CSEMPBNUM_905

REAL TIME FACE RECOGNISATION SYSTEM

Report on Requirement Analysis and Design

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Signature

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INTRODUCTION

Computer vision is a field of informatics,which teaches computers to see. It is a way computers gather and interpret visual information from the surrounding environment .The feature invariant approaches are used for feature detection of eyes, mouth, ears, nose, etc. In recent years, face recognition has attracted much attention and its research has rapidly expanded by not only engineers but also neuroscientists, since it has many potential applications in computer vision communication and automatic access control system.

Especially, face detection is an important part of face recognition as the first step of automatic face recognition. However, face detection is not straightforward because it has lots of variations of image appearance, such as pose variation like front, non-front, occlusion, image orientation, illuminating condition and facial expression. For example, the template-matching methods are used for face localization and detection by computing the correlation of an input image to a standard face pattern. The feature invariant approaches are used for feature detection of eyes, mouth, ears, nose, etc. This project presents a face detection technique mainly based on the color segmentation, image segmentation and template matching methods. The implementation is on Haar-casacde algorithm in order to detect the face from the given image dataset loaded by the user.

SYSTEM ANALYSIS

Existing System:

Existing System is on using the "The Local Binary Pattern" operator (LBP) and HOG cascade classifiers to detect the face rectangular region in specific front_face rectangular region. Basically in LBP, For LBP, a binary pattern is extracted inside a given rectangular region. In this paper, we simplify the computational complexity of both HOG and LBP features for fast feature extraction time. To achieve this, we quantize the gradient angle into 2 orientations(horizontal and vertical axes).The LBP front_face xml files have many training data in order to locate the rectangular portion of the face in particular.

Disadvantages:

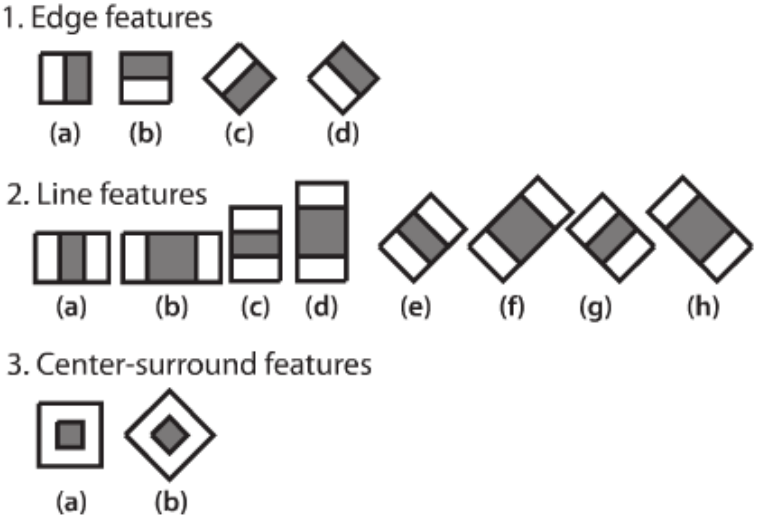
- LBP and HOG is less accurate when compared to the Haar Cascade Classifier which is implemented
  in the project.
- In any window inside an image, a huge amount of MB-LBP features can be found. So, during the training age, it is necessary to focus on a small set of critical features, discarding most of the non-critical ones in order
  to increase classification speed significantly without affecting accuracy

Proposed system:

A more sophisticated method is therefore required. One such method would be the detection of objects from images using features or specific structures of the object in question. However, there was a problem. Working with only image intensities, meaning the RGB pixel values in every single pixel in the image, made feature calculation rather computationally expensive and therefore slow on most platforms .This problem was addressed by the so-calledHaar like features, which is a trained cascade Due to its efficiency, Haar-like rectangle features have become a popular choice as image features in the context off detection. We compare our

rectangular features with Haar-like features are attributes extracted from images used in pattern recognition. Their name comes from their similarity to Haar wavelets. The utilization of these features instead of handling gray or color level of the pixels directly was proposed in . First, the pixel values inside the black area are added together; then the values in the white area are summed, Then the total value of the white area is subtracted from the total value of the black area. This result is used to categorize image sub-regions.
The image that is passed to detect the face using the haar cascade classifier plots the rectangular region in most accurate manner.

Haar Cascade Classifier:



Advantages:

- As occurs in LBP cascades, weak classifiers become strong classifiers when arranged in sequence in Haarlike cascade.
- We select the features with minimum error rate, which means they are the features that best classifies the face and non-face images.
- The accuracy rate also is more using the haar cascade classifier in order to detect the faces in specific front faces rectangular region

REQUIREMENT ANALYSIS

Hardware Requirements:

- RAM: 4GB and Higher
- Processor :Intel i3 and above
- Hard Disk: 500GB: Minimum

Software Requirements:

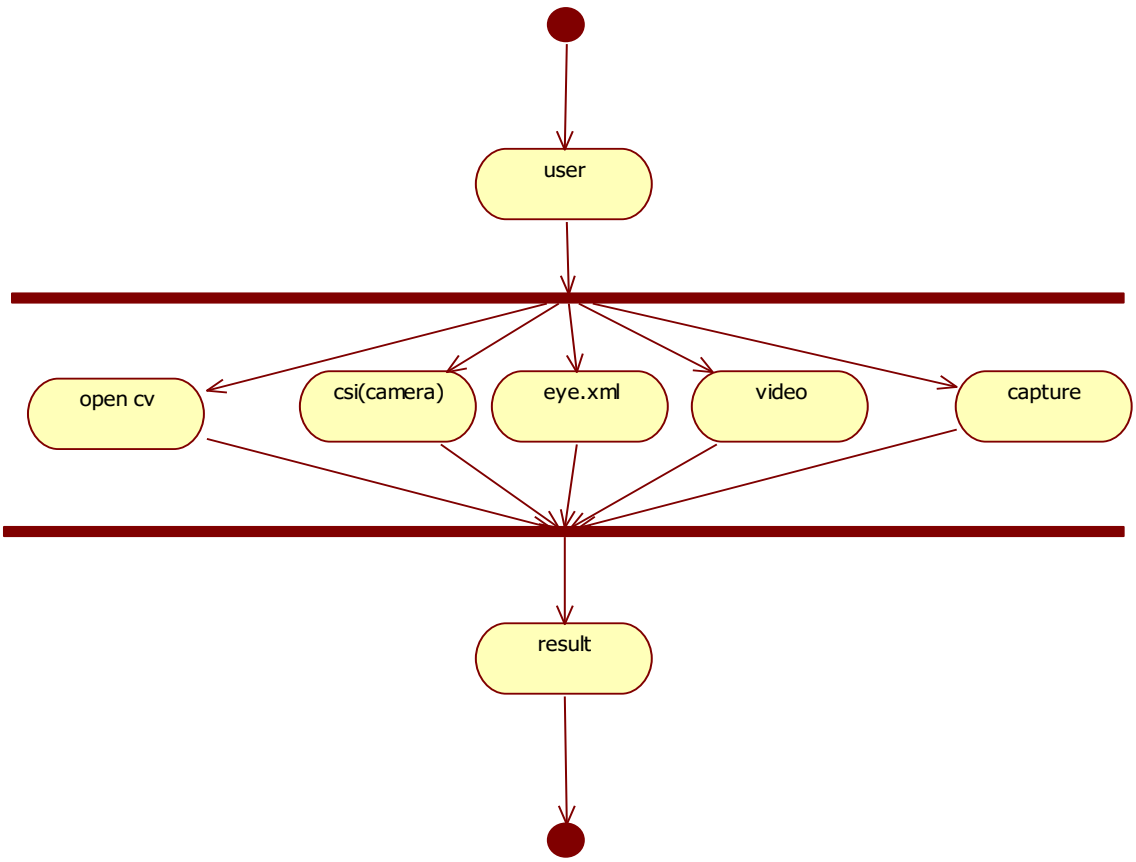
- OS: Windows
- Python IDE : python 2.7.x and above
- jupyter notebook
- setup tools and pip to be installed for 3.6.x and above

DESIGN ANALYSIS

UML DIAGRAMS

Activity diagram:

Activity diagrams are graphical representations of Workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

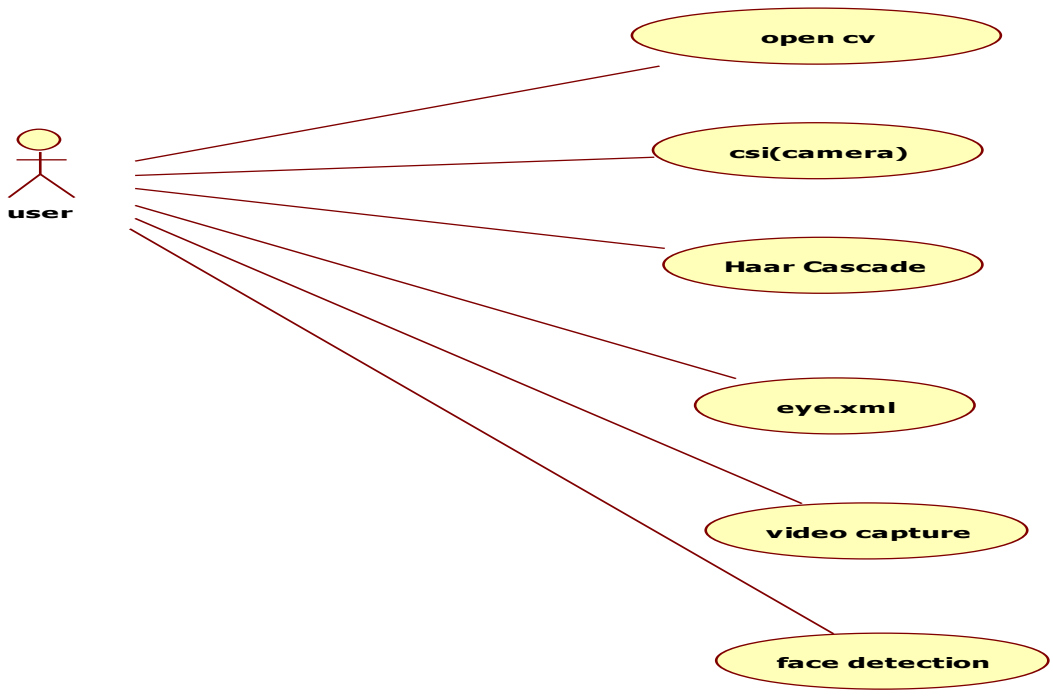


Use case:

Use case diagrams are considered for high level requirement analysis of a system. So when the requirements of a system are analyzed the functionalities are captured in use cases.So we can say that uses cases are nothing but the system functionalities written in an organized manner. Now the second things which are relevant to the use cases are the actors. Actors can be defined as something that interacts with the system.

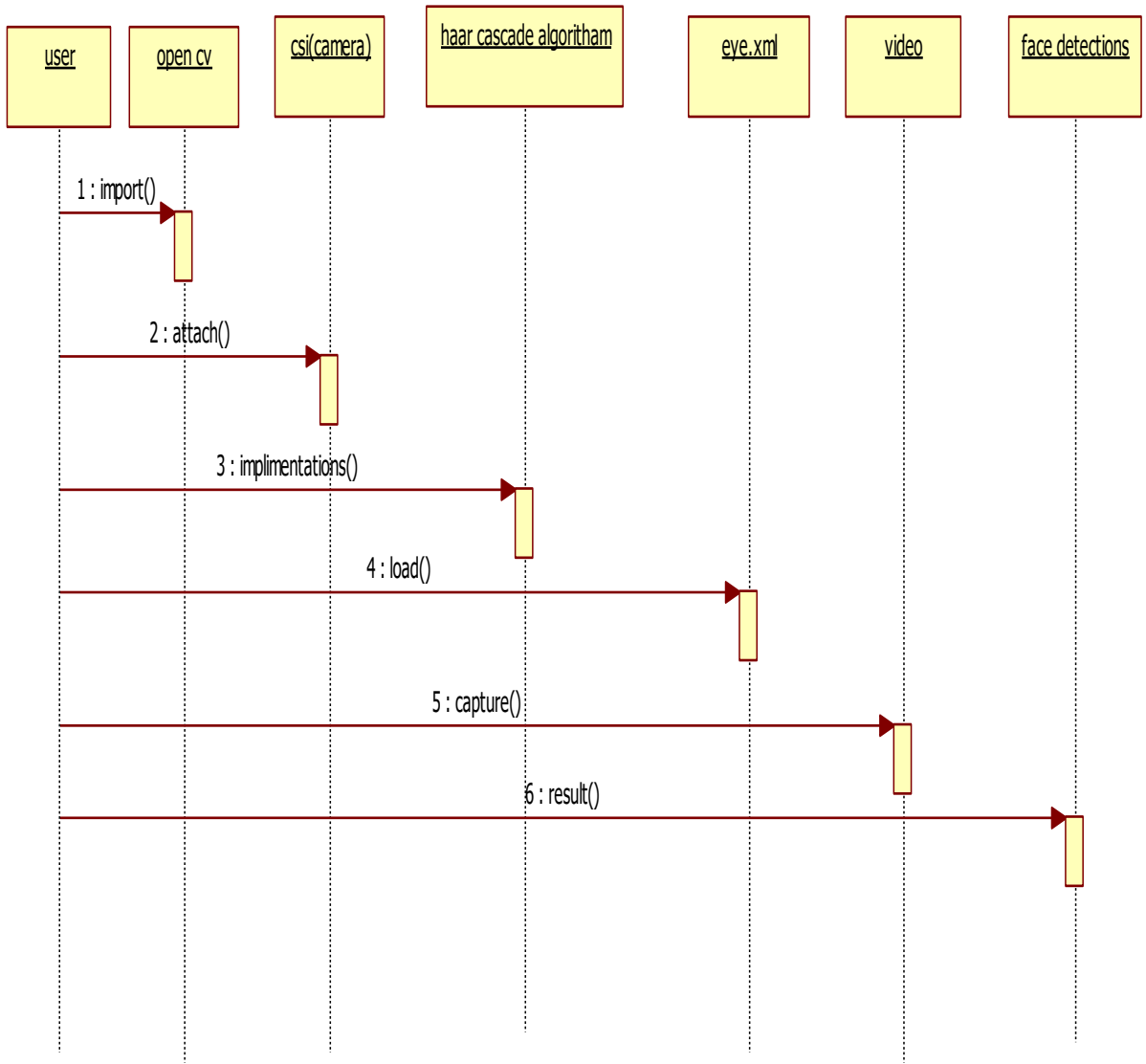
The actors can be human user, some internal applications or may be some external applications. So in a brief when we are planning to draw an use case diagram we should have the following items identified.

- Functionalities to be represented as an use case
- Actors
- Relationships among the use cases and actors.



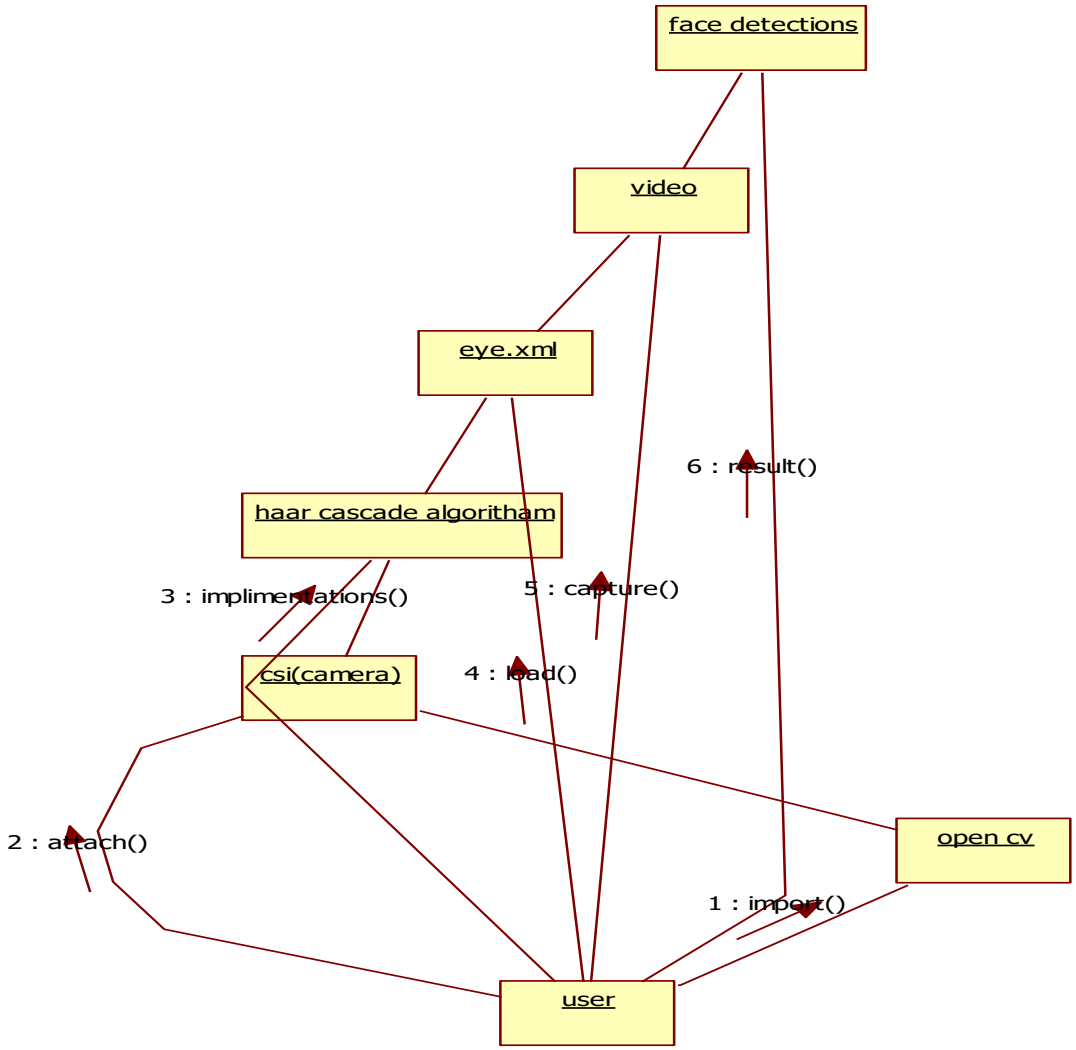
Sequence diagram

A **sequence diagram** in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. A sequence diagram shows, as parallel vertical lines ("lifelines"), different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur. This allows the specification of simple runtime scenarios in a graphical manner.

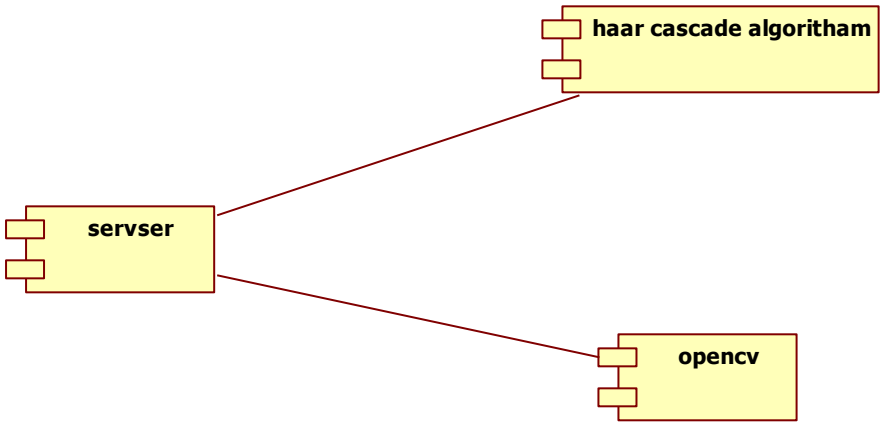


Collebaration diagram

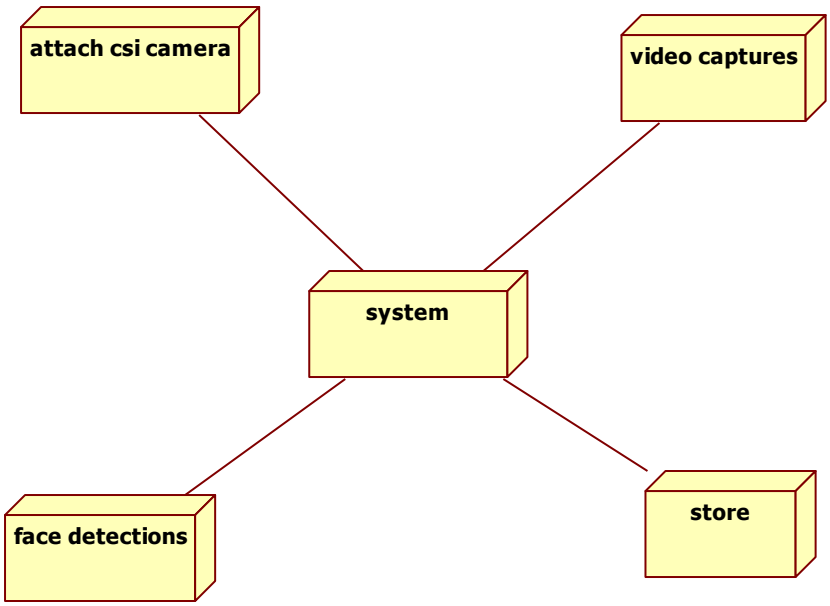
A **collaboration diagram**, also called a communication diagram or interaction diagram. A Collaboration diagram is easily represented by modeling objects in a system and representing the associations between the objects as links. The interaction between the objects is denoted by arrows. To identify the sequence of invocation of these objects, a number is placed next to each of these arrows. A sophisticated modeling tool can easily convert a collaboration diagram into a sequence diagram and the vice versa. Hence, the elements of a Collaboration diagram are essentially the same as that of a Sequence diagram.



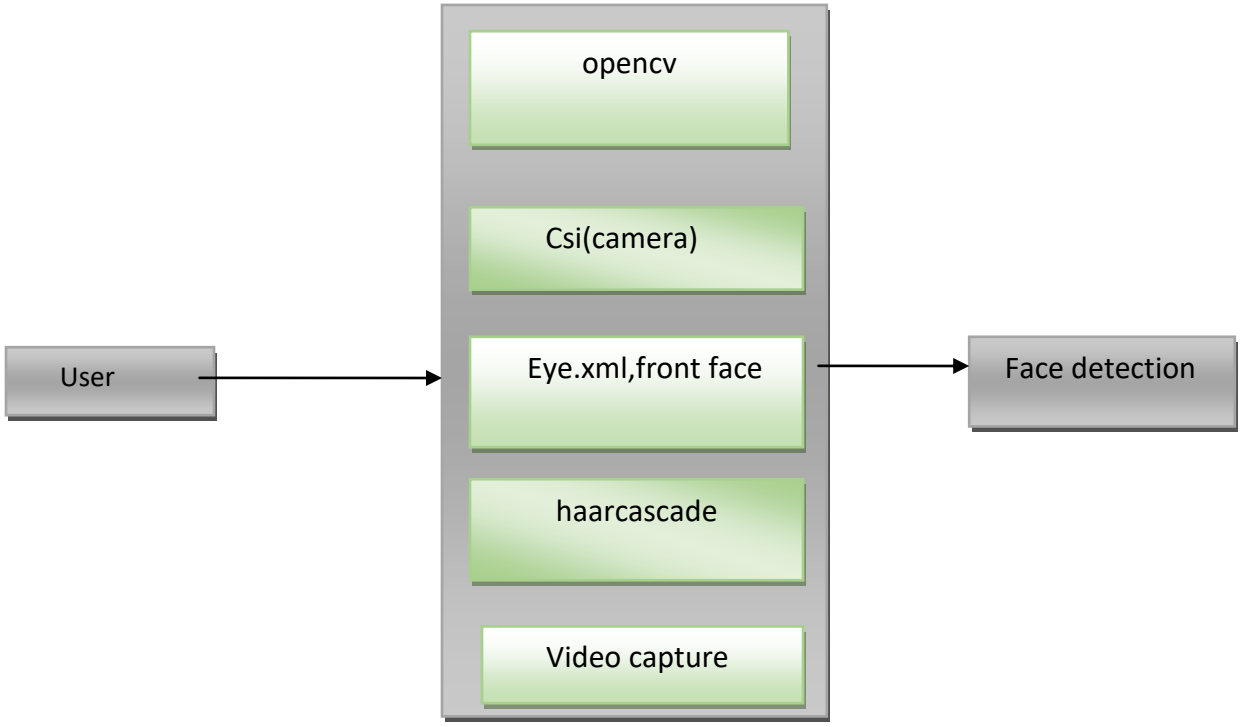
Component diagram



Deployment diagram



DATAFLOWDIADRAM:



Face detection

System process