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Mobile Eye Friend Application

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Abstract – *To provide a platform or mechanism which can be beneficial, usable and efficient in terms of health and technology which will provide benefits to the individual persona. The mechanism is an application for Android which provides benefit to the individual persona while using their smartphones. The technique or application is focusing to make the risk factor minimize of the human eye when using a smartphone for several hours.*

Key Words: Android, Eye, OpenCV, Face recognition, Real detection etc.

1. INTRODUCTION

The smartphone is an efficient and usable, one of the most important and effective invention of humans. Smartphones become an important part of human life either in education, travel, health and medical or any other activity or domain smartphone is playing a vital and important role in human life peoples are getting addicted and dependent on mobile phones but with this dependency there are many health risks occur which affects the human life [1]. According to [2] mobile phones have generally 1000 times higher radio frequency which may cause many health risks for the human body. Mobile phones are communicating with a base station using the radio frequency which has high enough to give the health risks to the human body [3]. In this paper, the proposed model is focusing on one of the major health risks of the human body while using the smartphones. The proposed model is focusing on the human eye in order to make it safe while using the smartphones. Some researches show that the main reason why peoples are getting the eye disease from smartphone is the resolution, brightness small screen size and others which may affect the human eye in order to focus on the screen to read and to view, people increase the resolution, brightness and other accessibility functions in order to get a better interaction, people will get better interaction while managing some resources of smartphone but it may effect on the human eye. Due to these above-mentioned areas, the human eye may face some problems such as dry eye, radiation effects on eye cataracts [4][5]. The objective of our project is to reduce the eye problem ratio which occurs from the use of a smartphone. At least from 1 out of every 4 patients of eye disease complains about eye strain due to the usage of bright screen while using their mobiles phones especially the smartphone user due to the brightness of screen and the attraction towards the modern era technologies screen size also plays a disadvantage for the eyes Chart -1 is representing the graph of mobile phones users [6]. Ordinarily, while blinking our eyes about 15-20 times per minute [7], but this rate and measurement decrease by half when we are staring at our smartphone or while we are using our smartphones. As we cross-eyed to read these small screens, our facial, neck and shoulder muscles tighten, eyes become exhausted and vision can be blurred or anxious. This series of symptoms is known as Computer Vision Syndrome [8][9]. The purpose of the system is to calculate the screen resolution, brightness and the distance from eye to the screen. By the use of face recognition in our application which is developed on the Java platform. The main points of the proposed solution are;

- High performance
- Easy to use
- Cross-platform
- To develop an eye detection app using android.
- People can easily access and install it.
- To maintain the measurement between eye and screen.
- To produce quality service and reduce eye diseases and eye blindness.
- To maintain the brightness of the screen.

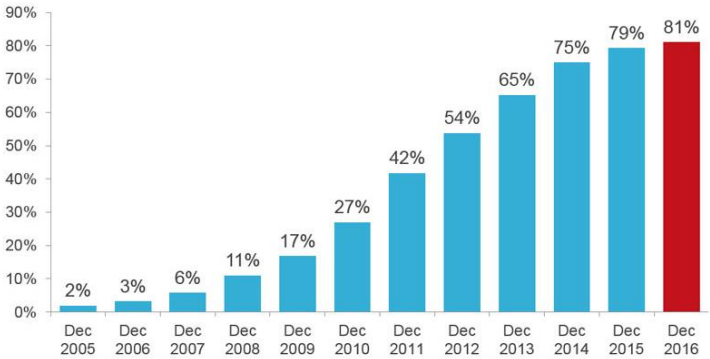

Chart -1: Usage of Mobile Phones in several years [10]

According to [11] smartphones usage is increase on the high level in adults due to the intense usage health risk may occur this paper is proposing a model which is focusing on eye safety while using the smartphones. To make the smartphones more usable, effective and efficient for human the proposed model mobile friend application is providing such usability factors to the users.

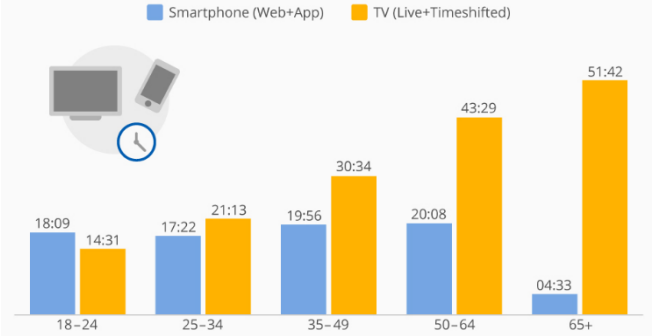

Chart -2. Usage of mobile phones in adults [11]

2. BACKGROUND STUDY

The detection of face-screen distance on the smartphone which is the distance between the smartphone and the user while using and exploring their smartphones is of paramount importance for many mobile applications, including dynamic adjustment of screen on-off, screen resolution, screen luminance, font size, with the purposes of, protection of human eyesight. [12] To solve this necessity, the solution or concept is proposed which is a methodological framework for the practical evaluation of different gaze tracking systems [13]. Vision is the most important sense of humanity which plays an important and vital role for every age group. Unfortunately, many elderly people lose their vision due to several diseases which could have been identified in their early time period. Some of the diseases can be identified or some have the symptoms detected with the use of some tests [14]. It is a hard problem to measure the camera and the face or facial distance. The proposed model discussed in the mentioned paper [15] with the use of frontal facial features developed from the monocular camera to find the depth information with the use of a supervised learning algorithm [15]. There is the variation in eye distance in pixels with the deviations in camera to person distance in inches is used to frame and formulate the distance measuring system. The structure or system starts with computing the distance between the eyes of a person and then the person to the camera the distance is measured [16]. Everyday use of modern technologies implies the need for an optimization of readability and legibility parameters used for the reading of text on the screen. A lot of research on readability and legibility in printed materials and digital media has been conducted [17].

3. PROPOSED MODEL

In this paper, the proposed model is a mobile eye friend application developed for the smartphone's users, focusing to the Android user due to the android demand and easy to use as compared to others [18]. To create a smartphone application which would be helpful in decreasing eye diseases which occurs by using a smartphone as discuss in the introduction. Mobile eye friend is an application which is basically for the smartphone users to protect their eyes from screen's harmful raises and to maintain an appropriate distance between eyes to the mobile screen. The proposed solution has a limited scope which is shown in Fig -1.

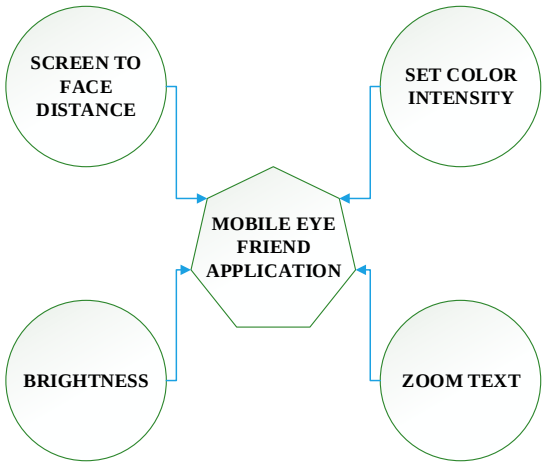

Fig -1. The scope of the proposed solution or model

4. WORKING OF PROPOSED MODEL

The proposed model or solution is based on the face recognition and detection technique which is an important factor to achieve the goal. Mobile eye friend application is focusing on four factors as shown in Fig -1. The proposed model helps the user to automatically adjust the screen resolution, brightness, contrast, readability factor so the user can easily interact with their particular action while using their smartphones. A real-time face detection and text variation-based application to protecting the eye from harmful radiations, control brightness and set color intensity, when the user reads the text. Mobile eye friend app keeps detect face and measure the distance between the user's face. This experimental app includes real-time face recognition and detection to detect the face when the user reads the text. HAAR Cascade Classifier [17] is used for face detection followed by execution of primary component analysis algorithm for recognition of their faces measuring the space of their Eigenvalues. The application permits the smartphone user to measure the distance between user face and mobile screen. First of all, the user will require to install open source software OpenCV manager [19] for installation of the mobile eye friend application.

4.1 Face Detection

Face detection is a technology that detects and determines the sizes [20]. It detects face features and ignores anything else, such as trees, buildings, and bodies. HAAR- like feature is utilized to encode and enhance contrast among different regions of the image. HAAR-like Features is a recognition process can be much more efficient if it is based on the detection of features that encode some

information about the class to be detected. Some of these features may be utilized to encode the exhibited by the human face. HAAR-like features are so called as they're calculated like the coefficients.

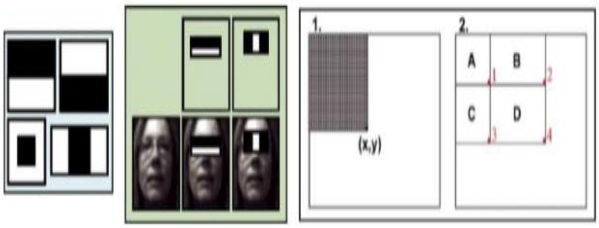

Fig -2. The scope of the proposed solution or model

4.2 Face Recognition

An algorithm based on recognition of human-face. The process of face detection must detect the face first then cascade classifier which is available in OpenCV Library for the face detection and the concept of Eigen in order to recognition [17] Here are the steps that how to face recognition works.

- Compute a "distance" between the face and of the mobiles.
- Select the face that's closest to the mobile screen.
- If the distance to that face is near or far text will automatically variate, otherwise face not detects then show garbage value.

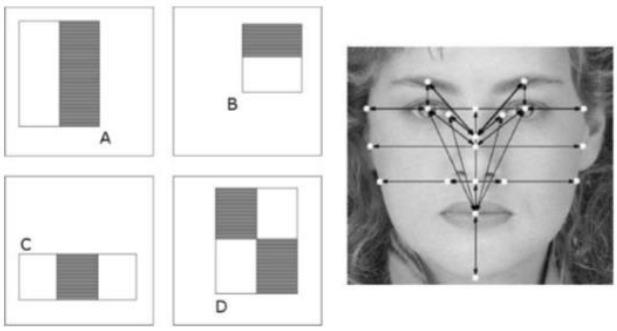

Fig -3. Face Recognition

4.3 HAAR Cascade Classifier

It is a classifier which is used for the detection of the object for which the system has been trained for [22].

- Based on the region of interaction between a classifier and a live image.
- The classifier is an image model.
- HAAR features subsections of the image.
- Cascade: Mechanism to find the region of interact by applying the classifier subsequently

4.4 Construction and Composition

In this section, the detection of faces is an experiment. A version of Viola and Jones face detector [20] [23] was run on every single image used in code OpenCV. Faces were detected by using open source library of OpenCV which is HAAR-Cascade-Classifier. If the face is detected and already stored in a database or a computer directory, then it displays a name of a person.

Table -1: Comparison of different applications with proposed model [24] [25]

Application	Screen to face distance	Filtration	Brightness	Text variation
Eye detect application	×	✓	✓	×
Eye reduce problem	×	✓	✓	×
Blue light filter application	×	✓	×	×
Mobile Eye friend application	✓	✓	✓	✓

4.5 Real-Time Detection

The face recognition also displays general characteristics like showing text variation that is using front camera as a sensor. When user open application and select any one text and read that messages front camera active on the background and detect face and calculate the distance between screen and user face, because of radiations very harmful for the human eye so this feature work on that problem.

4.6 Auto Brightness Control

This feature user uses when they want brightness control automatically senses the light intensity and you can also use the RGB color customize as you want to protect your eyes. So, by introducing a smartphone app which will prevent eyes from these diseases then definitely the project gets to succeed.

4.7 Blue Light Filtration

Blue light filtration is a range of the visible spectrum of lights the blue light sources are getting very much popular

and common nowadays especially in the modern technology either they are tablets, mobile phones, and other gadgets. Not all light colors have same effect blue wavelength which are beneficial during the daylight hours due to the reaction times, mood and boost attention seems to be more troublemaking during the night. Nearly all visible blue light passes through the cornea and lens and reaches the retina. This light may affect vision and could early age the eyes. Blue light from digital devices and mobile screens can decrease contrast leading to digital eyestrain. Fatigue, dry eyes, bad and sharp lighting, or how the way and the time you use the mobile phone can cause eyestrain. Indications of eyestrain include irritated eyes or sore and difficulty focusing. So, the proposed model is adjusting blue light in app to protect the human eye.

5. IMPLEMENTATION

Mobile eye friend is an android application, which contains the following layers: user interface layer, functional service layer, and the hardware layer. It shows the overall design of a system. The core functionality of face recognition is based on HAAR Classifier object detection is the HAAR-like features. Detecting human faces, such as eyes, nose, and mouth requires that HAAR classifier cascade need to train first. Fortunately, HAAR classifier cascade library is developed by Intel which is open-source and easier to make an application like Face Recognition or related to Computer Vision programs called Open Computer Vision Library (OpenCV). OpenCV Library helps in major application to the field of Robotics, Image Processing, Human-Computer Interaction (HCI), Biometrics, Artificial Intelligence (AI) and some other areas.

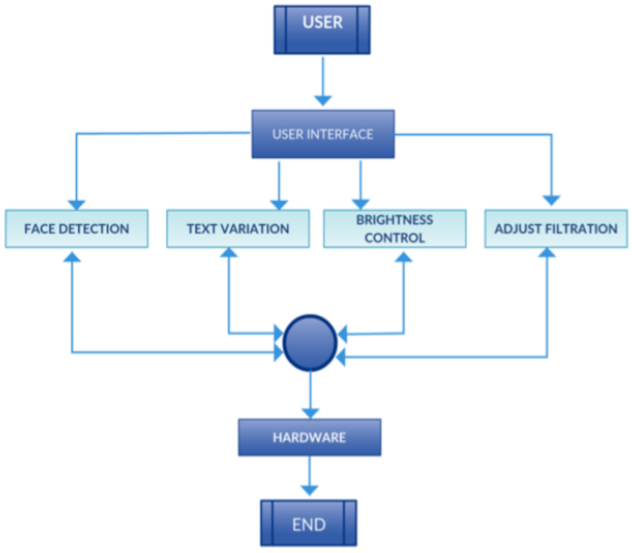

Fig -4. Design of System

6. CONCLUSION

The proposed model, solution, technique, the platform is designed and developed a Mobile eye friend application for android users using OpenCV for face detection. This application makes use of available technologies to provide a rich user experience to the users who are facing eye issues and by enabling them to save eyes. However, the model of this application is ideal for small to medium-sized android mobiles it can be further improved when deploying on eye detection.

7. FUTURE WORK

The proposed solution towards the problem encountered by the user while they are using smartphones which is a mobile eye friend application which provides a usable and effective way to get the interaction with the smartphones can further be modified in future some key points are listed below:

- Deploy Application on iOS mobile instead of using android mobiles.
- Create an application on Web-Based.
- Detect Face through the retina.
- Implement on overall OS.

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