System Requirements Specification for: Emotion Detection Project

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1 INTRODUCTION

1.1 PURPOSE

This is the Software Requirements Specification (SRS) for our project to capture the basic emotions of human face like happiness, sadness, anger, stress, focus , fear etc. It will illustrate the purpose and functionality of the app in CS242. It will also explain the details of the projects requirements, design issues, components, constraints, interface and interactions with other applications.

1.2 PRODUCT SCOPE

The project is an android based mobile app to indicate the users mental state using an image of the user. Stress, disgust, Happiness, Fear/surprise and focus are the main mental states that the application will detect. The application is mostly intended for the younger generations as they go through a lot of mood swings, due to puberty and havent fully grasped their emotions , but it can be used for all types of age groups. This app can be used by companies and people who create stuff like videos for entertainment of audience to get feedback for their content.This app can also be used for fun activities for kids. The app will provide real time display of mental state of the user, so user can use it to know his/her mental state during some other activity and also provide the analysis of anolder image present in gallery of the user, for nostalgia and fun.

1.3 DEFINITIONS ,ACRONYMS ,ABBREVIATIONS

ABBREVIATION	FULL FORM
SRS	Software Requirement Specification
MP	Mega Pixels
app	Application
FR	Functional Requirement
Desc.	Description
Rat.	Rationale
max	maximum

1.4 REFERENCES

Software engineering: A practitioners approach, 4th edition, Roger S. Pressman.
Software engineering , 3rd edition, K.K Aggarwal and Yogesh Singh.
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https://belitsoft.com/software-requirements-specification-document-example-international-standard
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1.5 OVERVIEW

The remaining sections of this document provide a general description, including characteristics of the users of this project, the product's hardware, and the functionaland data requirements of the product. General description of the project is discussed in section 2 of this document. Section 3 gives the functional requirements, data requirements and constraints and assumptions made .Section 3 also gives the specific requirements of the product. Section 3 also discusses the external interface requirements and gives detailed description of functional requirements. Section 4 is for supporting information.

2 OVERALL DESCRIPTION

2.1 OPERATIONS

Realtime and image analysis for emotion detection of face of the user. The user can share the detected emotions with their family and friends.

2.1.1 PRODUCT FUNCTIONS

With the mobile application, the users will be able to check their emotional state in real time and their emotional state of some previous image. The app will require access to the front camera and the gallery.

2.1.2 USER CHARACTERISTICS

The user should have a smartphone with a front camera for real time analysis of her image. They should have basic knowledge of english to operate the application.

2.1.3 CONSTRAINTS

Emotion detection occurs for a single face only. Emotion detection from multiple faces are not supported in our app. There would be some time lag between the output and the input in real time emotion detection. The mobile should have a front camera.

2.1.4 ASSUMPTIONS AND DEPENDENCIES

It is assumed that the user has basic proficiency in english. The user's mobile has front camera present in it. Multiple faces are not supported.

3 SPECIFIC REQUIREMENTS

3.1 EXTERNAL INTERFACE REQUIREMENTS

This section provides a detailed description of all inputs and outputs from the system. It also gives a description of the hardware, software and communication interfaces and provides basic prototypes of the user interface.

3.1.1 USER INTERFACE-

As the user opens the app on her smart phone, she is prompted with two options i.e "choose image from gallery" or "real time emotion detection" .

Mode 1-

If the user opts to choose an image from the gallery, the device's gallery shall open and the user can select any one image(max). If there are more than one faces in the picture, user is requested to change her preference. If the requirements are met, user can see her face under analysis and the detected emotions. User can further share the results with concerned persons.

Mode 2-

If the user selects the second mode real time emotion detection will start . User can see her face as seen by front camera of the device. If the requirements are met, user can see her emotion changing dynamically on the screen. User can share the results with concerned persons.

The user can exit the app or change between the above mentioned modes.

3.1.2 HARDWARE INTERFACE REQUIREMEMTS

The following app has been designed for android phones (android 4.1+), having a front camera of atleast 2 MP. There is as such no hardware requirements. The real time detection is managed by the internal front camera of the device whereas the static image detection is managed by the gallery in the device.

4 SOFTWARE SYSTEM ATTRIBUTES

4.1 RELIABILITY

The following application is designed to be built and deployed on android platform, and will reliably run on any android phone with android version above 4.1.The reliability of the app in emotion detection will depend primarily on the accuracy of emotion detection algorithm, a requirement that needs to be taken care of on the developer side while working on the project

4.2 AVAILABILITY

The application will be available for download on the google play store and will run 24*7 with or without internet connection.

4.3 SECURITY

Users of the app can in no way see the emotion results of other users without their prior knowledge and permission.

4.4 MAINTAINABILITY

Maintenance is one form of change that typically is done after the software development has been completed, as the time changes, so do the needs. This application needs a timely updation of the expression and face detection database suiting to the location where the app is intended to be used, and so the database needs to be expanded upon every updation of the app. As an example, for the app to show best results in emotion detection, training data comprising of faces from different parts of the world is needed, so as to facilitate better detection. All this maintenance will be timely done on subsequent versions of the app by the developers.

4.5 PORTABILITY

Since the app is built for portable android phones, it is freely portable and needs no re-download or update if it is to be used from some different location of the world. Also, the app can be freely transferred from one device to another, given that the other device complies to the hardware and software requirements as specified in section 7.

5 FUNCTIONAL REQUIREMENTS

5.1 FR-1

TITLE : SELECTON OF MODE
INPUT : User's choice from the given options of mode.
OUTPUT : opening the required application.
DESC. :There shall be two modes for emotion detection in this app vis. imotion detection from image or real time detection using front camera. The user shall be able to choose between the modes. Further navigation of the app depends on the user's choice here.

RAT. : In order to provide option to choos between modes.

5.2 FR -2

TITLE : IMAGE SELECTION
INPUT : stored images
OUTPUT : selected image
DESC. : If the user chooses for emotion detection from an already saved image, she shall be able to select an image from those stored in the device.
RAT : In order to facilitate image selection be the user.

5.2.1 FR- 2.1

TITLE : Seeking confirmation for image
INPUT : Detected face
OUTPUT : User's decision. DESC : After the user selected an image from all the stored images, she shall be able to verify by looking at the detected face, whether this is the face she intend to use for analysis.
RAT : verifying if the detected face is correct.
DEP : FR 2 , FR 1

5.2.2 FR- 2.2

TITLE : Emotion Detection from image
INPUT : Detected face
OUTPUT : calculated emotion
DESC : If the detected face is confirmed by the user, It's emotion shall be calculated and shown in decreasing order of the accuracy of the calculated emotion.
RAT : Displaying the results.
DEP : FR 3 , FR 2 , FR 1

5.2.3 FR- 2.3

TITLE : Exit option for image detection mode
INPUT : User's choice to exit
OUTPUT: Directing user to beginnning
DESC: If user has seen the results, user shall be able to exit the mode. User shall be able to either change the mode or choose another in the same mode to continue emotion detection.User may even opt to leave the application.
RAT: in order to provide usr option to exit.
DEP : FR 1

5.3 FR - 3

TITLE : Seeking confirmation for correctness of detected face in real time
INPUT : Detected face
OUTPUT : User's decision.
DESC : If the user chooses for real time emotion detection then she shall be able to verify if the detected faces in the recorded video from front camera is correct or not. She can proceed further if everything is correct.

RAT : verifying if the detected face is correct.

5.3.1 FR 3.1

TITLE : Real time emotion detection
INPUT : Detected face
OUTPUT : calculated emotion
DESC : If the detected face is confirmed by the user, It's emotion shall be calculated and shown in decreasing order of the accuracy of the calculated emotion . If the user changes her facial expression output should change dynamically according to her expression.
RAT : Displaying the results for real time emotion detection.

5.3.2 FR 3.2

TITLE : Exit option for real time emotion detection mode
INPUT : User's choice to exit
OUTPUT: Directing user to beginning
DESC: If user has seen the results, user shall be able to exit the mode. User shall be able change the mode. User may even opt to leave the application.
RAT: in order to provide user option to exit.

5.4 FR - 4

TITLE : share option
INPUT : user's choice to share
OUTPUT : analysed emotion willl be shared
RAT : to facilitate sharing emotions with acquaintances

5.4.1 FR - 4.1

TITLE : selection of sharing mode
INPUT : user's selection for mode of sharing
OUTPUT : further process will proceed with the selected mode
DESC : User can select their mode of preference for sharing the information, and further process will proceed through selected mode
RAT : to facilitate sharing using preferred mode

5.4.2 FR- 4.2

TITLE : selection of destination user
INPUT : alphanumeric string
output : information shared with selected person
DESC : user shall be able to select an acquaintance with whom he/she wants to share their mood. Analysis of user's emotions will be shared with the selected person.