DETECTION OF BAD POSTURE AND SEND ALERTS AND SUGGESTIONS USING IOT AND OPEN CV

PROBLEM STATEMENT:

Millions of people spend 7-8 hours a day sitting in front of their computers. One common trait is apparent among people with improper computer usage: a head-forward posture and the body posture. Since people usually sit while using a computer, people also tend to slouch and bend their spine into a curve as well.

Analysis of head posture: (diagrams are been taken just as reference base from internet)

Neck pain caused by improper computer usage can be prevented through mindfulness training without the need for uncomfortable equipment.

The neck   Flexion   Extension
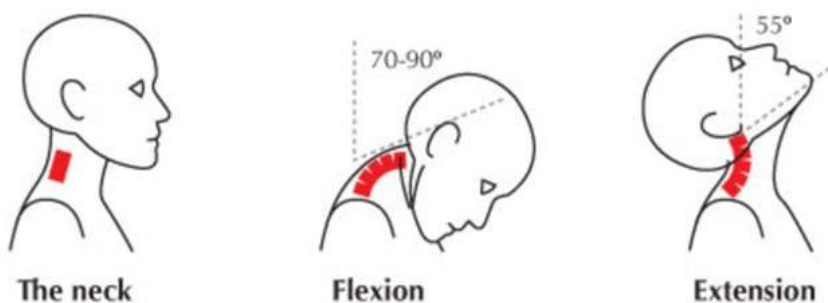
Neck flexibility and joint limitations.

This head forward posture has been shown to exert considerable pressure on the human neck. A normal human head weighs around 10 to 12 pounds (4.54 kg). An assessment of stresses found that a 15 degrees head forward posture increased the effective weight on the neck portion of the spine to 27 pounds (12.25 kg). According to one study, work-related neck pain is twice as likely for those sitting with 20 degree neck flexion.

Analysis of body posture: (diagrams are been taken just as reference base from internet)

The body posture has also been very prior , bad posture effects health and mood as some of them are stated below:

- Soreness & Pain
- Poor Circulation
- Negative Mood
- Increased Stress
- Carpal Tunnel Syndrome
- Less Motivation
- Poor Digestion
- Fatigue

Solution:

The innovative solution involves the development of a product which includes raspberry pi and raspi cam. The head posture is analysed using computer vision application named Open CV, posture is tracked using OpenCV's face detection with the Haar cascade method. The distance of the head to the monitor is inferred from the width of the face rectangle. Then , by considering a threshold value if the posture is not good then the product sends alert to the respective person phone and also give suggestions like do some breathing exercise, yoga , eat this type of food or listen to music. To analyse the body posture we can extract the skeleton image using convolution neural network and based on the joint points in skeletal image the bad posture is detected and the suggestions are given.

Hardware components

- Raspberry pi3
- Raspi cam
- Power cord cable

Software apps and concepts used:

- Open CV (Python)
- Ssmtp server'
- Convolution neural network
- Haar cascade classifier for face detection
- Face recognition to recognize each individual and send the alerts to their mobile.

BLOCK DIAGRAM:

RASPICAM

RASPBERRY PI 3

RASPICAM monitors the staff of software office and send alert as below

WI-FI

ALERT- EMAIL

Your posture is bad please sit straight

Suggestion:

Close eyes for 2 min and take a deep breath and continue your work