PREVENTION OF VISION HEALTH FROM SMART PHONE LIGHT

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Abstract — **In health care domain eye vision protection is one of the most castigatory and important function. In present scenario computer devices came up with feature of hand handling that include decade of hard work. Smart phones provide functionalities of calculation to communication, it's get involved in human's day to day life because it's provided a life of ease but it's also came up with some drawback. One of most important drawbacks of Smartphone that it's damaged human's physical health like eyes are the most sensitive organs of human's and constant exposure of Smartphone damaging our vision health. Now days most of the people use Smartphone as their primary source of entertainment so it's important to reduce its drawback for that in this paper we have provide an idea to secure eye from phone ray using python.**

Keywords- **Secure Eyes, Face detect, DES, Protect Primary camera.**

I. INTRODUCTION

At the time of using smart phone protecting vision health is core concept of this project for that we have proposed a model where automatic identification will work when a user uses smart phone, at that time they have to maintain a particular distance to keep smart phone light turn on for that preferred distance is 25 cm here smart phone capture image image distance of user to smart phone screen is less than 25 cm screen will automatic turn off to protect user eyes from smart phone ray [1]. In the past distance identification is performed manually user has a control to decide from what distance they want to use their smart phone but somehow this process effect the health of their eyes.

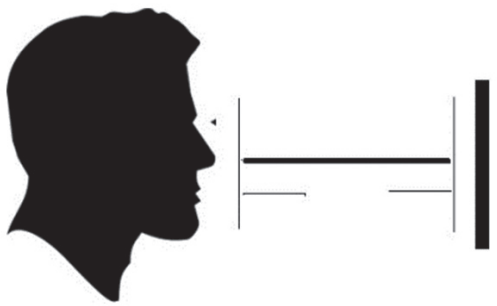

Fig.1 Distance between eyes and phone should be 25 cm. [1]

In present to overcome from this problem face detection and identification can be helpful approach to overall improve vision health of user. Process of face detection and recognition is integrated and helpful to provide solution of that problem which will affect health of user [2]. Over the year concept of facial recognition get evolved and integrated with other computational approach to provide betterment of life to user. In past smart phone came up with limited functionalities and now world of smart phone grow rapidly and contain all kind of possible functionalities in itself that can be helpful to provide ease of life to user.

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In 2023 Indian user spend 4.9 hour daily on their Smartphone that is recognize us 8th country with the greatest average daily mobile usage [3]. As per the latest research ,83% of young Indians who's age between 10 to 14 use smart phone that ratio is 7% higher than the global average which is 86%.

Main reason behind rapid use of smart phone is portability. User can perform their professional and personal work related task on a single device here they can respond on emails, set up meeting and perform other activities of their daily life. Continuous use of smart phone develop a pattern of ophthalmic issues, including headaches, impaired vision, aching eyes, dry eyes, and muscular strain ,can be accelerated by the smaller screens of mobile phones. In normal scenario eye blinking rate is between 12 to 15 times per minute but continuous use of smart phone decreases this rate also the continuous living in the blue light of smart phone effect sleep cycle and disturbs health of user [4]. To overcome from this issue approach of computer vision called "facial detection "can be used that involves detecting and recognize human faces in digital images this technology is widely applied in a various fields. In vision health this concept use face detection to automatically determine and track a person's eyeballs distance from their phone gadgets. Facial reorganization

technologies make this process automatic and provide higher accuracy and reliable results [9]. Face recognition use two different approach first one is geometric (feature based) and second one is photometric (view based).Geometric – based approach involves recognize the spatial configuration of facial features like eyes and classifying faces based on geometric distances and angles between the features. The second approach photometric use multiple images taken under different lighting conditions to regain the shape of an object and identify it based on a greediness map made up of an array of surface normal [4]. Face detection technology is used in this project to automatically monitor and limit users' screen time and exposure to hazardous rays, which can assist address this issue.

II. HISTORICAL BACKGROUND

In field of DES (Digital Eye Strain) significant work is not available that can measure effect on mobile lights on vision health. All because people do not consider it as a serious health issue and also do not have awareness about this.

Protecting vision health from smart phones is always an important issue. We cannot deny the fact that in present time Smartphone's are essential to our lives but include serious health issue in our life also [5]. It's important to take right steps to reduce the effect of smart phone light on vision health. Aim of this project is to mark a significant distance from user eye to mobile screen preferably it would be 25cm. If distance from user eye to mobile screen cross that limit means their prefer distance is less than 25 cm so screen of smart phone will automatic get turn off, user will be able to use smart phone if they maintain the preferable distance.

Goals of Proposed Model: Protect Vision health from harmful screen light.

In day to day life use of smart phone is rapidly increases since some years [10]. In 2023 the global smart phones user has reached approximately 85.74% of the global population [5].

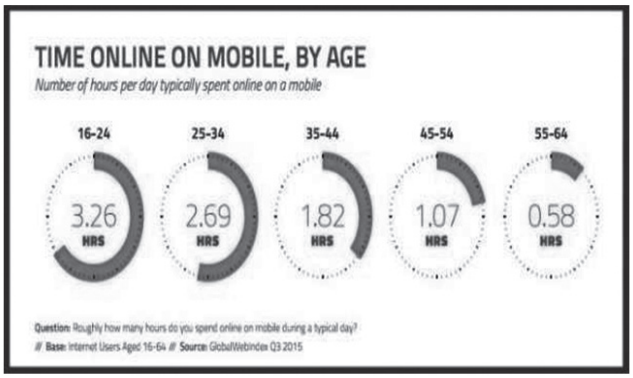

Fig.2 Show number of hours spend on mobile by different age group [3].

In India large number of populations suffers from visual impairment (Digital Eye Strain) because continuous use of smart phone. The age of these user lie between 10 to 40 years. By 2050, it is estimated that 48.8% and 9.8%, or 0.9 billion, of the worldwide population will have myopia along with severe myopia, respectively [6]. According to a prospective longitudinal cohort research conducted in schools, the incidence of myopia rose dramatically between 2005 and 2015, rising from 56% to 65%.

As a result, there is growing worry regarding youngsters and young adults using smartphones excessively. One more study has shown that user spend more than 20 hours' time in a week over smart phone. Its indicate now we are totally relay on smart phone [7].

Over use of smart phone cause serious health issue in user and to get over of this protection from digital eye strain is important.

A study conducted in 2021 by Dhir et al. [8] assessed the efficacy of software programs intended to lower exposure to blue light. They discovered that by adjusting the screen's brightness and color temperature, these apps can lessen the output of blue light, which in turn lessens its negative impacts on sleep quality and eye health.

O'Hagan et al. (2016) [9] talk about how extended exposure to blue light from LED screens—which includes smartphones—may cause retinal damage.

They point out that although there is little chance of immediate harm, repeated exposure may have cumulative effects.

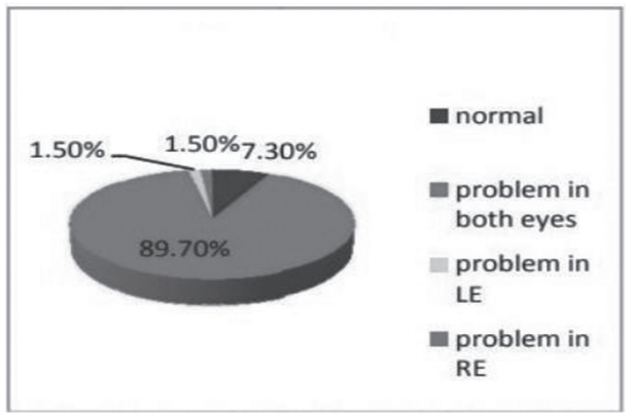

Fig.3 Percentage of normal and abnormal refraction for both eyes, LE and RE. [3]

III. PROPOSED WORK

Main objective of the research work is to create a face identification and recognition system which can identify the distance from face to screen and take a desirable action.

Whenever a person using cell phones sometime, they might not be remembered that they took their phones near to their eye's which leads DES (Digital eye strain).

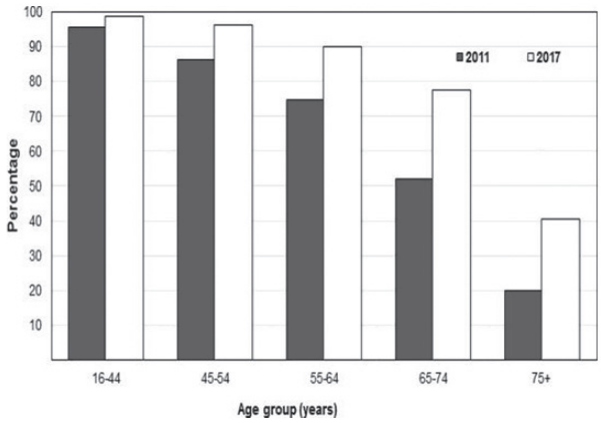

Fig.4 Percentage of DES in different age group [3]

As shown in the Fig.4 DES is increase as per the increase in the age group. So, we set a diameter of around 25 cm between a cell phone and eyes. Whenever a user crosses the desire diameter that is 25 cm, screen of the cell phone automatically gets off without stop any process which is running that time in a smart phone.

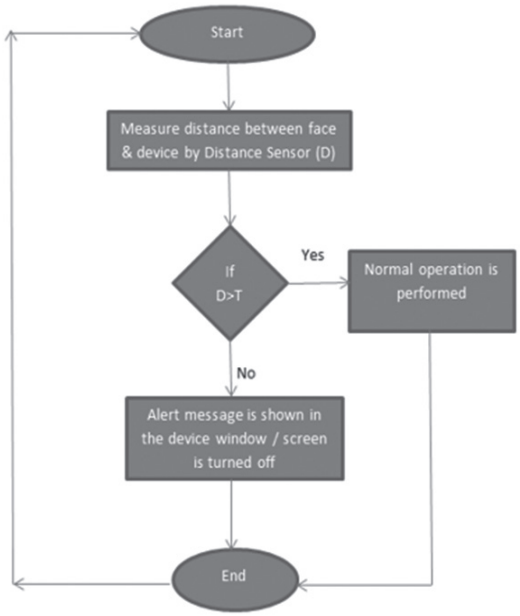

Fig.5 Process Flowchart.

As shown in the Fig.5 when a user starts using their phone the distance between face and cellphone is analyzed with distance detection sensor and the observed value D is compared with threshold value T set to 25cm. If the real time captured image distance value D is grater, then proposed threshold value, then the smartphone function will continue else the screen generate a pop message or screen will be turned off.

On the basis of our proposed model, we suggest three auto mated actions provided by the device, after measuring the distance between user face and cellphone**.**

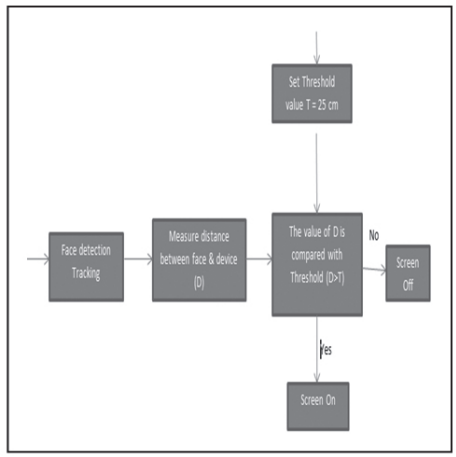

Fig.6 Proposed Model

Action 1: Normal Usage
- Distance (D) > Threshold value (T) = 25cm
- Phone remains functional
- User can continue using the phone as usual

Action 2: Alert Mode
- Distance (D) ≤ Threshold value (T) = 25cm
- Pop-up message appears on the screen
- Message may read: "Please move your phone away from your face" or "eye prevention activated"

Action 3: Screen Lock/Off
- Distance (D) ≤ Threshold value (T) = 25cm
- Screen turns off or locks automatically.
- User needs to move the phone away from their face and unlock the screen to continue using it.

These results aim to provide care of eyes.

IV. FUTURE SCOPE AND CONCLUSION

A face recognition and identification system will be helpful to maintain distance from eyes to smart phone screen. For implementation purpose in proposed model face API can be used like Microsoft or library like OpenCV, which will be helpful to implement and provide desirable result with enhance in automated setting for brightness and contrasts, to gain a deeper understanding of the cumulative impacts of blue lights. Exposure and the efficacy of different Mitigation techniques, future research should be concentrated on long term Studies. As in future with changing cellphone models the threshold value can also be altered by the user in proposed API.

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