**Problem Statement**

The objective of this project is to build an application that detects the mood of users using still images or videos and recommends music accordingly. The system uses image analysis to infer the user's mood and provide personalized music recommendations to enhance their emotional experience.

**Steps to Build the Model**

* **Import Required Libraries**

The following libraries were imported for data processing, machine learning, and visualization:

* Pandas
* Sklearn
* Matplotlib
* NumPy
* TensorFlow

**Music Recommendation Model**

* **Data**

The dataset contains 686 songs labelled with 7 mood categories and 19 audio features.

* **Model Building**
* A Random Forest Classifier model was built and hyperparameters tuned using GridSearchCV.
* The best model had 100 trees and minimum split of 2 samples.
* **Training & Evaluation**
* The model was trained and achieved 79.7% accuracy on the test set.

**Music Mood Model**

* **Data Processing**
* The training and test image datasets were explored to verify class distribution of 7 mood categories.
* As preprocessing, images were resized to 128x128 pixels and pixel values were scaled to 1/255.
* **Model Architecture**

A sequential CNN model was defined with the following layers:

* Conv2D layers for feature extraction
* Maxpooling layers for downsampling
* Flatten layer to convert 2D features to 1D
* Dense layers for classification
* Final layer with Softmax activation to output probability scores for the 7 mood classes

* **Training**
* Data augmentation techniques like shearing, zooming and flipping were used to expand the training data.
* The model was trained for 130 epochs using categorical cross-entropy loss and adam optimizer.
* **Evaluation**
* The model achieved 87% training accuracy and 85% validation accuracy after training.
* Metrics like loss, precision and recall were tracked during training to monitor performance
* **Conclusion**

The documentation summarizes the workflow for building an end-to-end intelligent system using CNN and Random Forest models to detect user mood and provide appropriate music recommendations.

**Summary**

MoodforMusic uses CNN and Random Forest models to detect mood from images and recommend suitable music. The image classification CNN model achieves 87% accuracy in categorizing facial expressions. The music classification Random Forest model achieves 79% accuracy in categorizing songs into moods. By integrating these high-accuracy models, MoodforMusic delivers an intelligent end-to-end system for mood-based music recommendation.