

Contents

| | | |
|----------|-------------------------------------|-----------|
| 1 | Introduction | 4 |
| 1.1 | Background: | 4 |
| 1.2 | Motivation: | 5 |
| 1.3 | Objective: | 7 |
| 2 | Literature Review | 8 |
| 2.1 | Overview: | 8 |
| 2.2 | Introduction | 8 |
| 2.3 | Literature Survey | 9 |
| 2.3.1 | Children Facial Databases | 11 |
| 2.3.2 | Adults Facial Databases | 11 |
| 2.3.2.1 | JAFFE: | 12 |
| 2.4 | Algorithms | 13 |
| 3 | Methodology | 20 |
| 3.1 | Facial Database | 20 |
| 3.2 | Face Detection | 21 |
| 3.3 | Gabor Filter | 23 |
| 3.4 | Classifier | 24 |
| 4 | Implementation | 25 |
| 4.1 | Our Proposed Algorithm | 25 |
| 4.2 | Feature Extraction | 28 |
| 4.3 | Classifier | 30 |
| 5 | Results and Discussion | 31 |
| 6 | Conclusion | 35 |
| 6.1 | Overview: | 35 |
| 6.2 | System Configuration | 35 |

List of Figures

| | | |
|-----|--|----|
| 1.1 | Human Facial Expression | 6 |
| 2.1 | Facial Expression Recognition System | 9 |
| 2.2 | Flow of Facial Expression Recognition System | 10 |
| 2.3 | Frontal and 30-Degree view Cohn-Kanade AU Coded Facial Expression | 10 |
| 2.4 | Camera Setup of Dartmouth database | 11 |
| 2.5 | a) shows the photographic room b) illustrates the camera configuration | 12 |
| 2.6 | Apparatus illustration used for JAFFE Database | 12 |
| 2.7 | Image Capture Devices | 13 |
| 2.8 | 9 CMU 3D Room[9] | 13 |
| 2.9 | a) Haar like Feature b) Haar like feature detected on face | 16 |
| 3.1 | Division of Application | 20 |
| 3.2 | Face Localization | 21 |
| 3.3 | Histogram of LBP | 22 |
| 3.4 | Local Binary Pattern of image | 22 |
| 3.5 | Gabor Function | 23 |
| 3.6 | Gabor in Frequency Domain | 23 |
| 4.1 | Different Emotion Accuracy | 27 |
| 4.2 | Mean Rating of Age of Participants | 27 |
| 4.3 | Face Element Localization | 28 |
| 4.4 | LBP of image using threshold | 28 |
| 4.5 | Original Image to LBP to LBP Histogram | 29 |
| 4.6 | Wavelet coefficient calculation of Image | 29 |
| 5.1 | Accuracy comparison of different database | 32 |
| 5.2 | Emotion Recognition Accuracy | 33 |
| 5.3 | Variation in Expression Recognition | 33 |
| 5.4 | Accuracy comparison of different database | 34 |

List of Tables

| | | |
|-----|--|----|
| 2.1 | Summary of available facial expression database | 14 |
| 2.2 | Facial Expression Recognition Algorithm Summary | 18 |
| 4.1 | percentage of emotions we got out of 25 participants | 26 |
| 5.1 | Facial Expression Accuracy on Databases | 32 |