

**A Review on Mood prediction based Music System**Apurva Saswadkar¹, Snehal Kodale², Sarika Lalge³, Megha Somavanshi⁴, Prof. Mrs. P. U. Thakre⁵*UG Scholar, Dept. Of Computer Engg., Sinhgad Institute of Technology and Science, Narhe, Pune, M.S., India^{1,2,3,4}
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ABSTRACT- As far as music, we have our interests, most loved specialists, collections and music sort. Sometimes when some one listening to the music and is in really fantastic mood and plays some enthusiastic songs but suddenly after 2 – 3 songs a sad song gets played, somewhere it affects the mood of the person. So there is a need to categorize the music considering emotions or the mood of the person. Right now categorization depends on labels like Artist, Band (Group), Album, Movie, Year, Bitrate. Selecting a melody or music piece suiting our state of mind from a vast database is troublesome and tedious, since each of the specified parameter can't adequately pass on the enthusiastic perspective connected with the tune. We frequently select a tune or music which best suites our state of mind right then and there. Notwithstanding this solid relationship, the majority of the music applications exhibit today is still without giving the office of state of mind mindful playlist era. What is required is an extra parameter or rather seek channel, for this situation Mood, which connotes the feeling of that specific music piece. So in this paper we are going to implement a system which categorizes the songs in your playlist according to your state of mind or in simple words according to your mood. Here this implementation comprises of two domains as Image Processing and Data Mining. Image processing for recognizing the mood of the person and according to that playlist of the songs will be created.

KEYWORDS – vast database, specified parameter, passionate angle, situation Mood, mind-set Introduction

1. INTRODUCTION

Information mining is essentially utilized today by organizations with a solid purchaser center - retail, budgetary, correspondence, and promoting associations. It empowers these organizations to decide connections among "inward" elements, for example, value, item situating, or staff aptitudes, and "outer" components, for example, monetary markers, rivalry, and client demographics. What's more, it empowers them to decide the effect on deals, consumer loyalty, and corporate benefits. At long last, it empowers them to "penetrate down" into outline data to view detail value-based information. With information mining, a retailer could utilize purpose of-offer records of client buys to send focused on advancements in view of an individual's buy history. By mining demographic information from remark or guarantee cards, the retailer could create items and advancements to request to particular client fragments.

For instance, Blockbuster Entertainment mines its video rental history database to prescribe rentals to individual clients. American Express can recommend items to its cardholders in view of examination of their month to month consumptions we have our interests, most loved craftsmen, collections and music sort. Part of assortment is accessible and our decision varies every once in a while. Presently arrangement depends on labels like Artist, Band (Group), Album, Movie, Year, Bitrate and Genre. Selecting a melody or music piece suiting our state of mind from extensive databases troublesome and tedious, since each of the specified parameter can't adequately pass on the passionate perspective connected with the tune.

Subsequently, it is conceivable to assemble an inclination recognition framework in a solid situation, for instance, for established music in western culture. The connection amongst state of mind and music, Music feeling discovery and grouping has been broadly concentrated on and explored before. Generally example was favored. The broad work done in this field specifies an extent of change in the decision of sound elements and in addition characterization for better exactness.

This is the place we plan to contribute so that the state of mind can be naturally and effectively be distinguished for a given sound document. The majority of the experimentation done in the field of music state of mind order has been seen regarding non-Indian music. Music being subjective to social foundations, it is yet characteristic that Indian Music may require an alternate treatment.

Image Processing is a strategy to change over a picture into advanced shape and play out a few operations on it, so as to get an improved picture or to concentrate some helpful data from it. It is a kind of flag administration in which info is picture, similar to video casing or photo and yield might be picture or attributes connected with that picture. Typically Image Processing framework incorporates regarding pictures as two dimensional signs while applying effectively set flag preparing strategies to them

Image Processing essentially incorporates the accompanying three stages.

- Importing the picture with optical scanner or by computerized photography.
- Analysing and controlling the picture which incorporates information pressure and picture upgrade and spotting designs that are not to human eyes like satellite photos.
- Output is the last stage in which result can be adjusted picture or report that depends on picture investigation.

2. RELATED WORK

“Improving the Face Recognition system hybrid image reprocessing”

Cheng Cui ,Xin Wang, Hao Shen, In this paper we present a framework for improving face recognition system that have several stages. Some improvements of every stage are very important to the recognition results. Driven by this intuition, we proposed a scheme that gives the system a better performance. The scheme including dataset augments for learning, especially for big data requirement of deep learning. Enhancing the image contrast ratio and rotate the image for several angles that can improve the detection accuracy. Then, cropping the face in appropriate area for feature extraction and getting the optimal feature vector for face recognition at last.

“Emotion Recognition from Face Dataset Using Deep Neural Nets”

Deepjoy Das*, Alok Chakra arty The work presents an approach towards facial emotion recognition using face dataset consisting of four classes of emotions (happy, angry, neutral and sad) with different models of deep neural networks and compares their performance. We take the raw pixels values of all images in CMU face images dataset. The pixels values were represented by higher level concepts by feeding them into Restricted Boltzmann Machine, Deep Belief Networks and Stacked Auto encoder with Softmax Function. We observe that the later model could learn to recognize emotion with significantly higher accuracy compared to the former two models. Also, its performance improves with an increase in the number of hidden nodes in auto encoders, unlike the other two models.

“Continuous Emotion Recognition: Another Look at the Regression Problem”

Various regression models are used to predict the continuous emotional contents of social signals. The common trend to train those models is by minimizing a sense of prediction error or maximizing the likelihood of the training data. According to those optimization criteria, among two models, the one which results in a lower prediction error, or higher likelihood, should be favored. However, that might not be the case, since to compare the prediction quality of different models, the correlation coefficient of their prediction with the actual values is prevalently used. Hence, given the fact that a lower prediction error does not imply a higher correlation coefficient, we might need to reconsider the optimization criteria that we undertake in order to learn the regression coefficients, in order to synchronize it with the hypothesis testing criteria. Motivated by this reasoning, in this work we suggest to maximize a sense of correlation for learning regression coefficients. Two senses of correlation, namely Pearson’s correlation coefficient and Hilbert-Schmidt independence criterion, are seen for this purpose. We have chosen the continuous audio/visual emotion challenge as the framework of our experiments. The numerical results of this study show that compared to support vector regression, the suggested learning algorithms offer higher correlation coefficient and lower prediction error.

“Acquiring Mood Information from Songs in Large Music Database”

Yi Liu and YueGaoextracted the Audio Features such as Rhythm, timbre, intensity. They used and studied the Gaussian Mixture Model (GMM) and Support Vector Machine (SVM) as classifier. They also implemented the Feature Selection Algorithm named Relief, SFS, fisher and active. Due to the use of feature selection algorithm the obtained Accuracy was 84percent.

“Multi-Modal Music Mood Classification Using Co-Training”

In this paper, we present a new approach to content-based music mood classification. Music, especially song, is born with multi-modality natures. But current studies are mainly focus on its audio modality, and the classification capability is not good enough. In this paper we use three modalities which are audio, lyric and MIDI. After extracting features from these three modalities respectively, we get three feature sets. We devise and compare three variants of standard co-training algorithm. The results show that these methods can effectively improve the classification accuracy

3. OVERVIEW OF SYSTEM

The prime focus is to categorize the audio into different moods. Following are the moods that we have identified currently for our work so far-Happy, Sad, Exciting, Silent. Songs with similar pattern or their similar audio feature range will be

grouped together to yield a particular mood. Hence, a mood based playlist will be provided to the user. Following Figure 1 shows the workflow of our system.

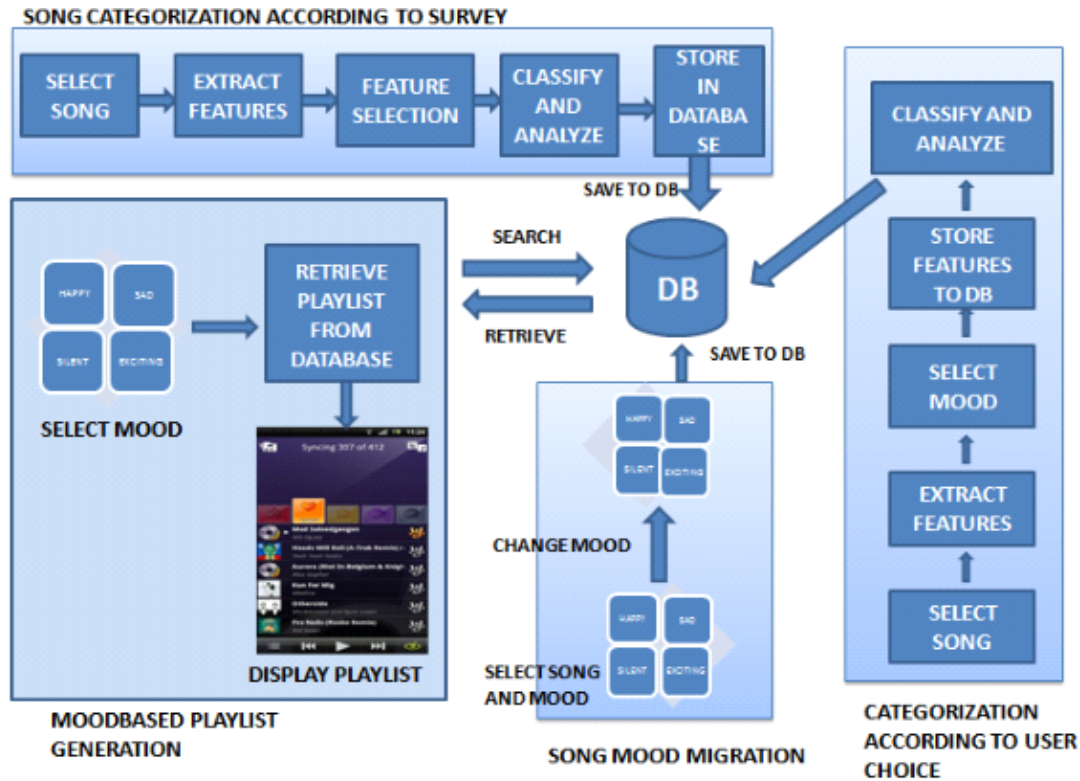


Figure 1: System Architecture

3.1 Playlist Generation

The user here has to select particular mood i.e. happy, sad, exciting, silent and the system then retrieves the songs of that particular mood from database which the user has selected and these songs are displayed in the playlist. So for every mood there is a different playlist and there is also facility for user to view all the songs. Here the user can play the songs by using the default audio player in their system.

3.2 Categorization According To Survey

The first step to categorize a song according to the mood and store it in database is to select the song from the hardisk and send it to the feature extraction module.

3.2.1 Feature Extraction

JAudio was used for the feature extraction process. Each clip is divided into .5 overlapping 32ms-long frames. The extracted features fall into 3 categories: imbre, intensity, rhythm. The first three sets can express mood information to some degree and are very important for mood detection.

Timbre features: Happy songs usually sound bright and vibrant, while grief ones sound pensive and gloomy. Timbre features can be used to judge whether the motion is negative or positive. The timbre features we used are listed as follows: Centroid, Rolloff Point, Flux, Zero Crossing, Strongest Frequency Via Zero Crossing, Strongest Frequency Via Spectral Centroid, Strongest Frequency FFT Maximum, Compactness, MFCC, LPC, Peak based Spectral Smoothness. We, Calculated the mean and standard deviation over all frames.

Intensity features: Intensity features can be used to judge whether the emotion is very strong or not. For example, if songs express a positive emotion, then using intensity features we can get whether it is enthusiastic or lively. In this paper, the intensity features are RMS and Fraction of Low Energy Windows. By calculating the mean and standard, we got 4 intensity features.

Rhythm feature: Through rhythm features, we also can get some information about whether the music emotion is positive or negative. Fast songs tend to be happier than slow ones. We extracted rhythm features including Beat Sum, Strongest Beat and Strength of Strongest Beat. Also by calculating the mean and standard deviation, led to 6 rhythm features..

3.2.2 Feature Selection

There are certain features which give similar values for audio of any mood. Hence such features can hinder the accuracy of the system. After conducting survey and feature extraction process, Information Gain algorithm was used to select the defined features and remove the redundant ones. Information gain helps to determine which attribute in a given set of training feature vectors is most useful for discriminating between the classes to be learned. When a particular classification model has multiple features, there is higher probability that many (if not most) of the features are low information. Information Gain algorithm is as follows:

Algorithm 1 Information Gain

- 1: Using the dataset reader take all the features and store it in an array list for further processing.
- 2: Let c is total number of features, a be features satisfying and b be features not satisfying the criteria.
- 3: Apply it in the formula $k1=a/c$ and $k2=b/c$
- 4: Use the $K1$ and $k2$ values for further analysis $L1=\log k1$ and $L2=\log k2$
- 5: Use the information gain formula $G=(k1*L1-k2*L2)$
- 6: The value obtained for every feature gives us an index value which tells us whether the feature should be included or not.

Features that are common across all classes contribute meagre information to the classification process are innocuous, but in aggregate, low information features can decrease performance. Eliminating low information features gives your model clarity by removing noisy data. When the higher information features are used, performance is increased and the size of the model is decreased, which results in less memory usage along with faster training and classification.

3.2.3 Classification And Analysis

After the features are extracted and stored in xml file and then the selected features given by feature selection algorithm are applied in the fuzzy logic. This helps to determine the mood of song.

Algorithm 2 Fuzzy Logic

- 1: Get the feature values recommended by information gain from Xml using ReadXML() and store them in variables.
- 2: Use the values to compare with the range setup through survey or through user categorization choice.
- 3: If the features satisfy the range of particular mood then that mood is given as output.
The mood determined and the song name is stored in the database.

3.3 Categorization according To user choice

This is the functionality provided in our system in which the user has got the choice to set the range or threshold for all the moods according to his choice of songs. Here he has to extract the features of all those songs he thinks to be in a particular mood and then that range of threshold will be set in the system. The algorithms used here are K-medoid and Random Forest Algorithm. K-medoid clustering algorithm is used for clustering songs into four clusters- happy, sad, exciting, silent. The k-medoids algorithm is a clustering algorithm related to the k-means algorithm and the medoid shift algorithm. Both the k-means and k-medoids algorithms are partitional (breaking the dataset up into groups) and both attempt to minimize the distance between points labeled to be in a cluster and a point designated as the center of that cluster. In contrast to the k-means algorithm, k-medoids chooses datapoints as centers (medoids or exemplars) and works with an arbitrary matrix of distances between datapoints instead of I^2 .

In some applications we want each center to be one of the points itself. This is where K-medoids comes in - an algorithm similar to the k-means algorithm, except when fitting the centers $c1, \dots, ck$, we restrict our attention to the points themselves. In some applications we want each center to be one of the points itself. This is where K-medoids comes in an algorithm similar to the k-means algorithm, except when fitting the centers $c1, \dots, ck$, we restrict our attention to the points themselves.

Algorithm 3 k-medoids

- 1: Initial guess for centers $c1, \dots, ck$ (eg., randomly select K of the points $X1, \dots, Xn$), then repeat

- 2: Minimize over C: for each $i=1,\dots,n$, find the cluster center c_k closest to X_i , and let $C(i) = k$
- 3: Minimize over c_1,\dots,c_k : for each $k = 1,\dots,K$, let $c_k=X_k^*$, the medoid of points in cluster k , i.e. point X_i in cluster k , that minimizes summation.
- 4: Stop when within-cluster variation doesn't change.

In random forest, each node is split using the best among a sub-set of predictors randomly chosen at that node. This somewhat counter intuitive strategy turns out to perform very well compared to many other classifiers, including discriminant analysis, support vector machines and neural networks, and is robust against over fitting.

Algorithm 4 **Random Forest**

- 1: Let the number of training cases be N , and the number of variables in the classifier be M .
- 2: We are told the number m of input variables to be used to determine the decision at a node of the tree; m should be much less than M .
- 3: Choose a training set for this tree by choosing n times with replacement from all N available training cases (i.e. take a bootstrap sample). Use the rest of the cases to estimate the error of the tree, by predicting their classes.
- 4: For each node of the tree, randomly choose m variables on which to base the decision at that node. Calculate the best split based on these m variables in the training set.
- 5: Each tree is fully grown and not pruned (as may be done in constructing a normal tree classifier).

4. SIMULATION RESULTS

The objectives of system are

- To take input image and detect mood of the person.
- To categorize the audio into different moods.
- To detect the mood of the song.
- To generate playlist according to the mood.

5. CONCLUSION AND FUTUREWORK

In this Paper some music designs speak to happiness or unwinding, while some others make an individual feel on edge or mad. Subsequently, it is conceivable to construct a state of mind discovery framework in a solid domain, for instance, for established music in western culture. The connection amongst temperament and music, Music feeling discovery and order has been broadly considered and examined before. Generally design acknowledgment approach was favored. The broad work done in this field specifies an extent of change in the decision of sound elements and in addition characterization for better precision. This is the place we mean to contribute so that the disposition can be naturally and proficiently be identified for a given sound document. If this solid relationship, the vast majority of the music applications show today are still without giving the office of state of mind mindful playlist era. What is required is an extra parameter or rather seek channel, for this situation Mood, which connotes the feeling of that specific music piece. Henceforth an example can be acquired for the same. This example can help us to decide the given parameter i.e. State of mind. Some music designs speaks to happiness or unwinding, while some others make an individual feel restless or hysterical. Subsequently, it is conceivable to manufacture a state of mind identification framework in a solid situation, for instance, for traditional music in western culture. The connection amongst state of mind and music, Music feeling discovery and arrangement has been broadly concentrated on and inquired about before. Generally design acknowledgment approach was favored. The broad work done in this field specifies an extent of change in the decision of sound components and in addition grouping for better precision. This is the place we mean to contribute so that the mind-set can be consequently and effectively be identified for a given sound record.

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