

# DIRECTING PHYSIOLOGY AND MOOD THROUGH MUSIC: VALIDATION OF AN AFFECTIVE MUSIC PLAYER

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**ABSTRACT:** A facial expressions is one or more motions or positions of the muscles lying beneath the skin of the human face. These Muscle movements are used to convey the emotional state of an individual to various observers. Facial expressions are a Type of nonverbal communication. If Facial expression Recognition or Human facial emotion recognition software is carefully equipped in an analysis centre; it can very much produce valuable outcomes. Expression Recognition or Emotion recognition is one of the fresh concepts which is Gaining momentum in the vast field of research on intelligent Systems and Human Computer Interaction. Though facial Expressions obviously does not necessarily convey emotions, in the human-computer interaction community, the term “Facial expression recognition” often refers to the Classification of facial features into one of the six so called basic emotions: happiness, sadness, fear, disgust, surprise and anger, as introduced. There might be other useful areas for emotion recognition. In a hypothesized form of a facial expression recognition system, an input sensing device such as a webcam or a basic camera obtained the input image from a subject and then it communicates with the computer. After detection of the representative features from the face region, the emotionally Expressive facial image are obtained, it is then pre-processed and a classifier is used to classify them into one of the emotion classes such as anger, fear, surprise, happy, natural etc. And as per user’s emotions music player play the song list.

**Keyword:** HSV MODEL, Blob Analysis, Cascade Classifier, Canny Edge, Facial Expression; Human-Computer Interaction, Real-Time; Emotion Recognition.

## 1. INTRODUCTION:

listening to music is popular as it provides entertainment. It is readily available to anyone, can be listened to almost anywhere, and is one of the most popular ways to regulate mood. The ability of music to direct mood is important, as positive moods enhance several cognitive functions, cause optimistic feelings to predominate, and, among other things, can enhance cognitive revalidation. However, as our personal music databases increase in size, it becomes more difficult to select songs.

## 2. RELATED WORK:

Although emotion recognition has a broad literature, it is still now considered a complicated problem for research for the following reasons like the nature and surroundings of people are not the same all over the planet. People sometimes tend to express a feeling that is in his mind but cannot always express through physical expressions in the same way as others do which in result gives rise to mixed and complex emotional states which makes it difficult for an expression recognition system to recognize. Among alluring works on facial expression recognition, the work by Ekman and Friesen needs to be kept in mind. They proposed a scheme for recognition of facial expression from different regions of face.

## 3. BACKGROUND STUDY:

Face detection systems have many problems pertaining to pose, light, facial expression and quality of picture. It can be solved by applying some sort of image preprocessing before they are applied for further analysis purpose. The facial expression detection system is divided into four major steps:

- Face detection
- Normalization
- Feature extraction
- Classification

Detection of face and normalization phase detects the face and lighting effects reduced to some extent. The next step is feature extraction which extracts the all features and irrelevant features are eliminated in feature selection process. Final step is classifications where the facial expressions are classified in to four basic emotions shown in Fig. 1. Generally, there are two techniques in the facial expression recognition process the first technique is based on facial feature & the other considers the holistic view of the recognition problem.

**A. Feature based approach**

In this approach the local features (like nose, eyes) of the face are found. Then these features are segmented & then they are used as the input data for structural classifier. The techniques like dynamic link architectures, pure geometry & hidden Markov model (HMM) are classified under this category.

**B. Holistic approach**

In this approach the statistical methods are used to the statistical characterization from the entire training sample images. There are techniques like eigen faces, probabilistic eigen faces, fisher face, support vector machines (SVM), nearest feature line (NFL) and independent-component analysis which use holistic approach for detection of facial expression

**C. Hybrid approach**

Hybrid approach is a fusion of above two mentioned approaches. The idea of this method comes from how human vision system perceives both local features and whole face. The methods like modular eigenface, hybrid local feature, shapes normalized, and component based methods are used in hybrid approach.

**4. LITERATURE SURVEY:**

In 1977, Ekman and Friesen [7] developed a famous and flourishing facial action coding system. The Facial Action Coding System (FACS) establish the facial muscles that cause changes in the facial expression thus enabling facial expression analysis. This system consists of 46 Action Units (AU) describing the facial behaviors. Line based caricature of the facial expression for the line edge map (LEM) descriptor, measuring the line segment Hausdorff distance (measures how far two subsets of a metric space are from each other) among the line caricature of the expressions and the LEM of test faces. They achieve an optimal value, viewing that the average detection rate of females was 7.8% higher than that of males. Lajvardi and Wu offered a tensor based representation of the static color images. They achieved 68.8% accuracy in recognizing the expression with different resolutions in color space. Neural network is proposed in that compresses the whole face region with 2-D discrete cosine transform. Ma and Khorasani comprehensive this image compression with the legalone hidden layer neural network with the optimal block size to be 12 and the upper limit number of hidden units, therefore attaining the accuracy rate of almost 93.75%.

Researchers have likewise used the MPEG-4 standard to provide the facial action parameters (FAP) to interpret the facial aspects. Aleksic and Katsaggelos developed a facial expression detection system utilizing these facial action parameters basically describing the eyebrows and the outer lip feature, and categorization up to 93.66% of the test expressions by calculating the maximum likelihoods generated by the mainstream hidden Markov model (MS-HMM). Huang and He presented a super resolution method to improve the face detection of low resolution images. They applied canonical correlation analysis (CCA) to obtain the coherent features of the high resolution (HR) and low resolution (LR) images, and employed radial basis functions (RBF) based nonlinear mapping favoring the nearest neighbor (NN) classifier for detection of single input low resolution picture. The detection rate of their method tested on the Facial Detection Technology (FERET) face database was 84.4%, 93.0% for UMIST database, and 95.0% of the Olivetti Research Laboratory (ORL) database. The approach of Eigenface method was given by Turk and Pentland. Murthy and Jadon enhanced this method to recognize the expression of the front view of the face, tested for the Cohn-Kanade (CK) Facial Expression database and Japanese female facial expression (JAFFE) database. Zhi, Flierl, Ruan, and Kleijn used the projected gradient method and developed the graph-preserving sparse non-negative matrix factorization (GSNMF) for descent of feature verified on different databases. They achieved an accuracy of 93.3% detection for occlusion, 94.0% for nose occlusion, 90.1% for mouth occlusion and 96.6% for impulsive facial expression.

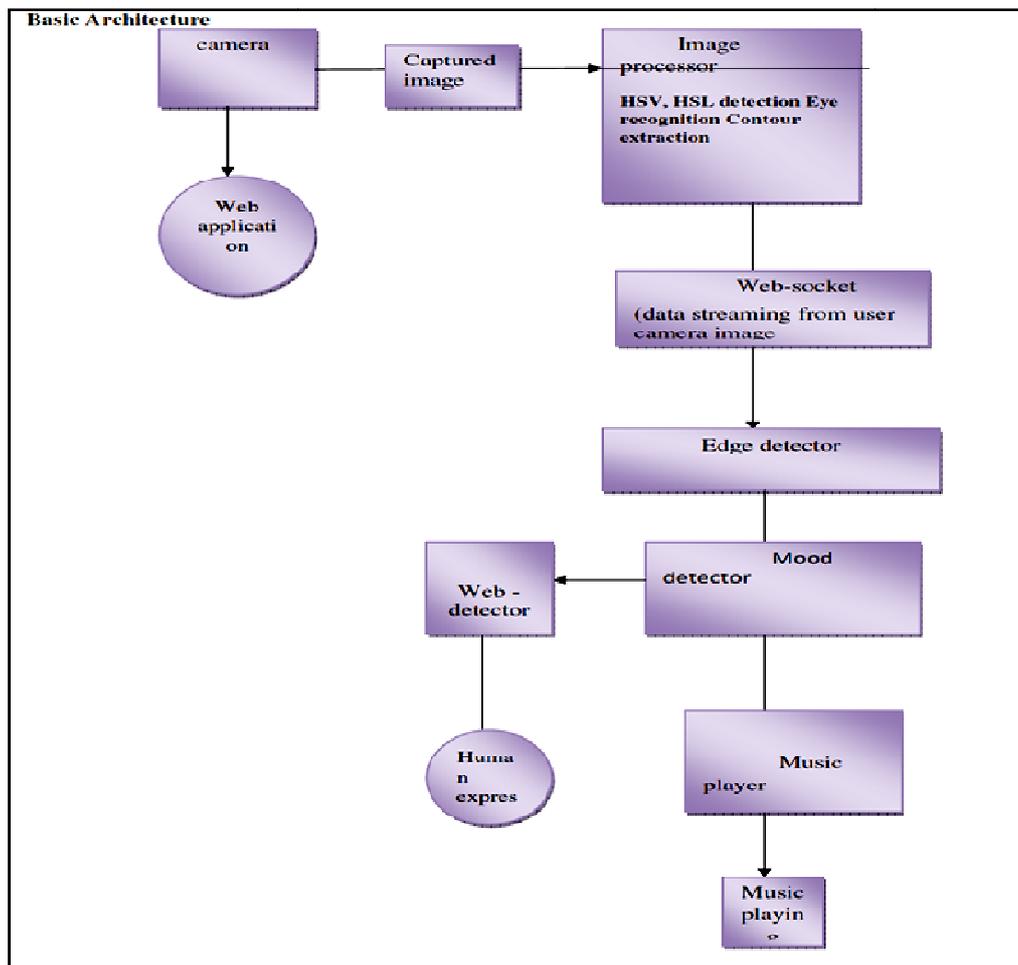
Mase and Pentland projected the activity of the facial muscles using dense optical flow. In new approach was extended combined with the face model, using recursive estimation and achieved 98.0% accuracy. Keith Anderson and Peter W. McOwan used an enhanced ratio template algorithm to identify the frontal view of the face, and chose the multichannel gradient model for motion of the face. They analyse detection system using support vector machine classifier (SVM) and noted 81.82% detection rate. In, the

elastic graph matching (EGM) algorithm has been recommended and the analysis conducted for the feature extraction was a novel 2-class kernel discriminate analysis to get better the performance for the facial expression detection. The detection accuracy achieved 90.5% for Gabor-based

elastic graph matching method, but for the normalized morphological based elastic graph morphological based elastic graph matching method was 91.8%. Facial expression detection has been analyzed on

visible light images, but new algorithm made a database for detection of expression of both visible and infrared images. Gabor wavelets were also useful for sensing as it shows the enticing attributes of specific spatial

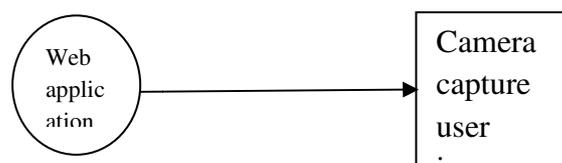
location and sparse object representation. Liu and Wechsler presented Gabor-Fisher based classification for face detection using the better version of Fisher linear discriminant Model (FLM) along with the augmented Gabor feature, tried on 200 fields. Zhang and Jondronegoro presented patch-based Gabor feature extraction from the automatically cropped images, in the kind of patches matched the patches of the input image with the trained images by comparing the distance metrics and categorization carried out by four different kernels support vector machine. The effects were seen for two databases, obtaining correct detection rate of 92.93% for JAFFE database and 94.8% for CK database. Two new methods were proposed in first discovering the dynamic facial expressions directly and second facial action units based detection. The sorting was performed using SVM. Although emotion recognition has a broad literature, it is still now considered a complicated problem for research for the following reasons like the nature and surroundings of people are not the same all over the planet. People sometimes tend to express a feeling that is in his mind but cannot always express through physical expressions in the same way as others do which in result gives rise to mixed and complex emotional states which makes it difficult for an expression recognition system to recognize. Among alluring works on facial expression recognition, the work by Ekman and Friesen needs to be kept in mind. They propose a scheme for recognition of facial expressions from different regions of face.



**Functional Model and Description**

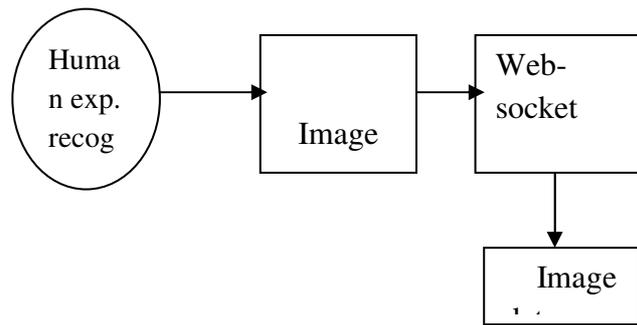
**Data Flow Diagram**

In level 1 data flow diagram, web application's camera captured image



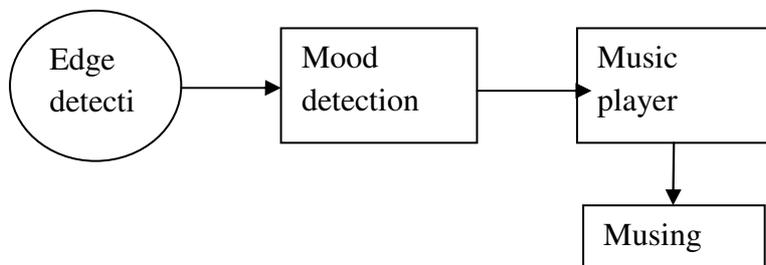
Level 1.data flow diagram

In level 2 data flow diagram, after the first level human expression are to be recognise from captured image and image processing is to be done after that the captured image data is to be read by web socket.



Level 2.data flow diagram

In level 3 data flow diagram, after level second edge detection is to be done for propose to remove noise from image, intensity gradient of image, suppression, detection of potential edge and tracking hysteresis then the mood is to be detected and as per mood music list is to be play.



**5. CONCLUSION:**

In a hypothesized form of a facial expression recognition system, an input sensing device such as a webcam or a basic camera obtained the input image from a subject and then it communicates with the computer. After detection of the representative features from the face region, the emotionally Expressive facial image are obtained, it is then pre-processed and a classifier is used to classify them into one of the emotion classes such as anger, fear, surprise, happy, neutral etc. And as per users emotions music player play the song list.

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