutional layers -
        i. layer 1: 64 5 × 5 × 3 filters
        ii. layer 2: 32 5 × 5 filters
        iii. layer 3: 32 5 × 5 filters
        iv. layer 4: 64 5 × 5 filters
        v. layer 5: 64 4 × 4 filters
    b. Four pooling layers
    c. Softmax layer
    d. One fully connected layer

EXTERNAL INTERFACE REQUIREMENTS :

HARDWARE INTERFACE :

1. Processor : INTEL i5 or above
2. RAM : Min. 4GB
3. HARD DISK : Min. 1 TB

SOFTWARE INTERFACE :

1. CLIENT : PC with Windows
2. DEVELOPMENT TOOLS : Microsoft Visual Studio & JUPYTER Notebook
3. PROGRAMMING LANGUAGE : Python

FUNCTIONAL REQUIREMENTS :

1. The system should classify an image into one of 9 emotions
2. The system should include an automatic face detection algorithm

NON-FUNCTIONAL REQUIREMENTS :

1. The system should be implemented in jupyter notebook