

Real Time Face Recognition System (RTFRS)

Internal Guide:

Mr. Gaurav Bhardwaj

External Guide:

Mr. Shakti Patel

Project Members:

Team Id:-13139

Patel Jay K.(120783107007)

Swami Parasgiri A.(120783107026)

Master Bhavin M. (120783107017)

Patil Nikhil R.(100780107043)

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Introduction

- Face plays a big role in conveying identity and emotion, being the primary focus of attention in social life.
- Also, familiar faces can be identified at a glance even after years of separation.
- Computational model of face recognition can be applied to criminal identification, security systems, image and film processing and human computer interaction.

Continuous

- This is a challenging problem because faces have a high degree of variability in size, shape, colour and texture, multi dimensional.
- The approach treats the face recognition problem as two dimensional recognition problem.
- Thus, a fast and an efficient face detection system using Haar Classifier approach, a face recognition system based on Eigen face which relies on Principal Component Analysis (PCA) and a face tracking system based on Haar Cascade Classifier is implemented.
- We use the software Open source Computer Vision (OpenCV) library.

Abstract

- Face recognition have been fast growing, challenging and interesting area in real-time applications.
- A large number of face recognition algorithms have been developed from implementations. The present paper primarily focuses on principal component analysis, for the analysis,
- The software is implemented using C#.NET.
- This face recognition system detects the faces in a picture taken by web-cam, and these face images are then checked with training image dataset based on Eigen features. Eigen features are used to characterize images.

Keywords

- Eigen Faces
- Eigen Values PCA (Principal Component Analysis)
- Face Recognition
- Person Identification
- Face Classification

Main Modules

- Face Detection
- Eyes Detection
 - Apply Bezier Curve on Eye
- Lip Detection
 - Apply Bezier Curve on Lip
- Skin Colour Segmentation
- Database and Training
- Emotion Detection

System Requirements

❖ Hardware Requirements:

- Processor : Intel Dual Core or Advance.
- Hard Disk : Minimum 80 GB.
- Display : LCD/LED Colour.
- Accessories : Web Cam, Keyboard & Mouse.
- RAM : Minimum 1 GB.

❖ Software Requirements:

- Operating system : Microsoft Windows 7 or Higher Versions.
- Programming Language : ASP .NET with C#
- Database : MySQL 10G

Face Recognition

Process of Face recognition

- The face image captured is now used in the face recognition process.
- This face image is analysed and considered as a high-dimensional vector.
- This vector is then compared to all the face images in the database, looking for a match.

Authentication system

- The face recognition system will be integrated with PC's authentication system. If a match is found for the face image than it will log that user on.
- The camera will be capturing images in real-time so if a enrolled face is not detected in front of the computer, the user is logged off.

Face Recognition Techniques

- Face detection as a pattern-classification task
- Controlled background
- By colour
- By motion
- Model-based
- Geometric Features

FACE RECOGNITION TECHNIQUES

❖ By colour:

- This technique is vulnerable. In this skin colour is used to segment the colour image to find the face in the image. But this has some drawback; the still background of the same colour will also be segmented.

❖ By motion:

- The face in the image is usually in motion. Calculating the moving area will get the face segment.
- There are also many disadvantages as there may be backgrounds which are in motion.

Continuous

❖ As a pattern classification task:

- In this face detection is a binary-pattern classification task. That is, the content of a given part of an image is transformed into features, after which a classifier trained on example faces decides whether that particular region of the image is a face, or not.

❖ Controlled background:

- In this technique the background is still or is fixed. Remove the background and only the faces will be left, assuming the image only contains a frontal face.

❖ Model-based:

- A face model can contain the appearance, shape, and motion of faces.
- This technique uses the face model to find the face in the image. Some of the models can be rectangle, round, square, heart, and triangle. It gives high level of accuracy if used with some other techniques.

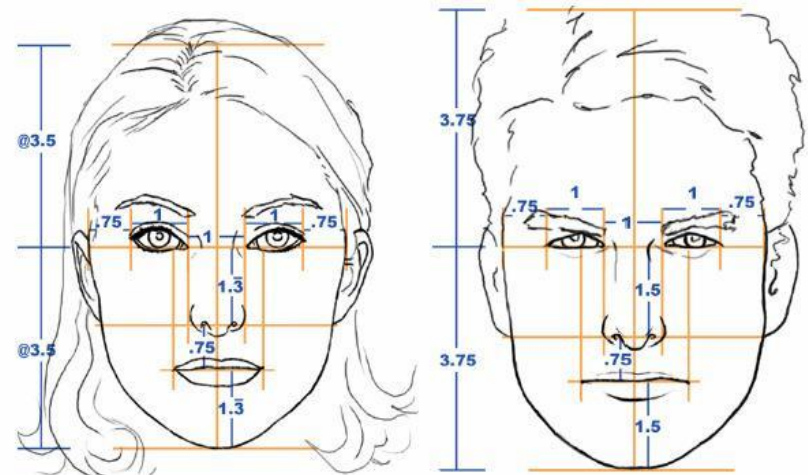
Continuous

❖ Geometric Features

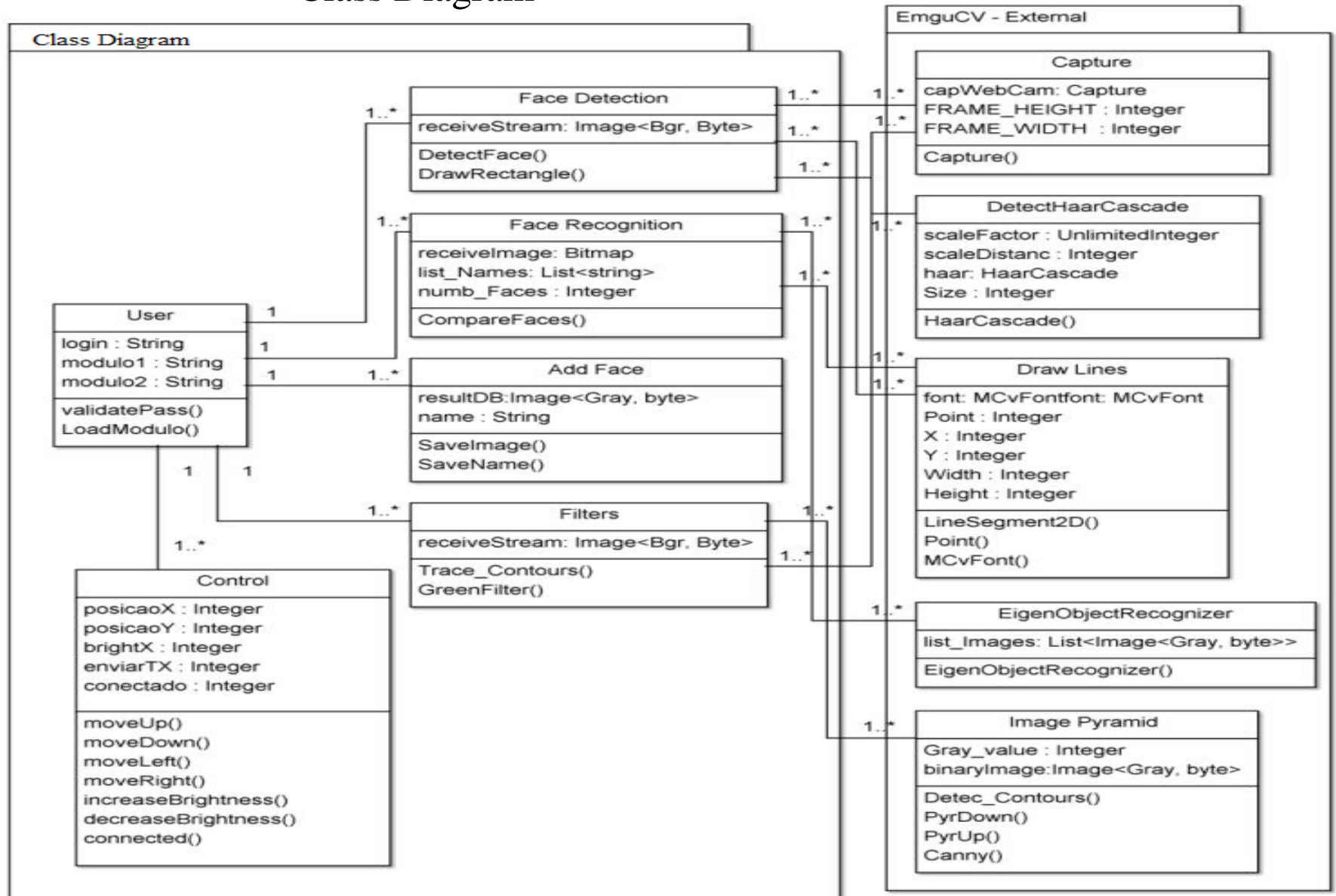
- Face height/ Face width
- Lips-where the eyebrow joint/Length of nose
- Distance of between pupils/distance of between two eyebrow
- Face height/the border of end point of chain between eyebrow
- Nose weight/distance of between two nostrils

❖ Some ratios belong to head with face:

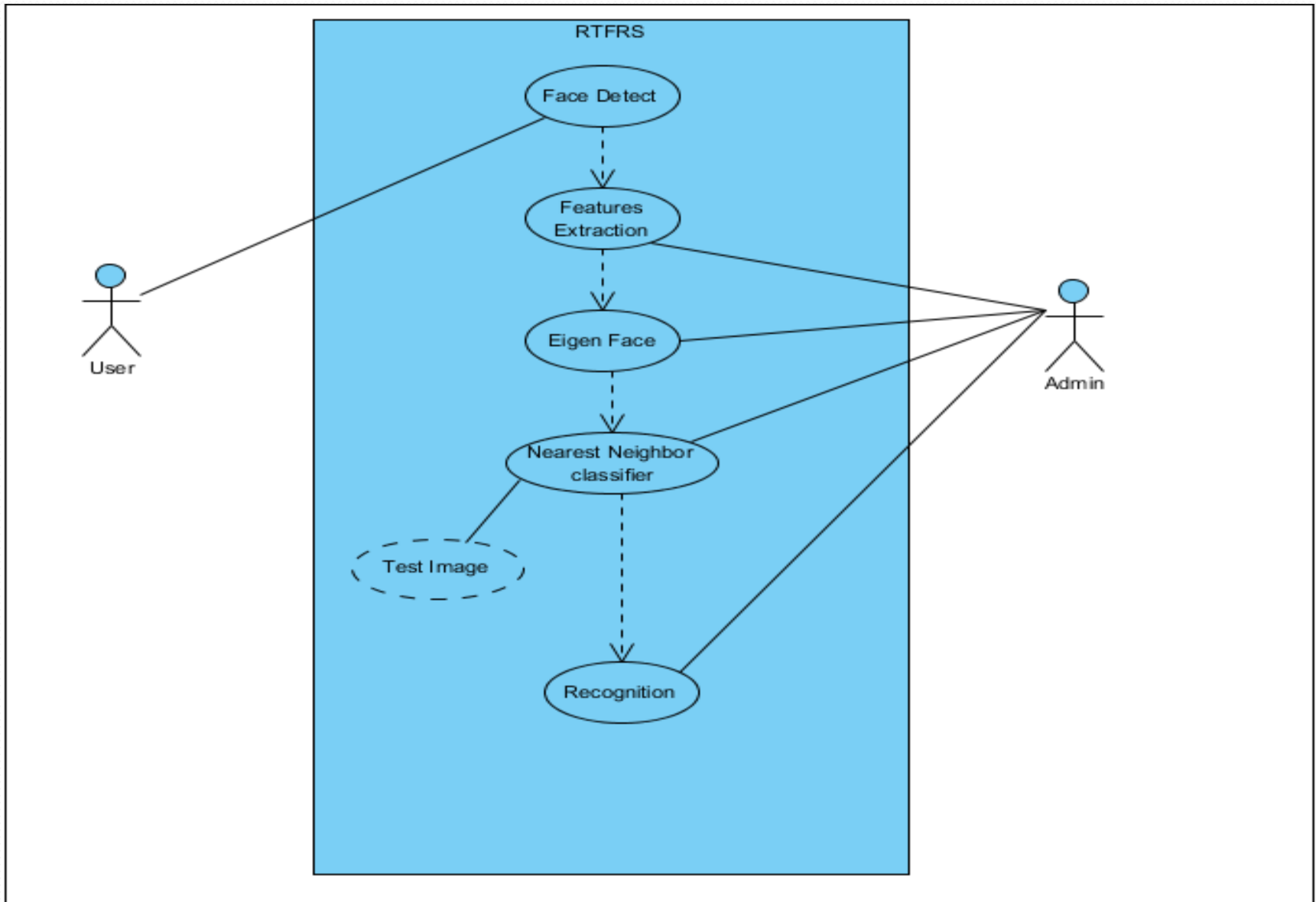
- Human eyes are located in half of head length
- Mouth, chin, and nose width is almost the same
- The width of each eye is width of the face $\frac{2}{5}$ times as much
- The distance between the two eyes is the length of an eye



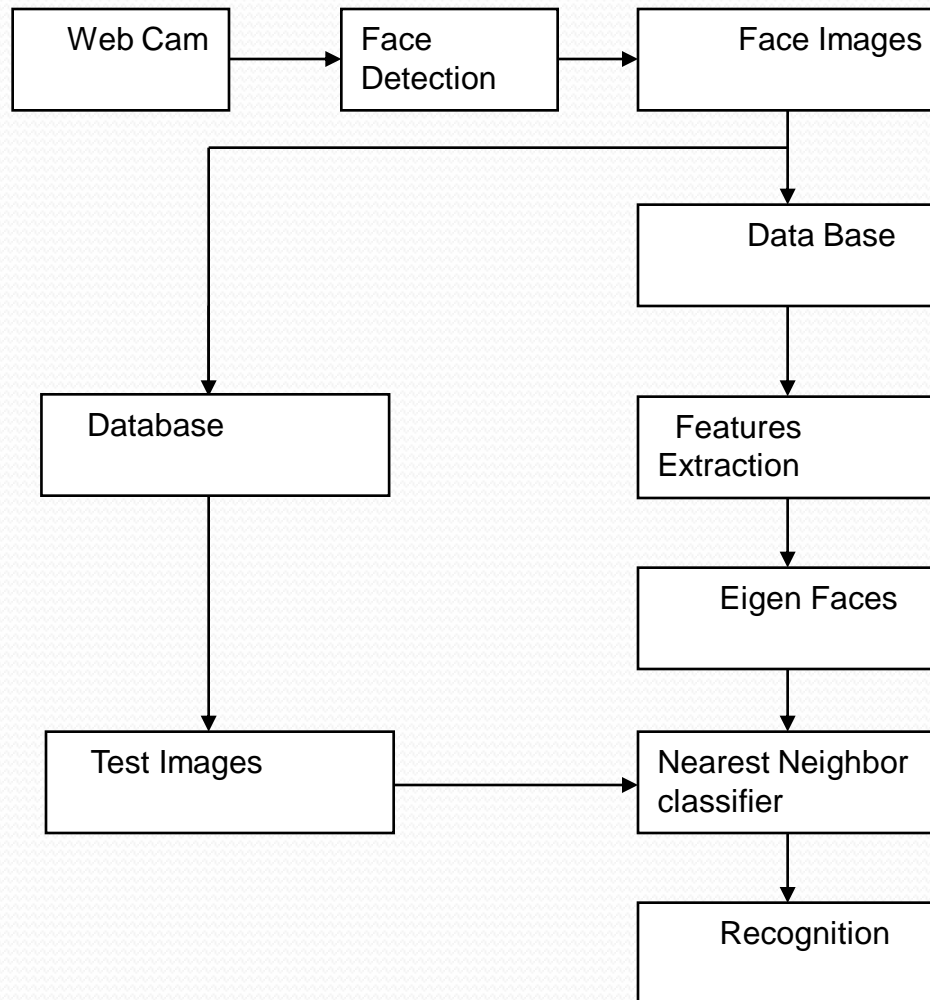
Class Diagram

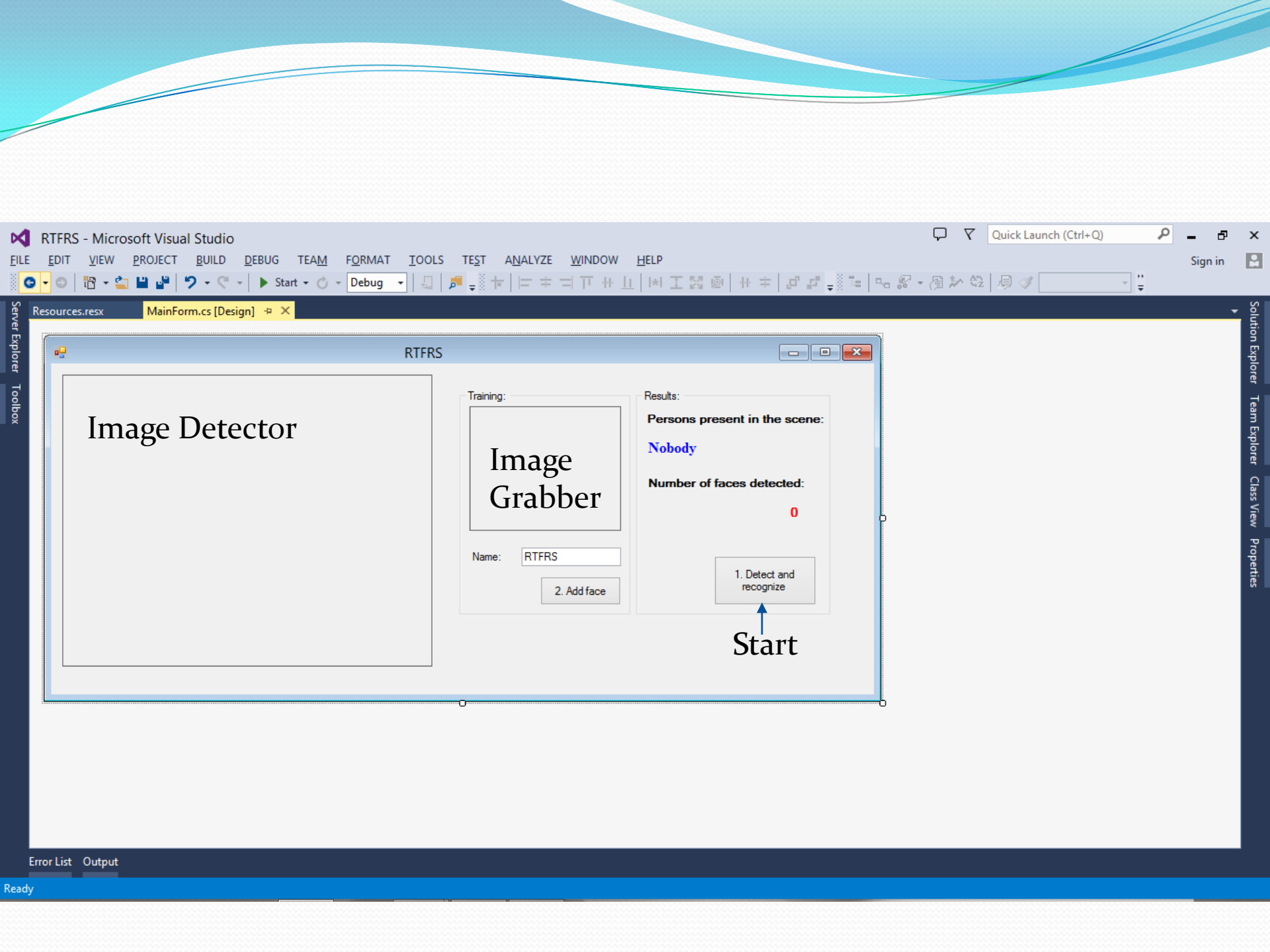


Usecase Diagram



Block Diagram Of Face Recognition





RTFRS

Image Detector

Training:

Image
Grabber

Name: RTFRS

2. Add face

Results:

Persons present in the scene:

Nobody

Number of faces detected:

0

1. Detect and
recognize

Start

Error List Output

Ready



Training:



Name:

Patil

2. Add face

Results:

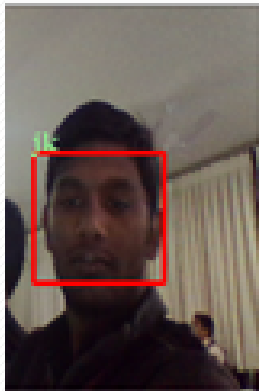
Persons present in the scene:

Patil,

Number of faces detected:

1

1. Detect and recognize



Training:



Name:

jk

2. Add face

Results:

Persons present in the scene

jk,

Number of faces detected:

1

1. Detect and recognize



Training:



Name:

2. Add face

Results:

Persons present in the scene:

swami,

Number of faces detected:

1

1. Detect and recognize

Conclusion

- .NET is really a powerful programming language for image acquiring and image processing.
- PNG is the format that should be used for image processing.
- Our face recognition system detects the faces in a picture taken by web-cam, and these face images are then checked with training image dataset based on Eigen features. Eigen features are used to characterize images.
- Finally Our Team would like to thank Mr Shakti Patel for their kind help and valuable suggestions.



THANK YOU...

[Any Questions ?]