

Unique features:

- 1) Face recognition uses best deep learning model according paper published by Facebook called FACENET which incredibly achieves **~99% accuracy**
- 2) Implemented Gender classification which can detect man or female using CNN based trained model and achieves around **~98 accuracy** over the test dataset
- 3) Facial expression recognition model achieves an excellent **68% accuracy**
- 4) For face Face detection employs dlib's library HOG algorithm which gives **99% accurate face detections** avoiding false detections and It is ~2 times faster than HAARCASCADES
- 5) **BETTER PERFORMANCE THAN GPU BASED SYSTEMS IN TERMS OF SCALABILITY and FPS rate**

By employing new methodology as mentioned below:

* Employs **threading method** to perform basic operations such as frame extraction from video source , converting image into gray scale , resize the image operations and face detection operations which tremendously reduces the blocking time that is been introduced due to above mentioned operations to perform different analysis over the frame

* **skip frame method** is employed as patient .Typically webcams record video at 30 fps. In a typical application such as patient monitoring patient that who is monitored by webcam won't not moving much. So there is no need to detect the face in every frame. We can simply do facial landmark detection based on facial bounding box obtained a few frames earlier. If you do face detection or face encoding operation every 2 frames, you can have just sped up landmark detection by almost two times.

* **Resize operations** : Facial Landmark Detector algorithms usually require the user to provide a bounding box containing a face. The algorithm takes as input this box and returns the landmarks. The time reported by these algorithms is only the time required to do landmark detection and not the face detection. Landmark detection algorithms can run in less than 5 milliseconds, but face detection can take a long time (30 milliseconds). The speed of face detection depends on the the resolution of the image because with smaller resolution images, you look for a smaller range of face sizes. The downside is that you will miss out smaller faces. I resize the image to a quarter of that for face detection. The bounding box obtained should be resized by dividing the coordinates by the scale used for resizing the original frame. This allows us to do facial landmark detection at full resolution.

6) **Work over web feed** coming from the mobile or raspberry pi or ip webcam rather than an webcam feed or saved video feed which is much more important for this patient monitoring application as the algorithm runs in a VM

7) Created **web application** through which patient feed can be monitored anywhere in the world through web browser

8) Face recognition works at it best just with **4 pictures** of patient face