# NECK POSTURE ASSESSMENT

ITE1014 (C1+TC1)

HUMAN COMPUTER INTERACION


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***Submitted To:***

*PROF.RAMYA G*


## LINKS

18BIT0126

https://drive.google.com/file/d/1FbjSQDtDo9OYPGAILmOnAQPjOgiwE5Cz/view

18BIT0137

https://drive.google.com/file/d/1DguTiyFyH6Y6DM7RBwFy0cvNyqYf-nBW/view?usp=drivesdk

18BIT0094

https://drive.google.com/file/d/1lqDaT7mIgzzOTjvUv5vTBVGRbCA8SFrN/view?usp=sharing

# ABSTRACT

Most people usually sit most of the time in-front of their computers nowadays because of modern lifestyle and now due to this pandemic situation this has been increased. Now as employees started working from home and students have their classes online, most of the students might lose their attention during their classes and their exams mostly being conducted online, it is easy for students to manipulate and get ready made answers. This neck posture assessment indicates when a student is looking somewhere but the monitor. It prevents cheating during online assessments and increase attentiveness among students during their classes.

Webcam captures the image and sends it to the server to assess the posture. For this assessment it checks the alignment of eyes nose and ears of the individual.

This can also be used for treating patients as poor neck postures often lead to neck pains which can take a serious toll on people's health over time.

# INTRODUCTION

Basically in our project here we focus on the student community so as to help the organizations to conduct fair and un-biased online examination. Here we are developing a neck posture recognition model that was developed by the python’s opencv and flask framework, here we develop our algorithm in the way that it produces insights on the neck posture for every 5 sec. By this model We can assure the accuracy up to 85% out

of 100 sec it shows perfect insight for about 85 sec. And our model can be embedded with the other examination platforms so that the platform can use our software for proctoring their participants. Our model can warn when the user is not present in front of the device and we are also trying to incorporate a mic recording feature through which we will be able to know if the person is talking to someone during the examination. And also we are trying to add reverse ip lookup in order to get the information about nearby devices and then ensure that student has no internet enabled devices nearby him around 5 feet.

## PROBLEM STATEMENT

Now a day's from elementary schools to the large multi-national companies are experiencing the online lectures, client meetings. And here we focus on the student as of now many schools and colleges have started their online classes via MICROSOFT TEAMS, ZOOM, and GOOGLE MEET etc.

Here the colleges like for the higher grade graduates and the above like UG, PG will be having the academic year separated into 2 semesters. Like now they had to at least complete one semester at home. For semester completion exams need to be conducted. So during examinations the intervention of each every student is not possible like it is from home. And there will be lot of choices for the student to cheat. So we are preparing the software that helps the institutes to conduct their online exams fairly and hassle free. Like we are making common platform for every student where the platform helps the institute to get students true potential.

# TARGET COMMUNITY

- Student-> can be useful during the online examination, useful when doing internship as work from home for monitoring
- Employees -> employee who has been doing work from home can be monitored as how much time he spent before device(time that he had worked)
- Patients -> monitoring the patients (in hospital we can assign a person to look after the each patient so we will use these system to monitor the patients moments like when the patient with oxygen mask is unable to breathe then he suffocates and shakes his head then our system can warn the corresponding nurse or doctor )

# REQUIREMENTS

Hardware needed

- Any of (Pc ,laptop ,tablet ,mobile) that contains front cam.

Software requirements

- At least 4gb ram , memory storage to store output files(16 GB), software that can run python code.

# LITERATURE SURVEY

| 1 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **Nekoze! - monitoring and detecting head posture while working with laptop and mobile phone** | Neck pain and other spine related injuries are on the rise. One potential cause is bad head posture while using digital devices. We present two systems to monitor and improve head posture for two of the common problematic cases: laptop and mobile phone use. The laptop system uses the front-facing camera. The mobile system the sensor data of a smart glasses prototype. Both systems work reasonable in an initial user study with 10 and 8 participants (72 % detection on the laptop system, 100% for the mobile one). From the discussion, it seems users are especially interested in the smart glasses based monitoring implementation. | The laptop system uses the front-facing camera. The mobile system the sensor data of a smart glasses prototype. | Tanaka, K., Ishimaru, S., Kise, K., Kunze, K., & Inami, M. (2015, May). Nekoze!-monitoring and detecting head posture while working with laptop and mobile phone. In *2015 9th International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth)* (pp. 237-240). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/7349406 |

| 2 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **A sitting posture surveillance system based on image processing technology** | There have been more than a billion PCs in active use worldwide, and the number will doubled soon. Computers make our life more comfortable and convenient, but they also brought troubles. As a result of longtime using computers, myopia and backbone/neck diseases are becoming increasingly prominent. However, the correct posture can reduce or avoid the myopia and backbone/neck diseases caused by the use of computer. Thus, it is very important to control the time of using computer and maintain a correct sitting posture. The surveillance of sitting posture is becoming a research topic and attracted more and more attention. The goal of the proposed system is to prevent myopia and backbone/neck diseases caused by using computers. | First, the profile of sitting posture is extracted; Second, the profile features, the face's location and size, is further extracted through pattern matching based on Hausdorff distance; Finally, by comparing the real-time profile features and the standard profile features, the surveillance system will remind the user to correct his/her sitting posture. | Mu, L., Li, K., & Wu, C. (2010, April). A sitting posture surveillance system based on image processing technology. In *2010 2nd International Conference on Computer Engineering and Technology* (Vol. 1, pp. V1-692). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/5485381 |

| 3 | TITLE | ABSTRACT | TECHNOLOGIES USED | PROPOSED METHODOLOGY | CITATION |
|---|---|---|---|---|---|
| | **A Posture Recognition Model Dedicated for Differentiating between Proper and Improper Sitting Posture with Kinect Sensor** | In this era, most of mankind's activities are carried out on top of a desk, but they rarely bother to sit with the right posture and this can lead to problems like back pain. In this paper, a preliminary study of posture recognition system has been developed, to rectify the user's sitting posture by alerting him/her. A proper and improper sitting posture might look quite similar to each other in the eye of sensors, especially different heights and genders cause difficulties in detection. Hence, a preliminary posture recognition model that specifically tackles the recognition between a proper and an improper sitting posture has been developed. | Kinect sensor is used for the sitting postures detection, and then feed the postures data to the posture recognition models such as Support Vector Machine (SVM) and Artificial Neural Network (ANN), for training purpose. | SVM with linear kernel has the highest accuracy. | Chin, L. C. K., Eu, K. S., Tay, T. T., Teoh, C. Y., & Yap, K. M. (2019, October). A Posture Recognition Model Dedicated for Differentiating between Proper and Improper Sitting Posture with Kinect Sensor. In *2019 IEEE International Symposium on Haptic, Audio and Visual Environments and Games (HAVE)* (pp. 1-5). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/8920964/ |

| 4 | TITLE | ABSTRACT | TECHNOLOGIES USED | CITATION |
|---|---|---|---|---|
| | WORK POSTURE ASSESSMENT IN FORGING INDUSTRY: AN EXPLORATORY STUDY IN INDIA | The present study is focused on posture analysis of the workers working in forging industry. The study was conducted on 130 workers engaged in various process of small scale forging firms of northern India. Video recording on different activities of the workers was done and then images were cropped from it for the analysis. Posture analysis tools RULA, REBA and OWAS were used. The results of REBA showed that about 10.65% of the workers were under very high risk level and needed a necessary action immediately. The results of RULA showed that about 30% of the workers were under high risk level. According to the OWAS method of analysis, About 23.85% of the workers needed corrective measures in the near future. | RULA (Rapid Upper Limb Assessment), REBA (Rapid Entire Body Assessment) and Ovaku Work posture Analysis (OWAS) | Singh, L. P. (2010). Work posture assessment in forging industry: An exploratory study in India. *International Journal of Advanced Engineering Technology*, *1*(3), 358-366.<br><br>https://www.technicaljournalsonline.com/ijeat/VOL%20I/IJAET%20VOL%20I%20ISSUE%20III%20OCTBER%20DECEMBER%202010/IJAET%20OCT-DEC,2010%20ARTICLE%2035.pdf |

| 5 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | Ergonomic assessment of neck posture in the minimally invasive surgery suite during laparoscopic cholecystectomy | With the expanding implementation of minimally invasive surgery, the operating team is confronted with challenges in the field of ergonomics. Visual feedback is derived from a monitor placed outside the operating field. This crossover trial was conducted to evaluate and compare neck posture in relation to monitor position in a dedicated minimally invasive surgery (MIS) suite and a conventional operating room | Assessment of the neck was conducted for 16 surgeons, assisting surgeons, and scrub nurses performing a laparoscopic cholecystectomy in both types of operating room. Flexion and rotation of the cervical spine were measured intraoperatively using a video analysis system. A two-question visual analog scale (VAS) questionnaire was used to evaluate posture in relation to the monitor position. | Van Det, M. J., Meijerink, W. J. H. J., Hoff, C., Van Veelen, M. A., & Pierie, J. P. E. N. (2008). Ergonomic assessment of neck posture in the minimally invasive surgery suite during laparoscopic cholecystectomy. *Surgical endoscopy*, *22*(11), 2421.<br><br>https://link.springer.com/article/10.1007/s00464-008-0042-6 |

| 6 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **Design of a Secure, Biofeedback, Head-and-Neck Posture Correction System** | Millions of patients are suffering from neck pains in the United States and all around the world. The most common condition that contributes neck and shoulder pains is poor head and shoulder posture. This research is motivated by the need of a tool to remind students and heavy computer users to correct their poor postures and prevent neck and shoulder pains. We develop a head-and-neck posture correction system with real-time head-and-neck posture monitoring and biofeedback mechanisms. An accelerometer and a microcontroller are used to collect and compute the cranial-vertebral angles from which the head and neck postures are analyzed. Angle data are sent to the cloud for storage and further analysis. Identity management and secure data storage and transfer are designed and implemented. | An accelerometer and a microcontroller are used to collect and compute the cranial-vertebral angles from which the head and neck postures are analyzed. | Liao, D. Y. (2016, June). Design of a secure, biofeedback, head-and-neck posture correction system. In *2016 IEEE First International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)* (pp. 119-124). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/7545824 |

| 7 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | The Intra- and Inter-rater Reliabilities of the Forward Head Posture Assessment of Normal Healthy Subjects | Assessment of posture is an important goal of physical therapy interventions for preventing the progression of forward head posture (FHP). FHP is an important component of evaluation and affects the design of the treatment regimen. The assessment of FHP was reliably measured by two physical therapists. It could therefore become a useful method for assessing FHP in the clinical setting. | FHP is characterized by the measurement of angles and distances between anatomical landmarks. Forward shoulder angle of 54° or less was defined as FHP. Intra- and inter-rater reliabilities were estimated using Kendall's Taub correlation coefficients. | Nam, S. H., Son, S. M., Kwon, J. W., & Lee, N. K. (2013). The intra-and inter-rater reliabilities of the forward head posture assessment of normal healthy subjects. *Journal of physical therapy science*, *25*(6), 737-739.<br><br>https://www.jstage.jst.go.jp/article/jpts/25/6/25_JPTS-2013-005/_article/-char/ja/ |

| 8 | TITLE | ABSTRACT | TECHNOLOGIES USED | CITATION |
|---|---|---|---|---|
| | **A Wearable Sensing Device for Monitoring Single Planes Neck Movements: Assessment of Its Performance** | The primary objective of this paper was the development of a "wear and forget" device able to monitor head posture. The proposed smart textile allowed the development of a light, comfortable, and non-invasive wearable system. The sensor accuracy and repeatability in measuring cervical range of motion in each primary plane (lateral bending, axial rotation, and flexion/extension) for five healthy subjects were evaluated. | Non-invasive wearable system. | Maselli, M., Mussi, E., Cecchi, F., Manti, M., Tropea, P., & Laschi, C. (2018). A wearable sensing device for monitoring single planes neck movements: Assessment of its performance. *IEEE Sensors Journal*, *18*(15), 6327-6336.<br><br>https://ieeexplore.ieee.org/abstract/document/8385120 |

| 9 | TITLE | ABSTRACT | TECHNOLOGIES USED | CITATION |
|---|---|---|---|---|
| | **Work Posture Analyses for Ergonomics Working Condition Improvement of Concrete Work Practices** | The aim of the research is to improve the working condition of concrete work practices at Politeknik Negeri Bali Indonesia. Occupational accidents in concrete construction in Indonesia have recently increased and the cause is always claimed as human error. This is true, but behind human error, there is another root cause, which is the awkward posture causes by the unsafe working condition. The body posture analyses were divided into two groups, group A (arm and wrist postures analyses) and group B (neck, body, and leg postures analyses). RULA analyses showed that all of the work body postures were in the high-risk category with the grand score more than 6. In conclusion, the work condition needs improvement immediately. | The work body posture assessment was based on the principal of RULA Software. | Sudiajeng, L., Mudhina, M., Intara, I. W., Jaya, I. M., Aryawan, I. G. M. O., & Sutapa, I. K. (2018, October). Work Posture Analyses for Ergonomics Working Condition Improvement of Concrete Work Practices. In *2018 International Conference on Applied Science and Technology (iCAST)* (pp. 641-645). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/8751572/ |

| 10 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **A vision-based walking posture analysis system without markers** | This study proposes a vision-based human walking posture analysis system without the need of markers. The system can be applied at home for **self-health care** or used in health-care institutions. This study analyzes the human walking posture based on side-view and front-view images of a subject. Four features are extracted from the images for walking posture evaluation, including body line, neck line, center of gravity (COG) and gait width. Tilting angles associated with body line and neck line and their periodic variation are adopted to evaluate upper body posture for any abnormality and its correction. The COG and gait width features are used to evaluate the posture condition of lower body parts. Since these two features show an inverse relationship for a normal posture, they can be used to evaluate the stability of a walking posture and see if any posture correction is needed. | The experiment results show that this study successfully extracts all the four features mentioned above from the silhouette image of human body. | Liao, T. Y., Miaou, S. G., & Li, Y. R. (2010, July). A vision-based walking posture analysis system without markers. In *2010 2nd International Conference on Signal Processing Systems* (Vol. 3, pp. V3-254). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/5555656/ |

| 11 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **Head posture assessment for patients with neck pain: Is it useful?** | Neck pain is a common complaint and accounts for a significant proportion of individuals seeking physiotherapy. Assessment for patients with neck pain normally involves a judgment of head posture. Head posture is considered important as deviations from 'normal' may have detrimental biomechanical and physiological implications and provide clues as to optimal interventions. However, studies comparing head posture between patients with neck pain and asymptomatic individuals have shown conflicting results. This article critically appraises the role of head posture assessment for patients with neck pain. It is unclear whether the assessment of head posture through observation is valid and/or reliable and whether therapeutic interventions to improve head posture result in gains for the patient. | The rationale for a relationship between head posture and neck pain is discussed; clinical assessment of head posture—including issues around surrogate measures, validity and reliability—is explored, and studies comparing patients with neck pain and asymptomatic individuals are examined. Finally, studies investigating techniques to correct head posture are appraised. | Silva, A. G., Punt, T. D., Sharples, P., Vilas-Boas, J. P., & Johnson, M. I. (2009). Head posture assessment for patients with neck pain: Is it useful?. *International Journal of Therapy and Rehabilitation*, *16*(1), 43-53.<br><br>https://www.magonlinelibrary.com/doi/abs/10.12968/ijtr.2009.16.1.37939 |

| 12 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | **Seated Posture Estimation of a Visual Display Terminal Worker using Single Web Camera and Iris Diameter: Report on the preliminary experiment** | The purpose of this study is to develop the seated posture estimation method for a VDT (Visual Display Terminal) worker by using single web camera. The upper body posture is the target of this method. A seated posture is modeled as a 2-links serial manipulator in the sagittal plane. The inverse kinematics of the manipulator estimates the seated posture. In this model, the eye position is equal to the end effector of the manipulator. Thus once the position of the end effector is obtained, two joint angles can be estimated, namely the seated posture can be estimated. As, the depth information can not directly be measured by using single camera. Therefore this research focuses on the iris as the reference of the depth information. | 2-links serial manipulator and iris diameter. | Ouchi, M., Yokota, S., Matsumoto, A., Chugo, D., & Hashimoto, H. (2019, June). Seated Posture Estimation of a Visual Display Terminal Worker using Single Web Camera and Iris Diameter: Report on the preliminary experiment. In *2019 12th International Conference on Human System Interaction (HSI)* (pp. 248-252). IEEE.<br><br>https://ieeexplore.ieee.org/abstract/document/8942637 |

| 13 | TITLE | ABSTRACT | METHODOLOGY | CITATION |
|---|---|---|---|---|
| | Validity of surface markers placement on the cervical spine for craniocervical posture assessment | The objective of this study was to evaluate the ability of a physical therapist to place surface markers on the skin over spinous process of C2, C4, C6, and C7 by evaluating the markers positioning using radiographs. The markers used were visible on the radiographs. The surface markers placement was tested by using percentage agreement. Based on the results from this study, clinicians and researchers should take into account possible errors on surface markers placement on the cervical spine when measuring craniocervical posture using photographs. | Evaluating the markers positioning using radiographs | Gadotti, I. C., & Magee, D. (2013). Validity of surface markers placement on the cervical spine for craniocervical posture assessment. *Manual Therapy*, *18*(3), 243-247.<br><br>https://www.sciencedirect.com/science/article/abs/pii/S1356689X1200241X |

## Existing Product Model, Drawbacks And Suggestions:

There are few models made with basic JavaScript libraries but they aren't that efficient as it takes time for each frame to capture, send it to the server and then assess it. Also, they don't work in the background.

Here, we are using python libraries with web interface using flask framework using CV library which allows the program to run in the background also.

It would have been even much better if the current model was able to solve the issue of multiple recognitions.

LIMITATIONS OF OUR MODEL

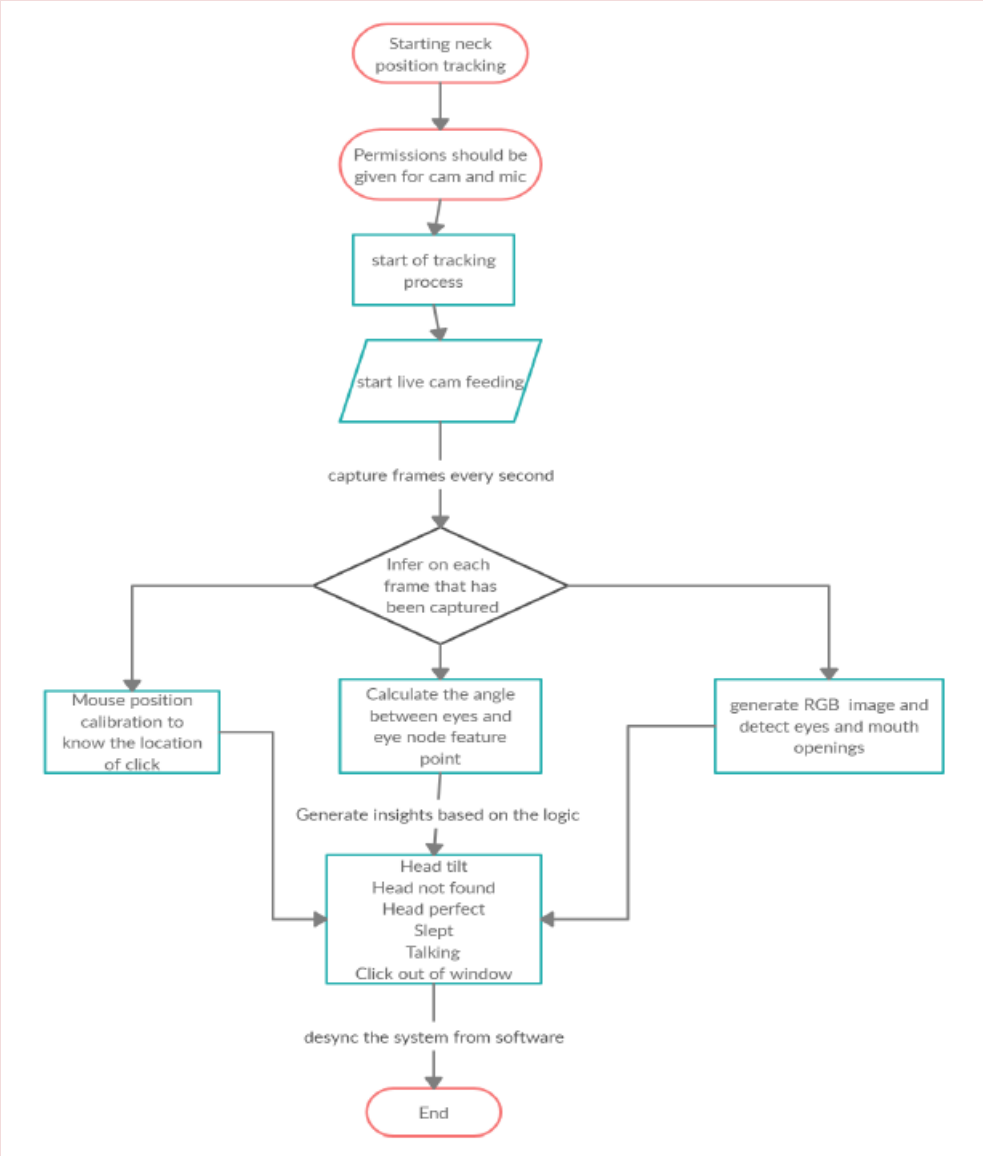
- Light must be considerable in order to get best images for the assessment.
- No of frames processed should be around 40-60 more than this the model takes long time to process the frames and we can't build up a good model.
- Requires some storage space in-order to store the images.

ADVANCEMENTS THAT CAN BE DONE

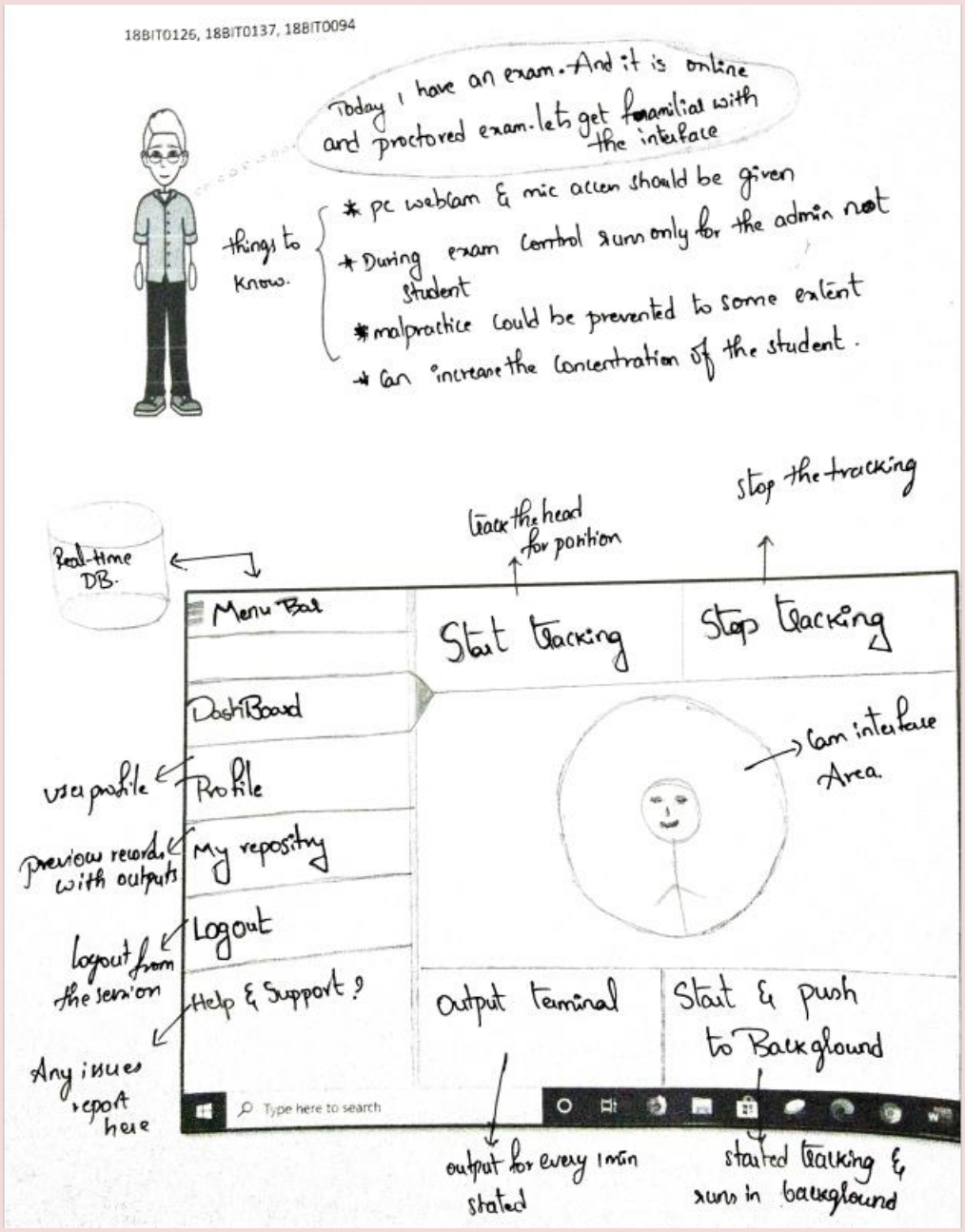
- Can be embedded into any application
- Can be used for the photography like we make the neck posture as best as possible to provide with good exposure in the photos.

- Can be joined to camera in the smartphones.

# TASK ANALYSIS



# STORY BOARDING



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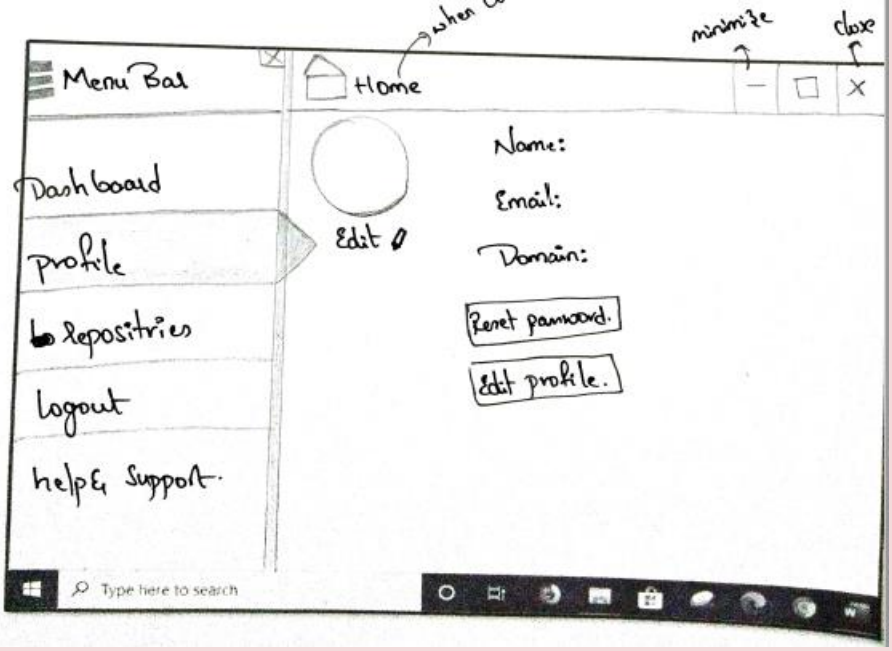
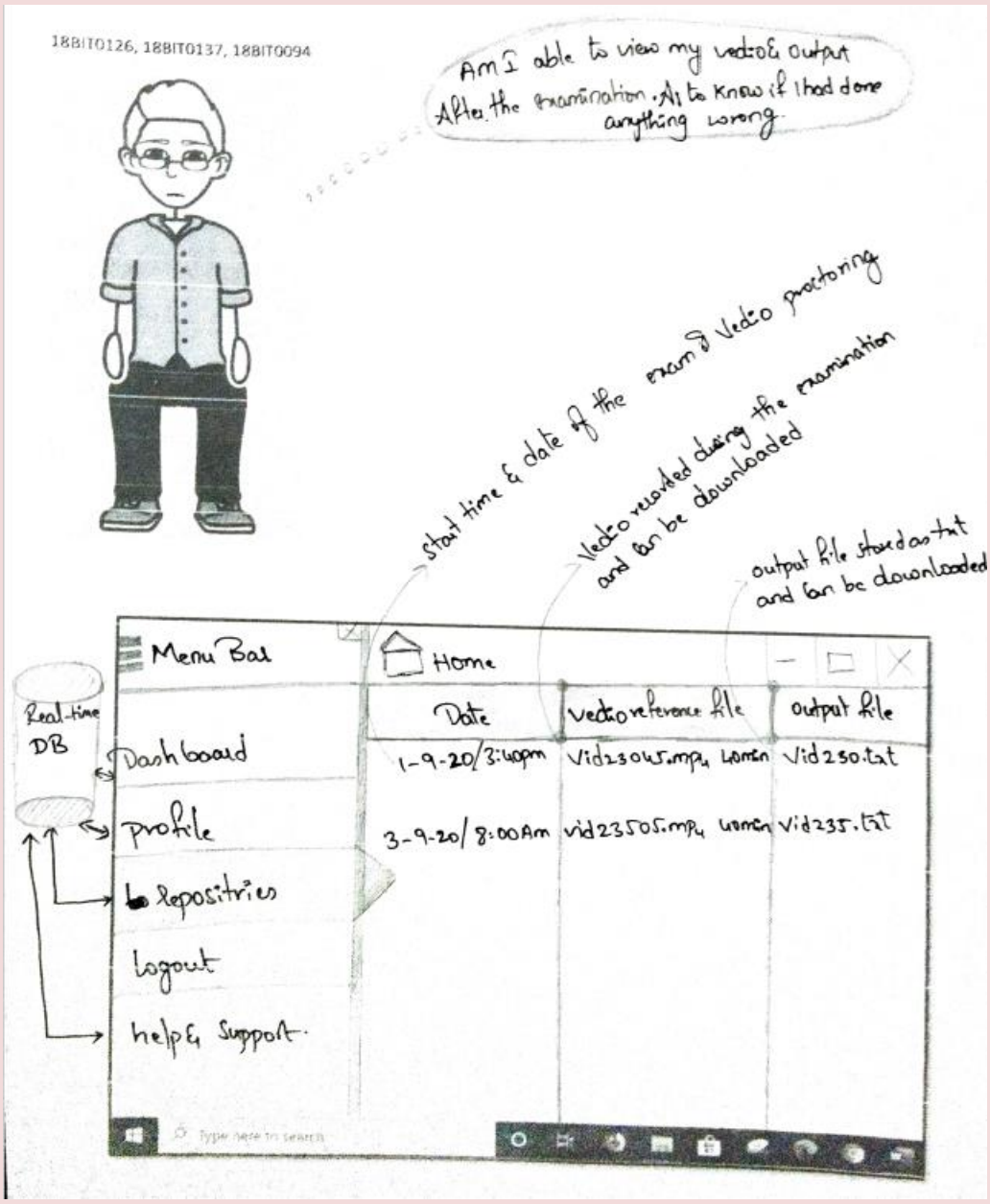
Exam is about to start. I should setup my profile for the proctoring software.

* Home button send you to Dashboard pane
* During exam student cant alter & do any thing about this software and also not permitted too
* software configuration is upto faculty
* login is must with domain mailId for accen.




18BIT0126, 18BIT0137, 18BIT0094
Am I able to view my video output After the examination. At to know if I had done anything wrong
start time & date of the exam & Video proctoring
Video recorded during the examination and can be downloaded
output file stored as txt and can be downloaded
Menu Bar
Home
Real-time DB
Dashboard
profile
Repositries
logout
help & support.
Date
Vedio reference file
output file
1-9-20/3:40pm
Vid2304S.mp4, Women
Vid250.txt
3-9-20/8:00Am
vid2350S.mp4, Women
Vid235.txt
Type here to search

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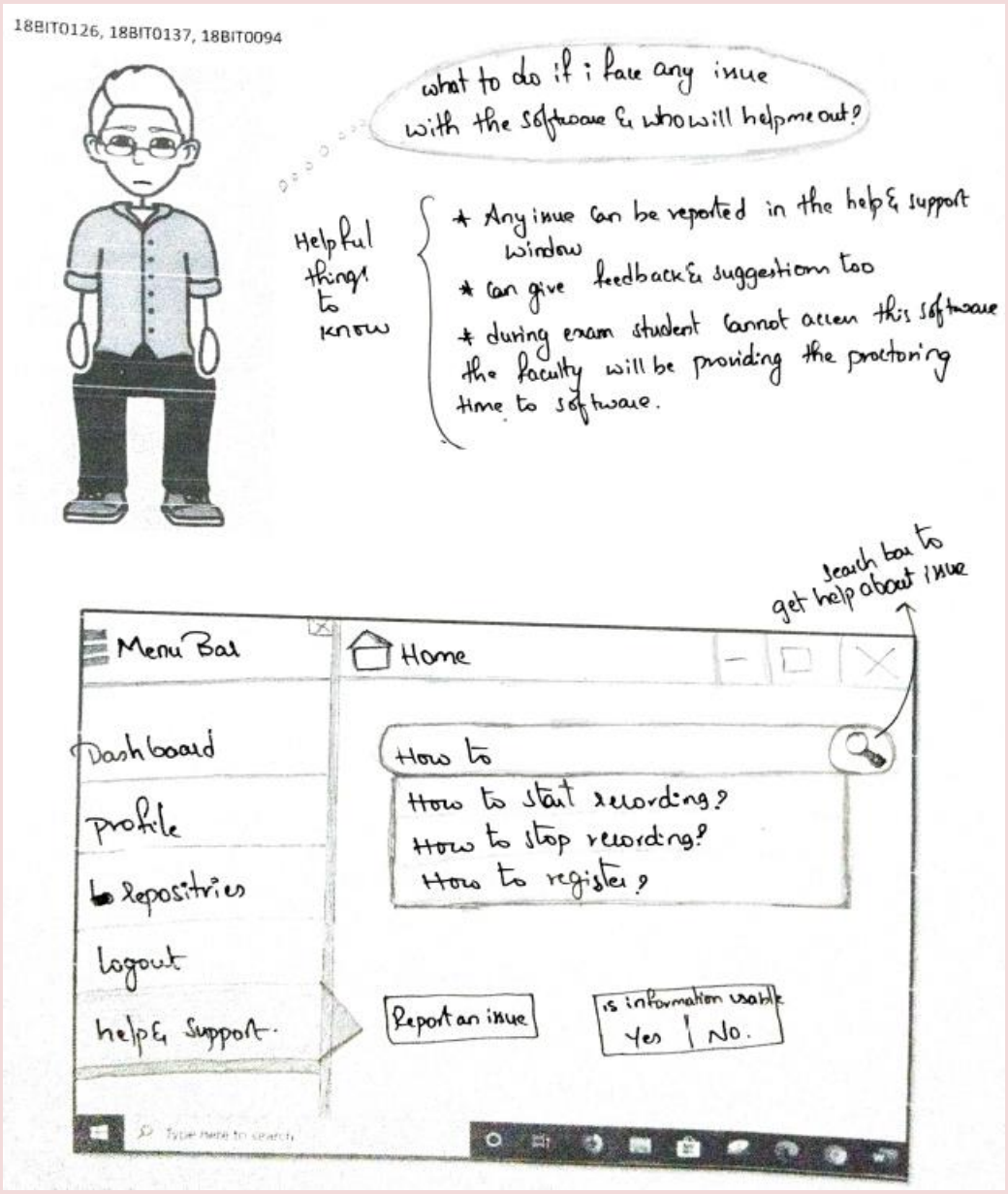

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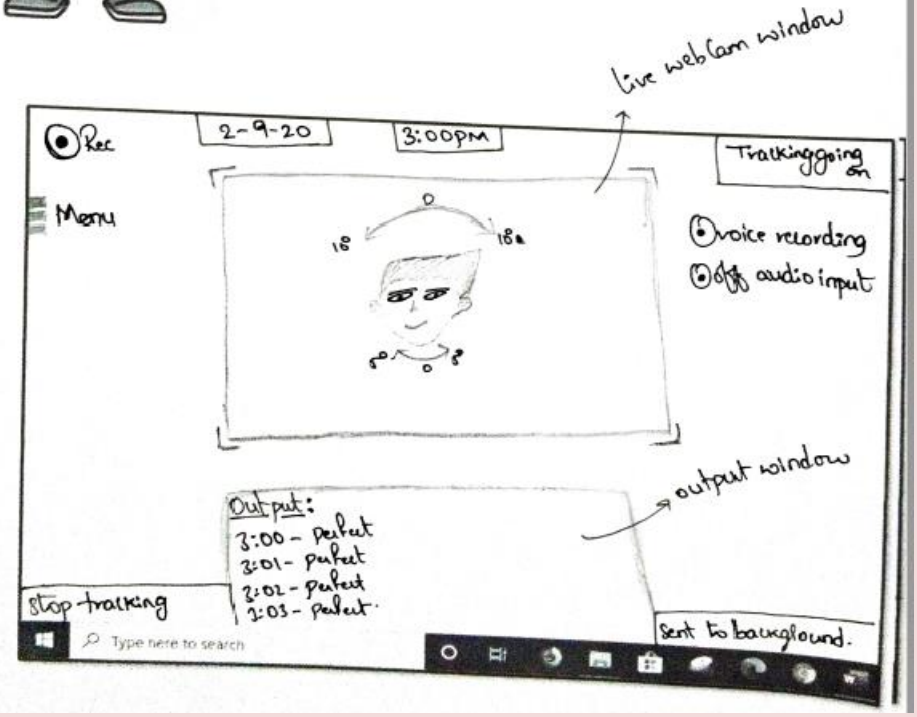
Now I am all set & just let us try how it tracks my neck and shows output. Lets just click on start tracking & see what happens

Things Good to know

* tilting upto some extent is entertained
* during exam you cant stop audio & video recording
* during exam you cant leave your pc
* during exam you cant sleep



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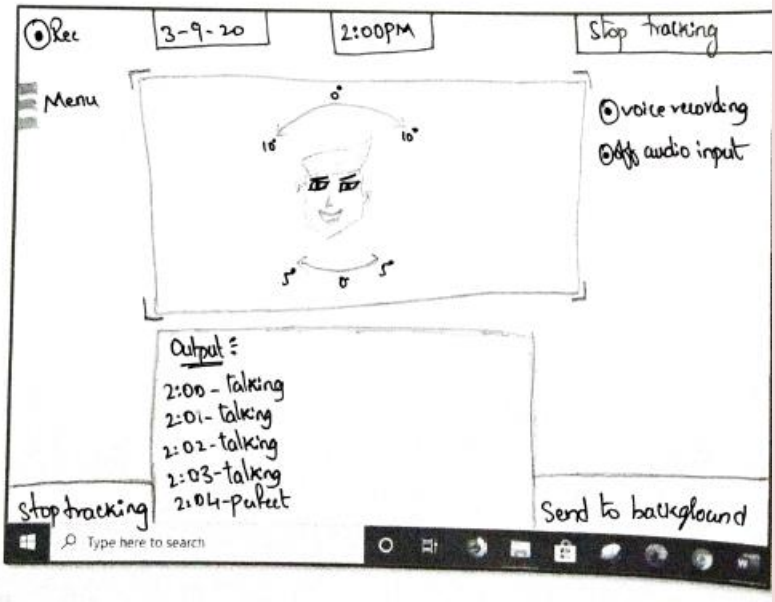
when I am straight it shows perfect what if I talk before the camera or laugh during the tracking phase.

Policies to Know

* During exam if any thing comes other than perfect neck angle for about 5 min your exam will be auto submitted & no Queries will be entertained



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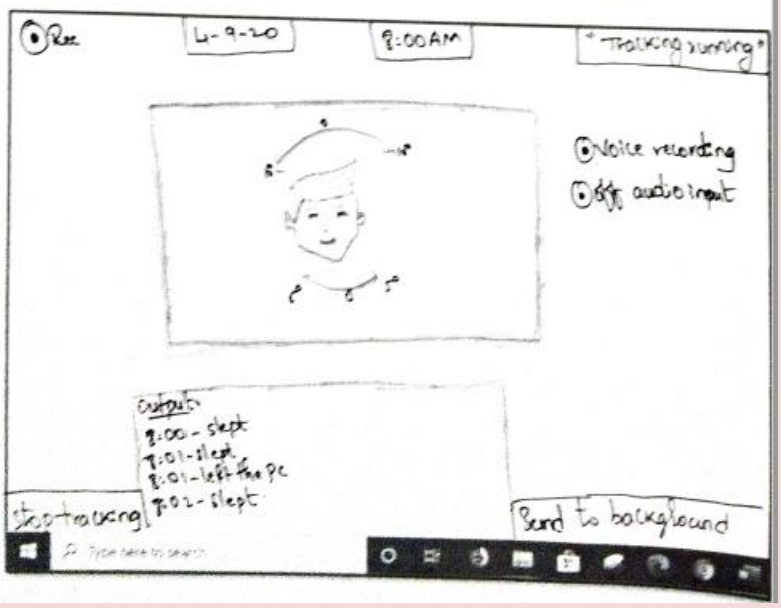
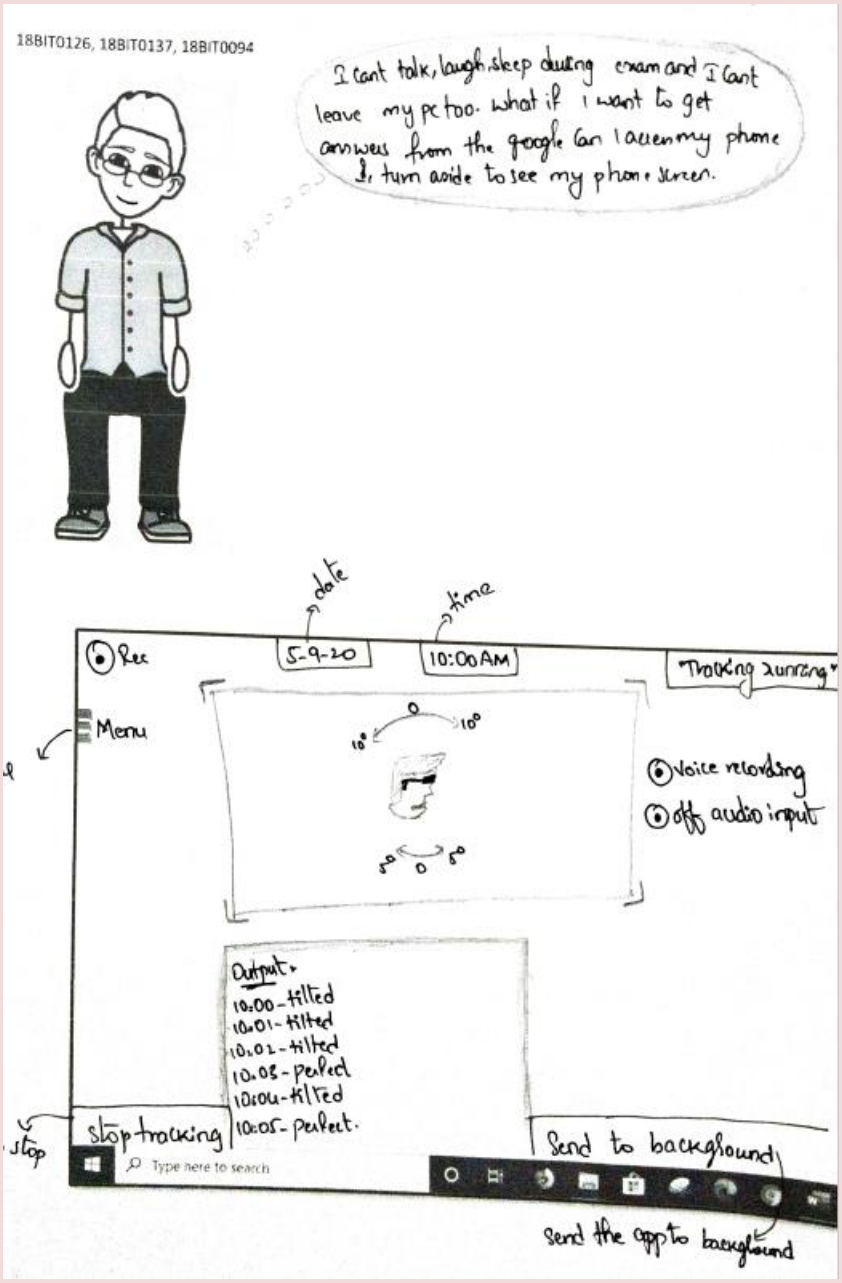
oh, then during exam I can't look and laugh, then what if I fall a sleep & left the pc and go away. let's see what happens :),




18BIT0126, 18BIT0137, 18BIT0094
I cant talk, laugh, sleep during exam and I cant leave my pc too. what if i want to get answers from the google Can I access my phone
I, turn aside to see my phone screen.
date
time
Rec
5-9-20
10:00 AM
"Tracking running"
Menu
10°
0
10°
Voice recording
off audio input
5°
0
5°
Output:
10:00 - tilted
10:01 - tilted
10:02 - tilted
10:03 - perfect
10:04 - tilted
10:05 - perfect.
stop tracking
Type here to search
Send to background
Send the app to background

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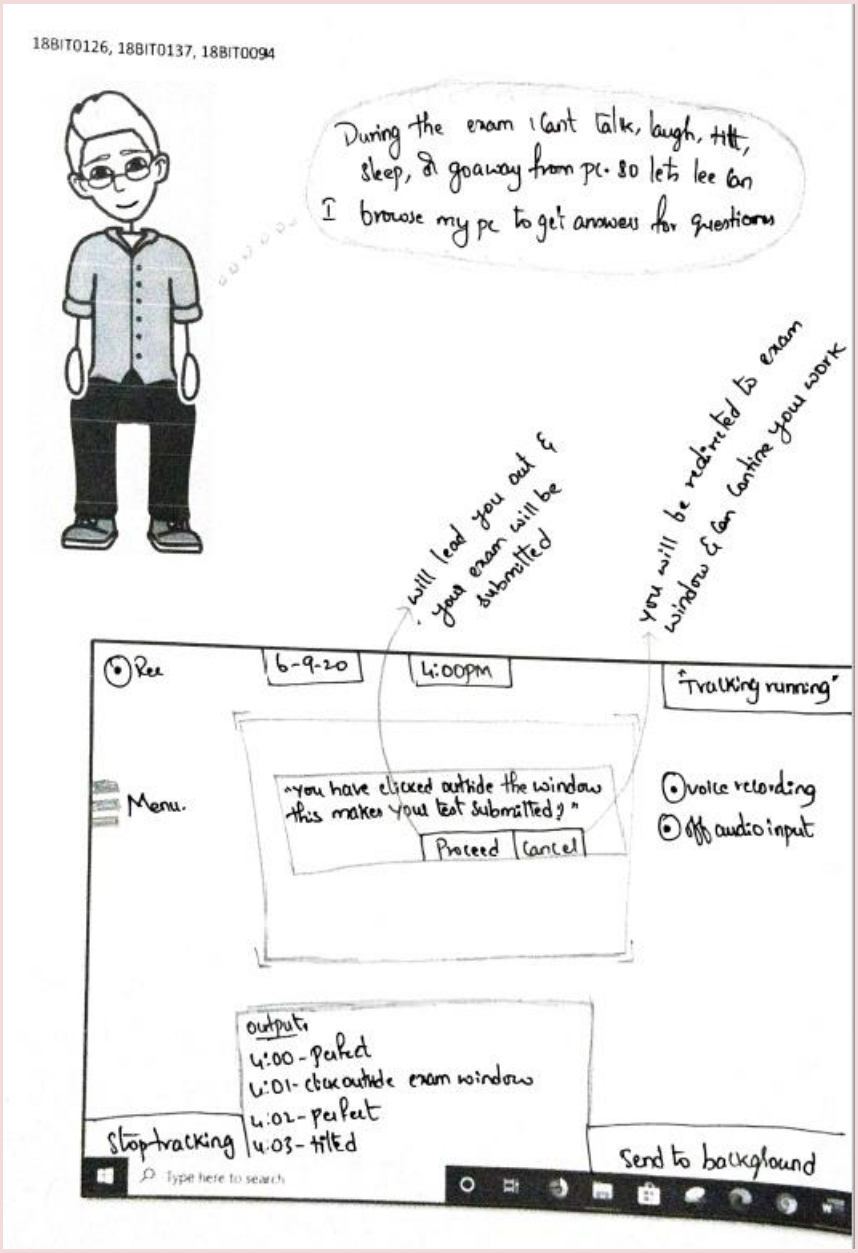


# INPUT / OUTPUT DEVICES

## INPUT DEVICES

- Laptop webcam
- Mouse
- Laptop mic
- Phone cam, mic

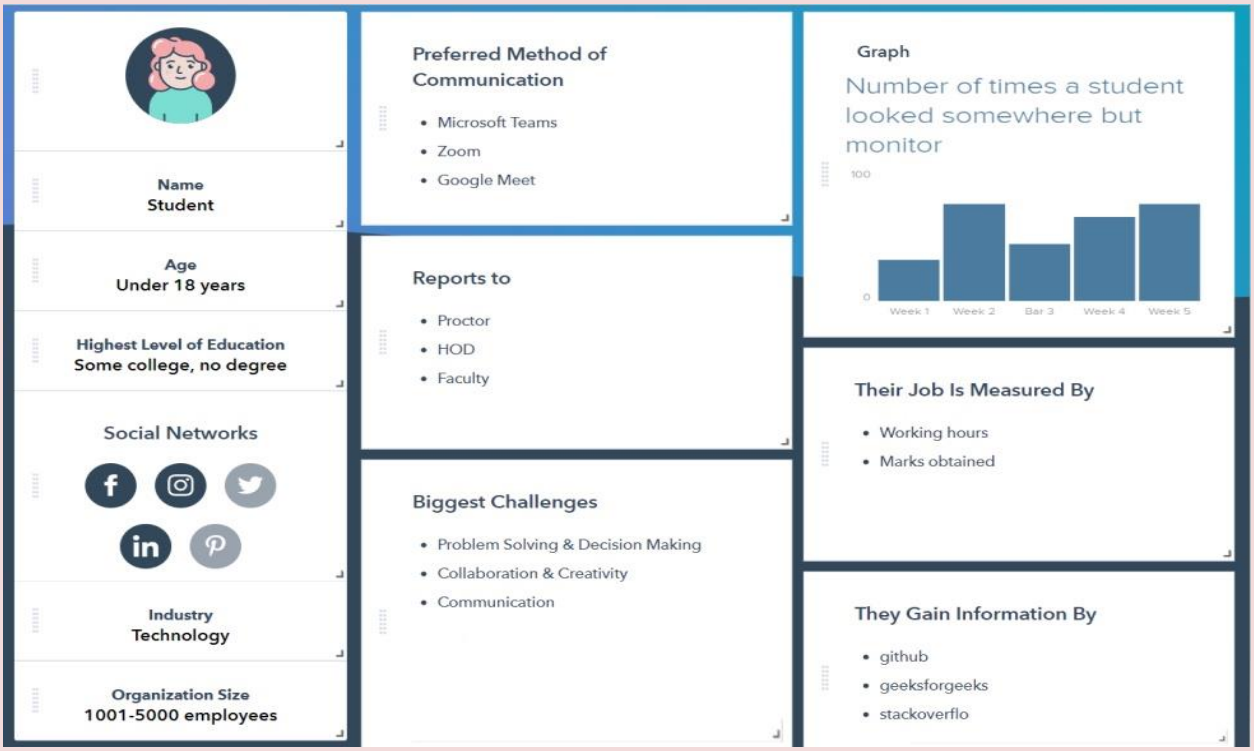
## OUTPUT DEVICES

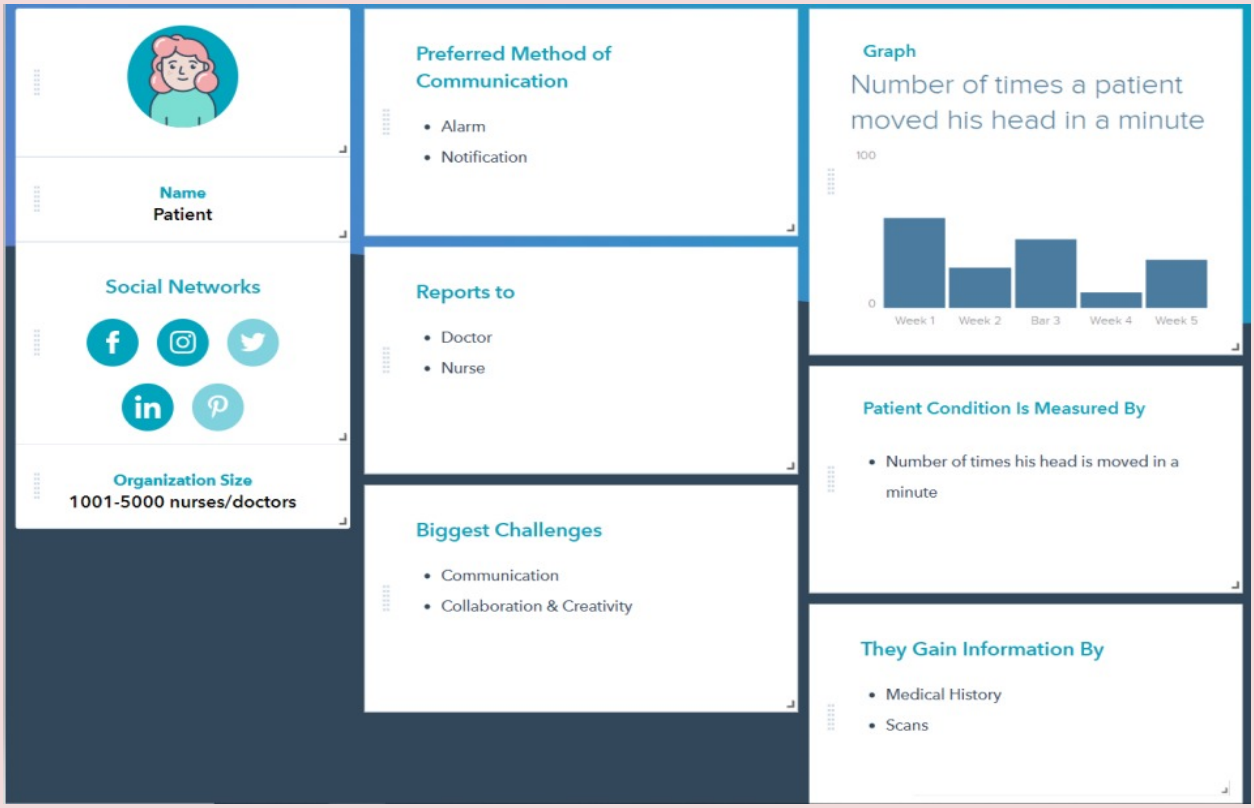
- Laptop screen (monitor)
- Software running device speakers
- In case of driving scenario phone screen
- Alarm (speaker) in case of sleep during driving

# PERSONAS AT WORK

Here we mainly focus on the student, employee patient

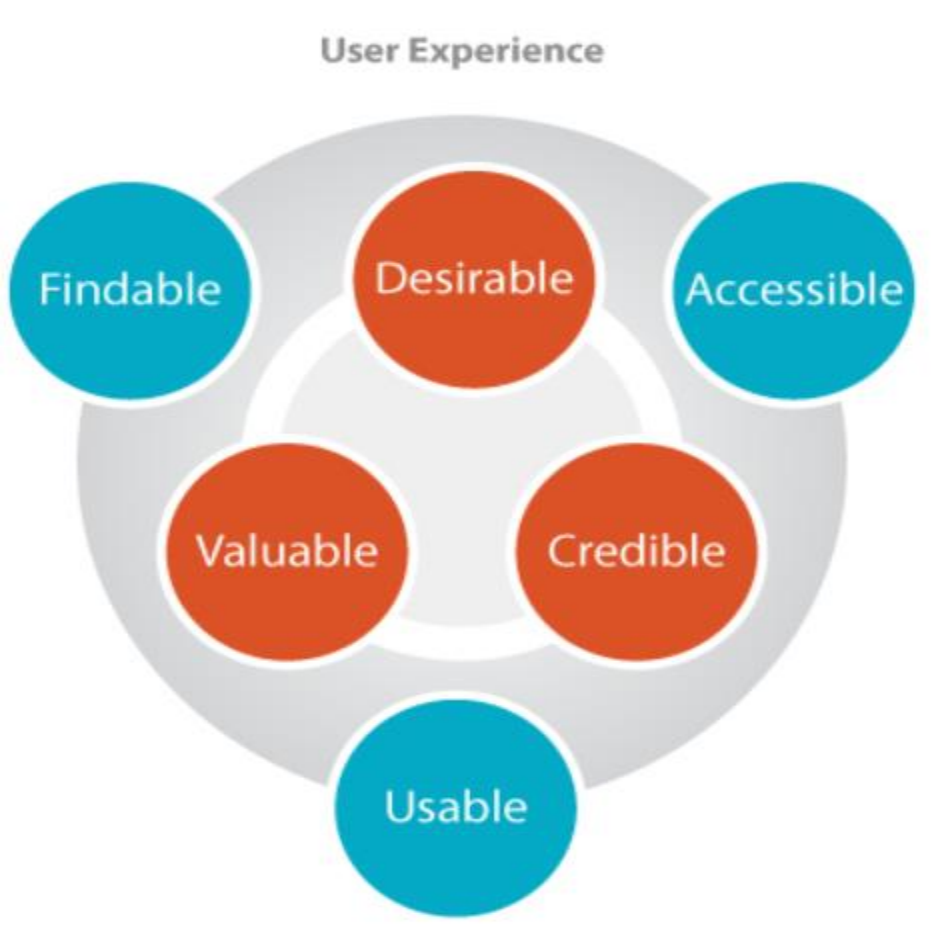
Personas are fictional characters, which you create based upon your research in order to represent the different user types that might use your service, product, site, or brand in a similar way. Creating personas will help you to understand your users' needs, experiences, behaviors and goals. Creating personas can help you step out of yourself. It can help you to recognize that different people have different needs and expectations, and it can also help you to identify with the user you're designing for.


Name
Student
Age
Under 18 years
Highest Level of Education
Some college, no degree
Social Networks
Industry
Technology
Organization Size
1001-5000 employees
Preferred Method of Communication
Microsoft Teams
Zoom
Google Meet
Reports to
Proctor
HOD
Faculty
Biggest Challenges
Problem Solving & Decision Making
Collaboration & Creativity
Communication
Graph
Number of times a student looked somewhere but monitor
100
0
Week 1
Week 2
Bar 3
Week 4
Week 5
Their Job Is Measured By
Working hours
Marks obtained
They Gain Information By
github
geeksforgeeks
stackoverflo


Name
Patient
Social Networks
Organization Size
1001-5000 nurses/doctors
Preferred Method of Communication
Alarm
Notification
Reports to
Doctor
Nurse
Biggest Challenges
Communication
Collaboration & Creativity
Graph
Number of times a patient moved his head in a minute
100
0
Week 1
Week 2
Bar 3
Week 4
Week 5
Patient Condition Is Measured By
Number of times his head is moved in a minute
They Gain Information By
Medical History
Scans


# COGNITIVE WALKTHROUGH

SDFSF Cognitive walkthroughs are used to examine the usability of a product. They are designed to see whether or not a new user can easily carry out tasks within a given system. It is a task-specific approach to usability (in contrast to heuristic evaluation which is a more holistic usability inspection). The idea is that if given a choice – most users prefer to do things to learn a product rather than to read a manual or follow a set of instructions.




The biggest benefit of a cognitive walkthrough (or walkthroughs) is that it is extremely cost-effective and fast to carry out when compared to many other forms of usability testing. It can also be implemented prior to development during the design phase which can give rapid insight before budget is spent developing an unusable product.

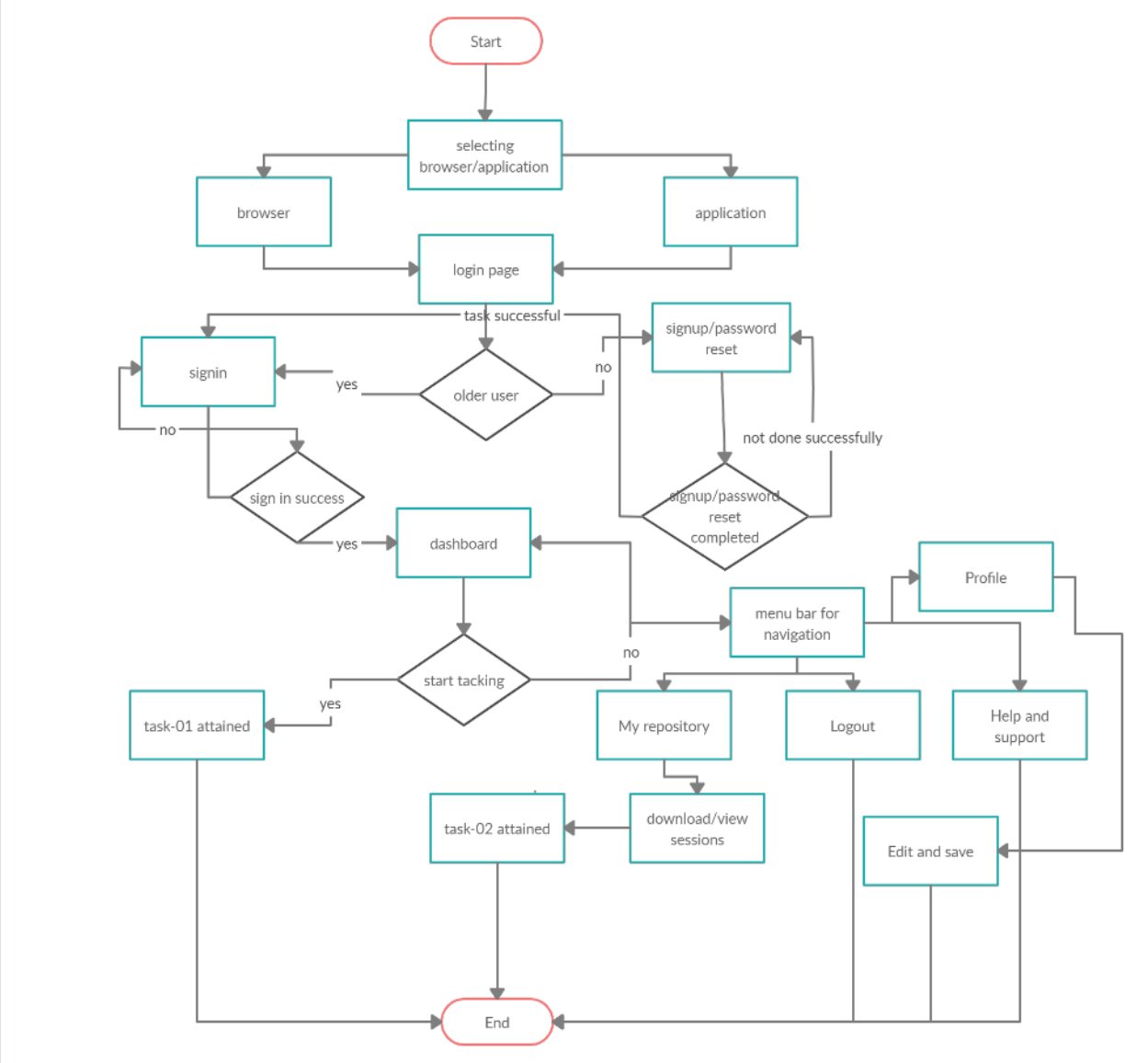
So here we will consider the two tasks which are to be done by the user

- Starting the video session for insights of user posture.
- To get my video sessions and output of a particular date.

| ATTRIBUTES | TASK-01 | TASK-02 |
|---|---|---|
| Common steps to be done | • open software app<br>• Login with your mail id if already registered<br>• Else register with mail id first | • open software app<br>• Login with your mail id if already registered<br>• Else register with mail id first |

| ATTRIBUTES | TASK-01 | TASK-02 |
| --- | --- | --- |
| Steps after the common steps | • Now after ensuring user logins and the main activity is the dashboard here<br>• In the dashboard navigate to the start tracking button and push it to start getting insights on postures | • Now after ensuring user logins and the main activity is the dashboard here then go for the menu bar in the menu bar navigate to the repository and then click repositories<br>• Here you can find all recorded sessions filter by your usage |

## NAVIGATION MAP ALONG WITH TASK-01 AND TASK-02 SUCCESS PATH




# PROTOTYPE

In here we are mainly using two thread functions one will be capturing the images and process them and send the output to the another thread that wakeup recently from sleep. Now this second thread further process the data

and generate the time intervals and refresh the intervals on user interface with changing the insight based on the time of a position. The first thread is

```
def runnn() :
    global img
    global sessionStartTime
    sessionStartTime = time.time()
    tic = time.time()
    print('start processing...')
    model = get_testing_model()
    model.load_weights('model.h5')
    cap=cv2.VideoCapture(0)
    vi=cap.isOpened()
    if(vi == True):
        cap.set(100,160)
        cap.set(200,120)
        time.sleep(3)
       while(1):
            tic = time.time()
            ret,frame=cap.read()
            params, model_params = config_reader()
            canvas = process(frame, params, model_params,model,frame)
```

```
            print(canvas)
            img = "img" + str(time.time()) + ".jpg"
            for filename in os.listdir('static'):
                if filename.startswith('img'):  # not to remove other images
                    os.remove('static' + filename)
            cv2.imwrite("static"+img, canvas)
            if cv2.waitKey(1) & 0xFF==ord('q'):
                break
            time.sleep(interval)
        cap.release()
    else:
        print("unable to open camera")
cv2.destroyAllWindows()
```

Second thread:

```
def chee():
    app.run()
from multiprocessing import Process
import threading
//the theard calling function
if __name__ == '__main__':
    threading.Thread(target= chee).start()
    threading.Thread(target= runnn()).start()
```

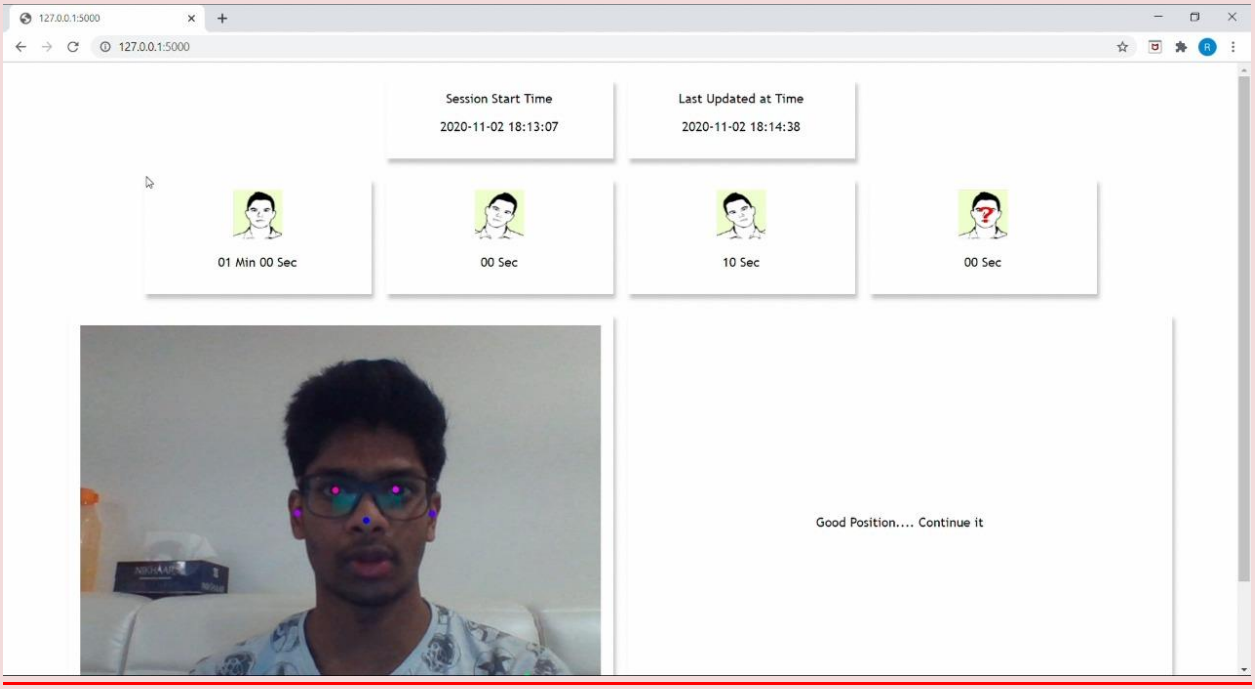
The main logic function

```
def generateInsight(headStraight, headTiltLeft, headTiltRight, headNotDetected):
    global hs
    global htl
    global htr
    global hnd
    global i
    if headStraight == 0 and headTiltLeft == 0 and headTiltRight == 0 and headNotDetected == 0:
        return ["Please wait no data found"]
    elif headStraight-hs>=5:
        hs=headStraight
        htl=headTiltLeft
        htr=headTiltRight
        hnd=headNotDetected
        i=1
        return ["Good Position.... Continue it"]
    elif headTiltLeft-htl>=5:
        hs=headStraight
        htl=headTiltLeft
        htr=headTiltRight
```

```
        hnd=headNotDetected
        i=2
        return ["You are leaning left for longer time.... ","Please Adjust your head position"]
    elif headTiltRight-htr>=5:
        hs=headStraight
        htl=headTiltLeft
        htr=headTiltRight
        hnd=headNotDetected
        i=3
        return ["You are leaning right for longer time....", "Please Adjust your head position"]
    elif headNotDetected-hnd>=5:
        hs=headStraight
        htl=headTiltLeft
        htr=headTiltRight
        hnd=headNotDetected
        i=4
        return ["Your head is not detected for longer time....", "Please Adjust your camera and lighting"]
    else:
        if i==1:
            return ["Good Position.... Continue it"]
```

```
    elif i==2:
        return ["You are leaning left for longer time.... ","Please Adjust your head position"]
    elif i==3:
        return["You are leaning right for longer time....", "Please Adjust your head position"]
    elif i==4:
        return["Your head is not detected for longer time....", "Please Adjust your camera and lighting"]
    elif i==0:
        return["please wait we are running diagnosis for output"]
```

output



FEATURES

- This software can get the mouse events so it could be useful during examination if students try's to open other window
- Software captures the frames and process them so that it generates insights for every 5 sec
- Software can detect if the person is sleeping
- Software is able to record the audio from mic if user talks anything we will be able to listen to it
- We are trying to embed a reverse ip lookup to get the nearby devices by the user side which have active internet and to maintain at least 5 feet distance from that devices in circular radius

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