Myopia Test for Eyesight using Android Development Application

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ABSTRACT

Android platform is used in this scenario, to develop the present application. An Eye-Test app is a smart-phone based application, to check the effectiveness of the visual acuity of your eye-sight. It is developed with the tool Android Studio in which the application contains Snellan Chart, E-chart, Landolt C etc., .This application offers to test your eye-sight individually at home easily and also helpful to specialists, since our application is compatible in any hand-held mobile devices.

Keywords: Visual Acuity, hand-held devices, compatible.

1. INTRODUCTION

Mobile development platform is a technology that enables mobile developers to create of production and processes that support present and future development of mobile applications. Android is that the hottest mobile platform within the world. Android delivers a complete set of software for mobile devices; an operating system, middleware and key mobile applications [10].Android is designed primarily for touch screen mobile devices like smart phones and tablets which have the OS modified version of Linux kernel and other open source software. It has been the best-selling OS worldwide on smart phones since 2011 and on tablets since 2013[1]. Android is developed by a consortium of developers referred to as the Open Handset Alliance, with the most contributor and commercial marketer being Google [9].Myopia (Nearsightedness) is a common vision condition during which you'll see objects almost near to you clearly, but objects farther away are blurry. It occurs when the shape of your eye tends to bend by light rays or refract incorrectly, focusing images ahead of your retina rather than on your retina. Globally, 285 million people are visually impaired and 80% have diseases which might be cured or prevented. However, most live in low-income countries and remain within the dark due to limited access to specialist clinics. To overcome this, we had developed an Android based application which is compatible in any hand-held mobile devices. This application contains 10 activities of visual acuity checks; Visual Acuity, Color Blindness, Color Cube, Duochrome

Test, Amsler Grid, Contrast Sensitivity, Astigmatism, Landolt Test, OKN Strip Test, AMD, which are manually operated and the results will be displayed after the activity check.

2. LITERATURE SURVEY

Visual acuity (VA) is the most frequently performed measure of visual function in clinical practice. VA measurements are used to establish the necessity for clinical investigation and quantify changes in sight over time. Four-percent of attendees to general practice in the UK do so with an eye problem [4] and a formal measure of VA should be part of each of these consultations [8].Globally, 285 million people have visual impairment, with 80% having diseases with known curative or preventative treatment. However, the majority live in low-income countries with minimal access to detection and subsequent treatment [7].The Snellen chart [3] is the most common method for the measurement of VA in ophthalmic and general practice, but is limited by the non-geometric progression in letter sizing from line to line and the inconsistent number of letters per line [6]. Different letters or optotypes (standardized symbols for testing vision) have varying legibility at the same size and secondary effects such as crowding are known to affect the ability of the patient to determine optotypes correctly and therefore could lead to measurement bias. The limitations of the Snellen chart have largely been overcome with the development of LogMAR (Logarithm of the Minimum Angle of Resolution) acuity charts [2], which are now frequently employed in clinical research, such as the popular Early Treatment of Diabetic Retinopathy Study (ETDRS) charts. Despite this improvement, the Snellen chart remains the dominant method for acuity testing in clinical practice [5]. This may be due to several factors including; familiarity, a well recognized scoring system, smaller chart size and the speed of performing the test relative to ETDRS.

3. EXISTING SYSTEM OF EYE-TEST

Being the primary country within the world, India features a proud tradition to implement a blindness control programmed which focused on a model to deal with blinding disease for blindness prevention. However, with 133 million people blind or vision impaired due to low income, it is imperative to test all of them. All the people can't go to the clinic and check their eye-sight.

Fig.1 Manual eye testing

The Fig.1 show the existing system of eye-tests which is manual in our country. To reduce this time-taking process an application is enough to recover the time and also it is easy to check the people.

4. PROPOSED MOBILE APPLICATION

A smart phone based application which is compatible in all hand-held devices can be easily handled by the specialists and also it is useful for individual checkup. The modules in our application are detailed below:

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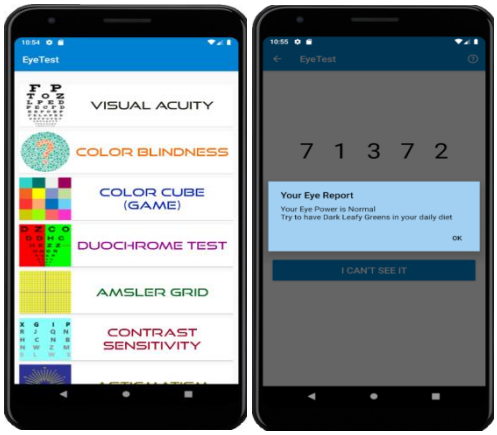

Fig:2 Visual Activity

The above activity is the Visual activity which is shown in Fig 2. It checks the eyesight through the numbers by minimizing the size of them and gives the result.

Module 2: Color Blindness

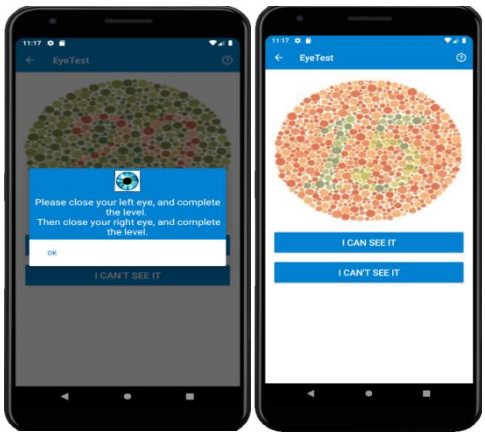

Fig 3. Color deficiency

Color blindness occurs once you are unable to ascertain colors during a normal way. It is also known as color deficiency and is shown in Fig 3. It also occurs when someone cannot distinguish between certain colors. This usually happens between greens and reds, and occasionally blues.

Module 3: Color Cube (Game)

The test which gives a toast message when you tap on a wrong grid as shown in Fig 4.

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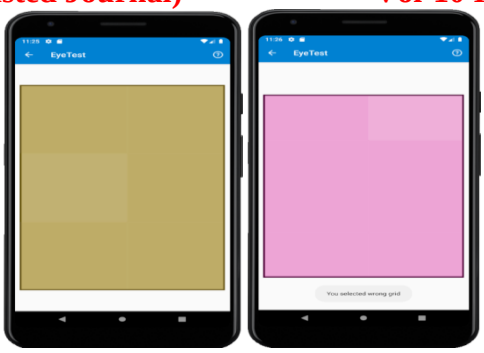

Fig. 4 Color Cube

Module 4: Duochrome Test

Duochrome test is shown in Fig .5

Fig.5 Duochrome

Module 5: Amsler Grid

This activity is to point out the dot in the amsler grid, operated manually and is shown in Fig. 6

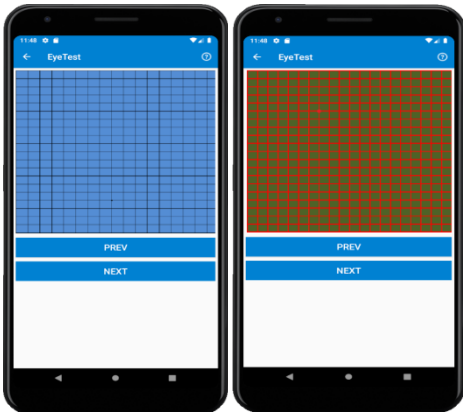

Fig. 6 Amsler grid

Module 6: Contrast Sensitivity

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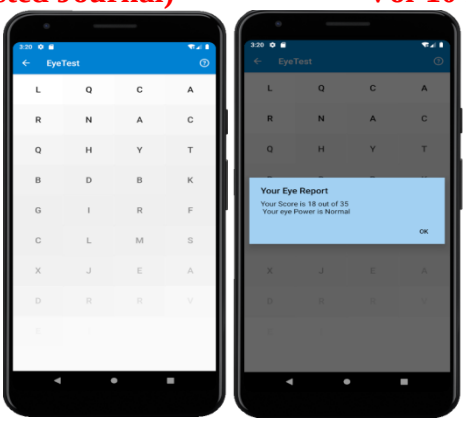

Fig 7. Contrast sensitivity

It tests the sensitivity of our eye as shown in Fig 7. You are allowed to tap on the letter which you can't see and the result is given.

Module 7: Astigmatism

Astigmatism is a condition of blurred vision as shown in Fig 8. It occurs when the cornea (the clear front cover of the eye) is irregularly shaped or sometimes due to the curvature of the lens inside the eye.

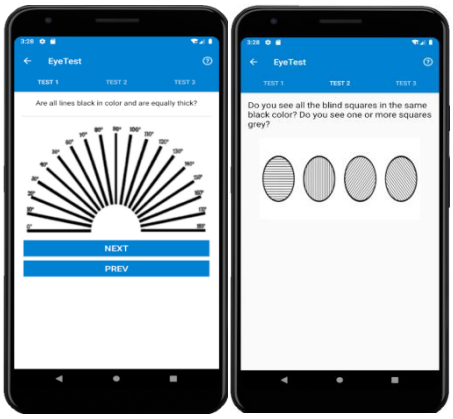

Fig 8. Astigmatism

Module 8: Landolt Test

This test contains two activities; Landolt C and Tumbling E as shown in Fig 9. You can individually choose the activity you want and proceed the instructions. So you are allowed to tap on the arrow mark by which side the letter is tilting.

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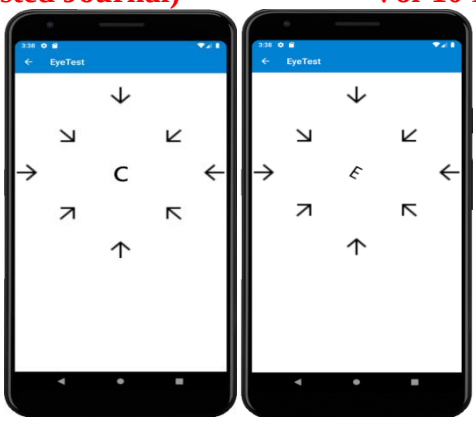

Fig 9. Landolt Test

Module 9: OKN Strip Test

Fig 10. OKN strip test

OptoKinetic Nystagmus, is that the eye movement elicited by the tracking of a moving field as shown in Fig 10. It differs from smooth pursuit which is that the eye movement elicited by tracking of one distinct target.

Module 10: AMD

People with macular degeneration can check their own vision with a simple test called AMDshown in Fig. 11.

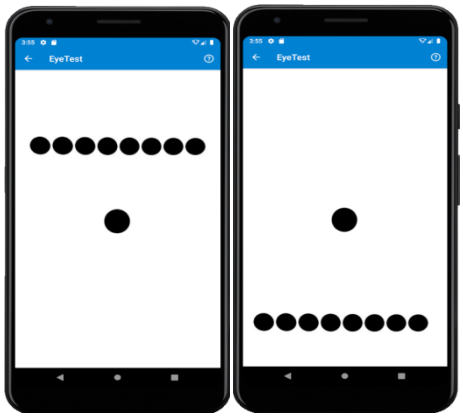

Fig 11. AMD

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5. CONCLUSION

All the activities mentioned above are helpful to the common people and also the doctors to check the low-income people in easiest and fastest way. EyeQue Vision Check, Peek Acuity and so on online test eye test apps are also famous and they also order eye-glasses on online.

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