**TABLE OF CONTENTS**

**Acknowledgments iv**

**Abstract v**

**List of Figures vi**

**1. Introduction**  **1**

1.1 Project Description 3

1.2 Existing System 2

1.3 Objectives 3

1.4 Purpose, Scope and Applicability 3

1.4.1 Purpose 3

1.4.2 Scope 4

1.4.3 Applicability 4

1.5 Overview of the Report 4

**2. System Analysis and Requirements 5**

2.1 Problem Definition 5

2.2 Requirement Specification 5

2.2.1. Functional Requirements 5

2.2.1.1 Capturing Button 5

2.2.1.2 Real Time Detection 6

2.2.1.3 Emotion recognition 6

2.2.1.4 Recommending Movies and Songs 6

2.2.2 Non-functional Requirements 6

2.2.2.1 Usability 6

2.2.2.1.1 Graphical User Interface 6

2.2.2.2 Performance 7

2.2.2.3 Security 7

2.2.2.4 Legal, Copyright, and Other Notice 7

2.2.2.5 Applicable Standards 7

2.3 System Requirements 8

2.3.1 Hardware Requirements 8

2.3.2 Software Requirements 8

**3. System Design** **9**

3.1 System Architecture 10

3.2 System Flow-Chart 11

3.3 Use Case Diagram 12

3.4 Data Flow Diagram 13

* Level-0 13
* Level-1 14
* Level-2 15

3.5 Interface Design 16

3.6 Dataset Description 18

3.6.1FER 2013 Dataset 18

3.6.2 Movies and Songs Dataset 21

**4. Implementation** **22**

4.1 Implementation Approaches 22

4.1.1 Image Data Preparation 22

4.1.2 Convolution Neural Network 22

4.1.3 Real Time Face Detection 24

4.1.4 Facial Emotion Classification 24

4.1.5 Deployment Using Flask 24

4.1.6 Recommendation of Movies/Songs 24

4.2 Coding Details: 25

4.2.1.1 Convolution Neural Network Model Building 26

4.2.1.2 Real-Time Emotion Classifier 31

4.2.1.3 Deployment Using Flask 32

**5. Testing** **34**

5.1 Test Cases 34

5.1.1 Test Cases for Emotion Detection 36

5.1.2 Output Recommendation 36

**6. Conclusion** **37**

6.1 Design and implementation issues 37

6.2 Advantages and Limitations 37

6.3 Future Scope of the Project 37

**7. References 38**

**ACKNOWLEDGMENTS**

I would like to express my greatest appreciation to all individuals who have helped and supported me throughout the project. I am thankful to my guide **Dr. Dalvin Vinoth Kumar A**  for his ongoing support during the project, from initial advice, and encouragement, which led to the final report of this project. I would also like to thank **Dr. Saleema J.S** who was always there for assistance.

A special acknowledgement goes to my classmates who helped me in completing the project by exchanging interesting ideas and sharing their experience.

I wish to thank my parents as well for their undivided support and interest who inspired me and encouraged me to go my own way, without whom I would be unable to complete my project.

In the end, I want to thank my friends who displayed appreciation for my work and motivated me to continue my work.

**Abstract**

Facial expressions are biologically formed from the relative positioning or movement of muscles that are located beneath the skin. According to certain debatable views, they also reflect the person's emotional condition at the time. They are undoubtedly contentious since it is simple to mimic their expressions. However, facial expressions are the primary form of non-verbal communication in a world where speaking is one of the most essential acts.

The term "recommender system" refers to a system that can be used to suggest products to a user based on information or criteria such as past user feedback or other user patterns.

A person frequently finds it difficult to choose which music/movie to listen to or watch out of the vast selection of available selections. Depending on the user's mood, a variety of suggestion frameworks have been made available for topics including music, dining, and shopping. Our multimedia recommendation system's primary goal is to offer people options that match their tastes. Understanding the user's present emotional or mental state may result from analyzing the user's face expression and emotions. One area where there is a great possibility to provide customers a wide range of options based on their preferences and recorded information is music and video.Humans frequently utilize their facial expressions to convey their intentions and the context in which they meant what they said. More than 60% of users say that there are occasionally too many songs in their music library, making it difficult for them to choose which one to play. By creating a suggestion system, it may be possible to help users choose what music or movies to watch or listen to, thereby lowering their levels of stress.When a song or movie matches the user's mood, there is no need for the user to waste time looking for them; instead, music or movies are presented to the user in accordance with his or her mood. The user's image is recorded with the aid of a camera. After taking the user's image, a music or movie from the collection that best suits the user's needs is then played based on the user's mood or emotion.

**Keywords: Facial Expression Recognition, Recommender System, Multimedia**

**LIST OF FIGURE**

| **Serial Number** | **Figure Number** | **Figure**  **Description** | **Page Number** |
| --- | --- | --- | --- |
| 1 | 3.1 | System Architecture for System | 10 |
| 2 | 3.2 | Flowchart for System | 11 |
| 3 | 3.3 | Use Case Diagram | 12 |
| 4 | 3.4 | Data Flow Diagram Level-0 | 13 |
| 5 | 3.5 | Data Flow Diagram Level-1 | 14 |
| 6 | 3.6 | Data Flow Diagram Level-2 | 15 |
| 7 | 3.7 | Home Page | 16 |
| 8 | 3.8 | Selection Page | 16 |
| 9 | 3.9 | Movie List Page | 17 |
| 10 | 3.10 | Song List Page | 17 |
| 11 | 3.11 | Angry Emotion from Dataset | 18 |
| 12 | 3.12 | Disgust Emotion from Dataset | 19 |
| 13 | 3.13 | Fear Emotion from Dataset | 19 |
| 14 | 3.14 | Happy Emotion from Dataset | 19 |
| 15 | 3.15 | Neutral Emotion from Dataset | 20 |
| 16 | 3.16 | Sad Emotion from Dataset | 20 |
| 17 | 3.17 | Surprise Emotion from Dataset | 20 |
| 18 | 4.1 | Convolution Neural Network Model Building Summary | 23 |
| 19 | 4.2 | List of files for System | 25 |
| 20 | 4.3 | Importing Required Modules for Building Convolution Neural Network Model | 26 |
| 21 | 4.4 | Preparing Data Using Data Generator | 26 |
| 22 | 4.5 | Facial Emotions Present in Dataset | 27 |
| 23 | 4.6 | Code to Visualize Prepared Data | 27 |
| 24 | 4.7 | Visualizing Prepared Data for different Emotions | 28 |
| 25 | 4.8 | Visualizing Prepared Data for different Emotions | 28 |
| 26 | 4.9 | Convolution Neural Network Model Building Summary | 29 |
| **Serial Number** | **Figure Number** | **Figure**  **Description** | **Page Number** |
| 27 | 4.10 | Model Defining | 29 |
| 28 | 4.11 | Running Model with 100 Epoch | 30 |
| 29 | 4.12 | Saving Model | 30 |
| 30 | 4.13 | Importing Required Modules for Real-Time Emotion Detection | 31 |
| 31 | 4.14 | Using Computer Vision Classifying Emotions for Real-Time | 31 |
| 32 | 4.15 | Saving Emotions Frame by Fame in an array and taking Dominant Emotion | 32 |
| 33 | 4.16 | Importing Required Modules and setting up flask | 32 |
| 34 | 4.17 | Detecting Emotions Using Model | 33 |
| 35 | 4.18 | Requesting Web Pages according to classified emotion | 33 |
| 36 | 5.1 | Sad Emotion Detection | 34 |
| 37 | 5.2 | Happy Emotion Detection | 34 |
| 38 | 5.3 | Fear Emotion Detection | 35 |
| 39 | 5.4 | Angry Emotion Detection | 35 |
| 40 | 5.5 | List of Songs for Detected Emotion | 36 |
| 41 | 5.6 | List of Movie for Detected Emotion | 36 |