Emotion-Aware Music Recommendation System

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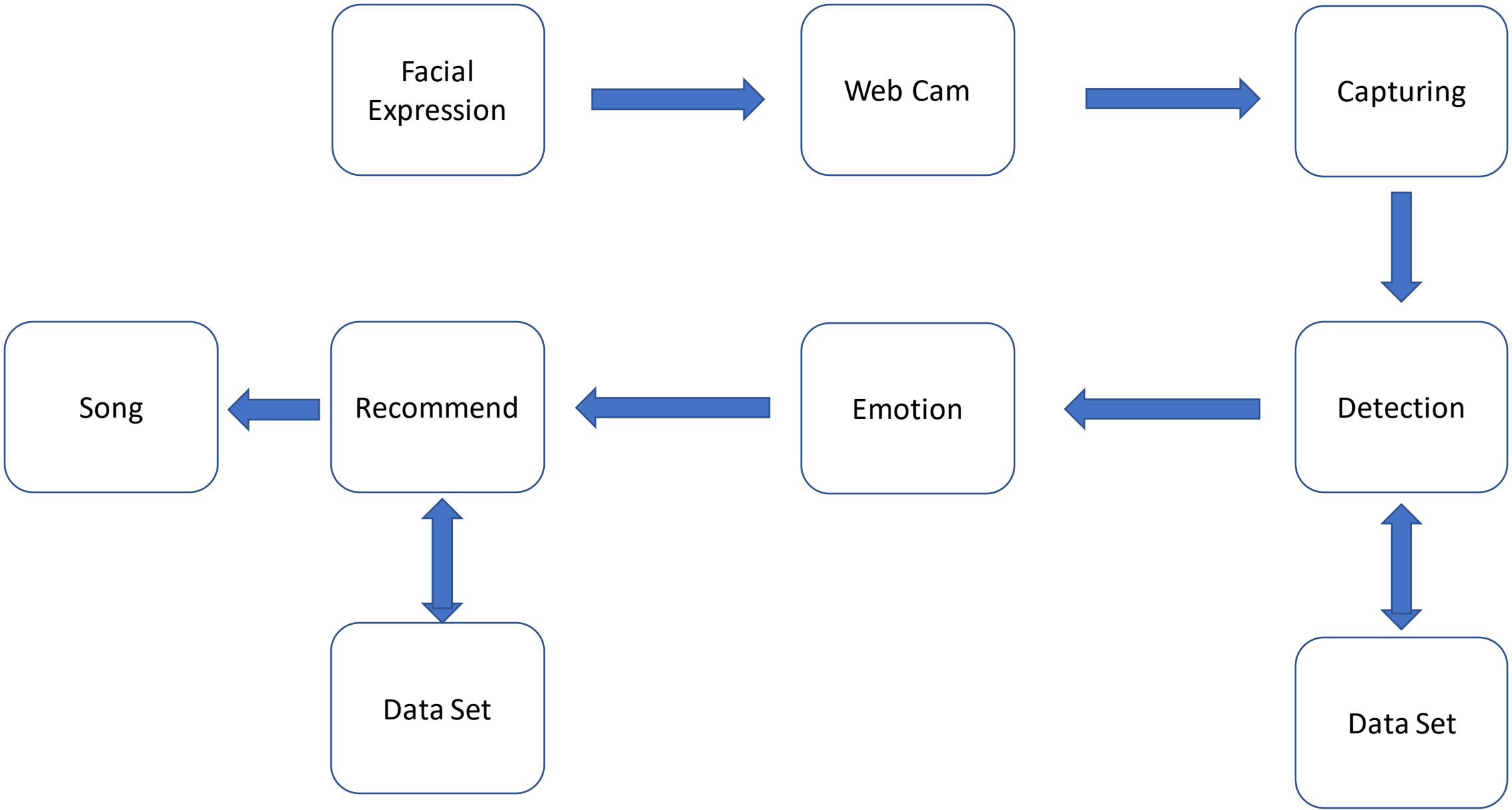
Introduction

- Recommend Music based on User's Current Emotion
- Emotion Identification
  - Implicit: Facial Emotion, Keystrokes, Mouse-click patterns
  - Explicit: Input from User
- Music Recommendation
  - Collaborative Filtering: Based on Similar Users
  - Content Based: Based on Similar Content

Motivation

- Lack of Context-aware Music Recommendation system
- Constantly Expanding Digital Music Libraries
  - ❖ Difficult to recall a particular song matching the current mood
- Confusion while choosing songs
- Useful when users can't reveal or express their emotion

Flow


Facial Expression
Web Cam
Capturing
Detection
Data Set
Emotion
Recommend
Data Set
Song

Literature Review: Emotion Detection

Parameter	CNN	Deep Face (DNN)	FER (MTCNN)
Accuracy	High	Low	High
Train time	Fast	Slow	Slow
Validation time	Fast	Slow	Slow
Advantages	Speed	Light Weight	Self-alignment of Face
Disadvantages	Large Training Data	Low Accuracy	Slow
Common	Unable to detect rare facial expressions like Disgust		

Proposed Methodology: Emotion Detection

- Based on the accuracies, both, CNN and MTCNN, seem a good fit for Facial Emotion Detection
- Choose CNN if time is an Important Factor
- Choose MTCNN if Accuracy is more important
- Time factor can be reduced by using GPUs.
  - ❑ MTCNN is better than CNN

Partial Implementation

- Datasets used:
  - FER2013: 28k train images + 7k test images; 48x48; B&W
  - Affect Net: 49k train images + 4k test images; 224x224; Colored

Parameter	CNN	Deep Face (DNN)	FER (MTCNN)
Train Accuracy	66.1 %	97.35 %	75.42 %
Test Accuracy	34.2 %	22.8 %	35.8 %
Train Dataset	FER 2013 Train	FER 2013 Train	FER 2013 Train
Test Dataset	Affect Net	Affect Net	Affect Net

Work to be done

- Part – 2: Music Recommendation System based on the Emotion Detected in Part – 1
  - Generate a Dataset using Spotify API
  - Two approaches: Content-based and Collaborative filtering
  - Recommend top K songs? (KNN)

Methods for Recommendation