Software Requirements Specification

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# 1. INTRODUCTION

The project is desktop application, Facial expression recognition system is implemented using Convolution Neural Network (CNN). Automatic recognition of facial expressions can be an important component of natural human-machine interfaces; it may also be used in behavioral science and in clinical practice.

**1.1 PURPOSE**

Facial expression are used to reconcile emotional state.

As its aimed to provide us a clear picture about how one looks/appears when s/he has an emotional state to outer world.

This **emotional look also communicate a lot about the person's internal condition as emotions are the outer make-up of a specific state of mind, and observers can easily evaluate a Peron’s** emotional state in order to assist him or give feedback about his outer makeup. Nurses observe such thing in mental health care centers to help Doctors in making a well diagnosed treatment plan for patients.

In short**its very important to understand meaning of emotions, reason behind a perticular emotion and different emotions in selection, hospitals, dating, in schools and counseling centers.**

## 1.2 SCOPE

* **App And Product development-**

Researching about different emotional states of a human body and how its influenced by usage of different products is a matter of prime importance for related industry professionals.

* **Improved Learning Practices**-

Here is an interesting fact,Contrary to common belief positive emotional state is thought to be bad for learning purposes while slightly negative emotional state fosters analytical thinking & is also appropriate for carrying out critical thinking.Hence this application is going to be very useful here.

* **Immersive Gaming-**

To make games more intrusive, video game creators base their research on different types of emotions commonly found to allure more & more players in such a way that they incorporate human emotions naturally into their game play.

**1.3 REFRENCES**

References for the information gathered are hereby followed:

* Wikipedia- **Artificial Neural Network & Convoluted Neural Network**
* Omar Ayman, Emotion Analysis,github-<https://github.com/omar178/Emotion-recognition>,2016.
* **Facial Emotion Detection using CNN and Representional Autoencoders Units By** Prudhvi Raj Dachpally ,School of Informatics and Computing ,Indiana University.
* Christine Lisetti ,Florida International University.

## 1.4 OVERVIEW

These Human facial expressions convey a lot of information visually rather than articulately. Facial expression recognition plays a crucial role in the area of human-machine interaction.Automatic facial expression recognition system has many applications including, but not limited to, human behavior understanding, detection of mental disorders, and synthetic human expressions. Recognition of facial expression by computer with high recognition rate is still a challenging task. Two popular methods utilized mostly in the literature for the automatic FER systems are based on geometry and appearance. Facial Expression Recognition usually performed in four-stages consisting of pre-processing, face detection, feature extraction, and expression classification. In this project we applied various deep learning methods (CNN) to identify the key seven human emotions: anger, disgust, fear, happiness, sadness, surprise and neutrality.

# 2. GENERAL DESCRIPTION

With the advent of modern technology our desires went high and it binds no bounds. In the present era a huge research work is going on in the field of digital image and image

processing. The way of progression has been exponential and it is ever increasing. Image

Processing is a vast area of research in present day world and its applications are very

widespread. Image processing is the field of signal processing where both the input and output signals are images. One of the most important application of Image processing is Facial expression recognition. Our emotion is revealed by the expressions in our face. Facial Expressions plays an important role in interpersonal communication. Facial expression is a non verbal scientific gesture which gets expressed in our face as per our emotions. Automatic recognition of facial expression plays an important role in artificial intelligence and robotics and thus it is a need of the generation. Some application related to this include Personal identification and Access control, Videophone and Teleconferencing, Forensic application, Human-Computer Interaction, Automated Surveillance, Cosmetology and so on. The objective of this project is to develop Automatic Facial Expression Recognition System which can take human facial images containing some expression as input and recognize and classify it into seven different expression class such as :Neutral, Angry, Disgust, Fear, Happy, Sadness, Surprise.

## 2.1 PRODUCT FUNCTION

2.2.1 There is a two way communication between user and application that is user can provide the data and can see the results implementing CNN for classification of facial expressions.

2.2.2 This products works on the processing of facial expressions of peoples.

## 

## 2.2 USER CHARCTERSTICS

* Get to improve their facial expressions.
* Able to understand others facial expressions.

## 2.3 GENERAL CONSTRAINTS

* The system should have properly working web camera.
* The system should have enough RAM and available space to unpack all modules and to run the application effectively.

**3. SPECIFIC REQUIREMENTS**

*The Specific requirements of this project is -*

***From user’s point of view***

1. Properly installed application.

2. Basic general knowledge of computer.

3. The user should have atleast a basic idea of expected output.

4. The image/input provided by the user must be clear.

***From Developer’s end***

1. Use of Convolutional Neural Networks.
2. Knowledge of HTML, CSS, JavaScript, Python.
3. A proper system to work on development of application.

## 3.1 FUNCTIONAL REQUIREMENTS

The major functional requirement of this project is to analyse the facial expression by Convolutional Neural Networks, so use of CNN is of extreme importance and for the application to work properly, system with above mentioned specifications should be available.

## 3.2 NON- REQUIREMENTS

### 3.2.1 PERFORMANCE

The application would be light weight and information it would provide should be precise.

### 3.2.2 RELIABILITY

In case user’s device crashes, a backup of his previous results would be maintained.

### 3.2.3 AVAILABILITY

The user must have a system with minimum required specifications and should have sufficiently charged (if required) system and web cam.

### 3.2.4 SECURITY

Security system needs database storage just like many other applications. All the results provided will be stored securely in a private database.

### 3.2.5 PORTABILITY

The product is highly portable as it can be accessed from any device with any Windows operating system.

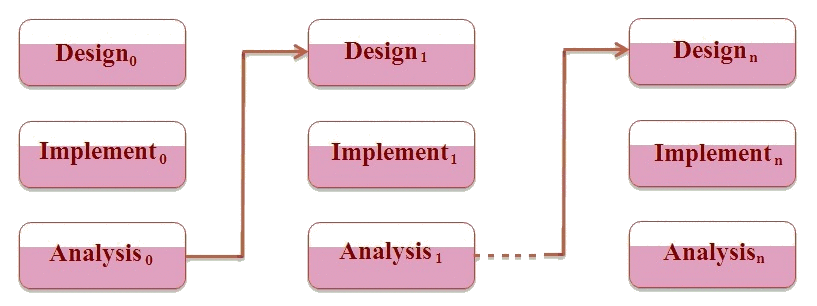
# 4. MODEL USED

**4.1 SDLC MODEL**

In the Iterative model, iterative process starts with a simple implementation of a small set of the software requirements and iteratively enhances the evolving versions until the complete system is implemented and ready to be deployed.

An iterative life cycle model does not attempt to start with a full specification of requirements. Instead, development begins by specifying and implementing just part of the software, which is then reviewed to identify further requirements. This process is then repeated, producing a new version of the software at the end of each iteration of the model.

Iterative process starts with a simple implementation of a subset of the software requirements and iteratively enhances the evolving versions until the full system is implemented. At each iteration, design modifications are made and new functional capabilities are added. The basic idea behind this method is to develop a system through repeated cycles (iterative) and in smaller portions at a time (incremental).



**Reason for use**

The development team in Iterative-SDLC model starts with a small set of requirement after the initial phase of requirement, a small handful stage are repeated over and over, with each completion of cycle incrementally improving and iterating on the software. Enhancement can be quickly recognized and implemented throughout each iteration to be at least marginally better than the last. The reason for using Iterative model are:

* Generates working software quickly and early during the software life cycle.
* More flexible – less costly to change scope and requirements.
* Easier to test and debug during a smaller iteration.
* Easier to manage risk because risky pieces are identified and handled during its iteration.