"FACE EXPRESSIONS Detection"

1.1 Introduction

Autism Spectrum Disorder is a lifelong developmental disability that affects, among other things, the way an individual relates to their environment and their interactions with other people. They have difficulty in recognizing people's face expressions and giving expressions. Therefore, they are unable to interact in society through non-verbal communication. The system will maintain a dynamic source of picture and after applying image processing techniques it will generate the models to classify them into different moods. Moreover, research will be performed to define a mood for detecting autism in patients. There will also be criteria set to get information about extent to which the expression recognition skills have been developed in the users.

1.2. Problem:

In a system is employed using Deep Convolutional Neural Network which has an architecture that consists of filter layers and a classification layer. A filter stage involves a convolutional layer, followed by a temporal pooling layer and a soft max unit. Deep learning methods have been proposed to solve the facial semantic feature recognition tasks and to detect facial point based on Restricted Boltzmann Machine. We use database of facial expression which has a ground truth called CK dataset.

1.3. Solution:

The goal is to assess whether children with ASD differed in their recognition of emotions using an FER task that included unfamiliar expressions as well as familiar ones. Facial emotion recognition (FER) tasks have been devised to assess recognition ability and overall emotional intelligence, with the general aim being to match emotional labels to their corresponding facial expressions.

Facial expressions play an important role in recognition of emotions and are used in the process of non-verbal communication. The aim of the research, presented in this article, is to recognize seven basic emotional states: neutral, joy, surprise, anger, sadness, fear and disgust based on facial expressions using k-NN and MLP classifiers. K-NN An object is classified by a majority vote of its neighbors, with the object being assigned to the class most common among its k nearest neighbors. MLP they are composed of an input layer to receive the signal, an output layer that makes a decision or prediction about the input

In proposed a system Affadex that records facial cues of different expressions when the user watches an advertisement or other media content. It then uses facial analysis to measure these emotional responses. This allows the advertiser or creator of the media content know how users feel about their advertisements.

In this paper it is shown that the classification accuracy is significantly lower when the network is trained with one database and tested with a different database. For high performance solution we can run on relative lightweight convolutional neural networks that can be implemented in hardware or on a GPU.

Project Overview Statement

Project Title: FACE EXPRESSIONS DETECTION

Project Goal:
Our Goal of this project to judge the expressions of autism patients in easiest way who can't express his feelings. We will make this project to detect the feeling of all these and to help them.

Objectives:

Sr.#	
1	It helps us to figure out face expressions of Autism people.
2	The app will convert an RGB image to greyscale and apply noise reduction techniques.
3	Then app will detect image and extract required features to create facial expressions.
4	Mood classifiers will generate models & matched to trained data using cognitive analysis.
5	Giving fastest results of mood detection.

Project Success criteria:

• Accuracy of Face detection is achievable.
• User Friendly Interface
• It will provide the fastest face recognizing results within seconds.
• The system will be most reliable.

Assumptions, Risks and Obstacles:
- Few guardians may have trust issues on the results of this system.
- If autism don't want picture, then this process can change his expressions instead of real expressions.

Organization Address (if any):

Type of project:	❑Development

Target End users:

Autism Patient

Development Technology:	❑Object Oriented

Platform:

❑Android based

Approved By:

Date:

1.4. Project Goals & Objectives:

System will be based on image processing techniques. Recognition of facial expressions is targeted in order to improve the autism patient's emotional understanding. To build software which involves image processing mechanism where training is performed on various facial expressions and then they are tested to recognize desired expression. Our Goal of this project to judge the expressions of autism patients in easiest way who can't express his feelings. We will make this project to detect the feeling of all these and to help them.

- First, the app will start and ask user to capture or browse image.
- Then app will convert an RGB image to greyscale/Bitmap and apply noise reduction techniques.
- After that, app will detect image and extract required features to create facial expressions.
- Then using mood classifiers, it will generate a model.
- After that generated model will be matched to trained data using cognitive analysis.
- If model matches then app will generate an alert about mood detection.
- At last, detected mood will be tested.

1.5. High-level system components:

- Capturing & Browsing of Image
- Noise Reduction
- Grey Scale Conversion
- Image processing & Edge Detection
- Analyzing Image matching
- Mood Detection

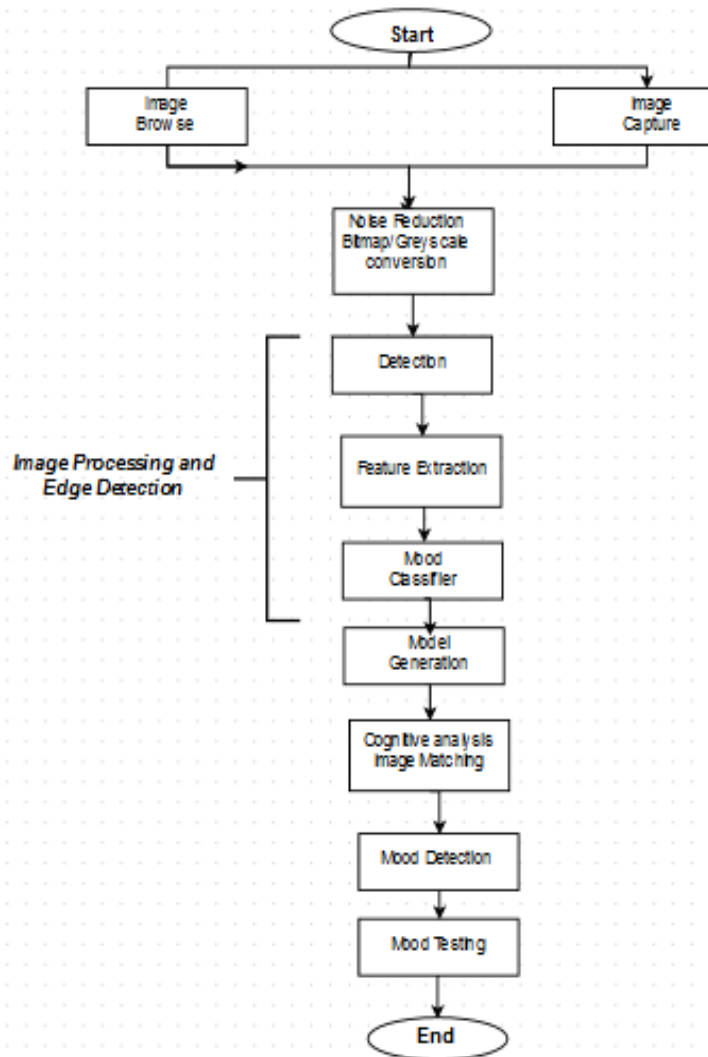### *1.6. List of optional functional units:*

- Patient Report
- Saving data

1.7. Exclusions:

This system will not work on Webpages.

1.8. Application Architecture:

It is 2-tier architecture. The following diagram shows the functionality of the project.

```
                              ( Start )
                                 |
        +------------------------+------------------------+
        |                                                 |
  +-----------+                                     +-----------+
  |  Image    |                                     |  Image    |
  |  Browse   |                                     |  Capture  |
  +-----------+                                     +-----------+
        |                                                 |
        +------------------------+------------------------+
                                 |
                       +--------------------+
                       | Noise Reduction    |
                       | Bitmap/Greyscale   |
                       | conversion         |
                       +--------------------+
                                 |
                       +--------------------+
                       |    Detection       |
                       +--------------------+
                                 |
  Image Processing and +--------------------+
  Edge Detection       | Feature Extraction |
                       +--------------------+
                                 |
                       +--------------------+
                       |      Mood          |
                       |   Classifier       |
                       +--------------------+
                                 |
                       +--------------------+
                       |      Model         |
                       |   Generation       |
                       +--------------------+
                                 |
                       +--------------------+
                       | Cognitive analysis |
                       | Image Matching     |
                       +--------------------+
                                 |
                       +--------------------+
                       |  Mood Detection    |
                       +--------------------+
                                 |
                       +--------------------+
                       |  Mood Testing      |
                       +--------------------+
                                 |
                             ( End )
```

Tools and technologies used with reasoning:

A brief list of tools and techniques that will be used in the project is given
below.

• Flask	Micro web framework written in Python which provides you with tools, libraries and technologies that allow you to build a web application.
• Firebase	Platform developed by Google for creating mobile and web applications.
• Android Studio	Developer tools for building market-leading apps
• Open CV	Library of Python bindings designed to solve computer vision problems
• Python	Programming Language to built applications etc.