



Optiwell: An Online Eye Test

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ABSTRACT

The website OptiWell is all about eye checkups with the help of artificial intelligence, matching the symptoms with the database, and giving the solution. And also experience the future of eye health with our virtual eye checkup. Online eye check-ups from the comfort of your home have revolutionized how we monitor our eye health. These digital solutions provide a convenient and accessible means to assess your vision and screen for potential issues. Through a combination of technology and interactive tests, you can gain valuable insights into your visual acuity, eye strain, and more, all without the need for a physical visit to an optometrist. In this era of digital innovation, online eye check-ups empower individuals to take a proactive approach to their eye care, ensuring that their vision remains sharp and their eye health is well-maintained. However, it's essential to remember that these online assessments are not a substitute for a comprehensive eye exam conducted by a licensed eye care professional. They are useful for initial self-assessment and may prompt further action if needed. Our Project Objective is to Enhance access to eye care, especially in rural areas. Promote early detection of eye conditions Deliver personalized recommendations and most importantly, Prioritize user experience and convenience

Keywords: Artificial intelligence, Machine learning, optometrist.

1. Introduction:

Employing our virtual eye assessment, the OptiWell website offers clients to simulate the eye health of the future. Being capable of doing online eye examinations from the comfort of your home has fundamentally altered how we keep an eye on our visual health. These improvements in technology offer a straightforward and readily available method of assessing your vision and testing for any potential issues.

You could discover a great deal regarding your visual acuity, eye strain, and numerous other issues without getting to visit an optometrist in people because of interactive examination and technology. Online eye examinations enable patients to take a preventive approach to their eye care in the age of digital innovation, assuring that their eyes stay healthy and that their vision remains sharp. However, you must remain in consideration of these online exams.

1.1 Who Can Take Online Test?:

The following healthy adults, aged 18 to 39, are eligible to take online vision tests: I already have an inadequate prescription for eyewear. possess shown their eyes are healthy through a previous comprehensive examination and possess no vulnerabilities for ophthalmic ailments, which include hypertension or diabetes.

It's crucial to get routine eye examinations as recommended by your eye doctor, even if you're young enough and in adequate condition to take an online vision test.

1.2 Working Of Online Vision Test:

A few stages may be involved in an online vision test. To successfully finish the portion of the assessment that measures your distant vision, you will need an electronic device and an appropriate location to sit. To utilize an app for some tests, you must also have a smartphone. Most likely, you'll need to wear your prescription contacts or glasses for the test if you have them.

Our websites perform perception tests only. It will be your responsibility to visit an eye doctor if the results seem to suggest you may have a problem. Depending on the outcomes of your tests, our websites provide prescriptions for contacts and glasses. Once your results have been examined, an eye professional in the area is going to compose you an email.

1.3 Problem Description:

These days, these days Out of 10,8 individuals vision problems impact them all. Depending on the cause—redness, irritation, stress, myopia, hypermetropia, etc. Consequently, taking care of our eyes is crucial since, without them, we would be unable to see this wonderful world, which is equivalent to death. We want to provide eye health care services to a large number of people through our initiative, Optiwell, which is specifically designed for rural locations. Many top doctors in large cities can treat eye conditions, but their prices are so high that middle-class people cannot afford them. Furthermore, persons in rural areas lack access to healthcare facilities, thus visiting the doctor in a metropolis requires an enormous financial investment. All of the aforementioned issues are resolved by our initiative, OPTiwell.

2. Collection Of Data Sets:

The Very first step in our method is Data Collection. We Will Compile Data on various Eye diseases including Kaggle and various Other Datasets.

5,000 patients with age, color fundus photos from both the left and right eyes, and physician diagnostic keywords are included in the organized ophthalmic database Ocular Disease Intelligent Recognition (ODIR).

A "real-life" set of patient data gathered by Shanggong Medical Technology Co., Ltd. from various Chinese hospitals and medical facilities is what this dataset is intended to depict. These institutes use cameras from different manufacturers, like Canon, Zeiss, and Kowa, to take fundus images, which produce a range of image resolutions. Professional readers with quality control management assigned labels to annotations.

The following five labels have been used to categorize patients:

Normality (N)

Diabetes (D)

Glaucoma (G)

A cataract (C)

Extraneous illnesses/disorders

2.1 Diabetes (D)

Amputations, heart disease, renal failure, and blindness are just a few of the many catastrophic repercussions that diabetes can cause. By practicing excellent health habits such as eating a balanced diet, practicing frequently, and taking your prescribed medications, you may successfully manage your diabetes. The disease when diabetes damages the eyes is called diabetic retinopathy.

All diabetics should get yearly eye exams with photo-screening or pupil dilation technological advancements. As soon as diabetic retinopathy is evident in the eyes, a follow-up examination with pupil dilation should be undertaken during various frequencies.

2.2 Glaucoma (G)

A medical disorder known as glaucoma causes structural damage to the optic nerve, which is irreparable and cannot be reversed. The neural network of the eye that transmits all of the visual data that the eye perceives is called the optic nerve. The optic nerve carries this information, which is then sent to the brain.

People of all ages are vulnerable to the highly prevalent disease glaucoma. It is expected that up to 10% of the population could be affected, according to sources. This figure is equivalent to 250,000 individuals in Canada. This amounts to 65 million individuals worldwide.

2.3 Cataract (C)

The lens, which is the natural lens of the eye, gets obstructed by a cataract. The latter is situated behind the iris, the colorful portion of the pupil, inside the eye. It is nicely represented in the eye anatomy diagram. Cataract formation can be impacted by several factors, such as age, environment, medicine, and inheritance. The lens gets blurry, yellowish, and frosty with time. As a result, the cataract distorts and reduces the light that approaches this lens. This kind of issue can be permanently treated with an intraocular surgical surgery called cataract extraction.

3. Algorithm Used:

Deep learning techniques based on the Convolutional Neural Network (CNN) type are particularly well-suited for image processing and recognition purposes. Convolutional, pooling, and fully connected layers belong to the layers that make up this structure of data. Convolutional layers are the main component of a CNN; they are where features including edges, textures, and kinds are obtained from the input image through the use of filters. Pooling layers are used to down-sample the feature maps to preserve the most important data while minimizing the spatial dimensions. The result of the layers

using convolution then passes through these successive layers. The image is then classified or predictions can be made by passing the output of the pooling layers through one or more fully connected layers.

3.1 Mobile Net:

It received its training from the ImageNet dataset, just as many other models. However, without materially sacrificing accuracy, its design is optimized to be resource-efficient for embedded and mobile systems. The way it's designed makes it ideal for situations where computational capacity is limited, such as mobile phone image identification, instantaneous object detection, and augmented reality technologies.

4. Methodology:

- The initial step in the process involves clients creating an account and logging in to our website after incurring a minimal registration expense.
- We can now scan the patient's eye and identify the disease by contrasting the symptoms with the dataset generated by artificial intelligence and machine learning algorithms.
- In addition, each described symptom in the dataset offers knowledge about the ailment, its source, and ways to prevent or treat it.
- Furthermore, we now recommend a nearby doctor for an extremely affordable cost if the disease demonstrated does not appear in the dataset.

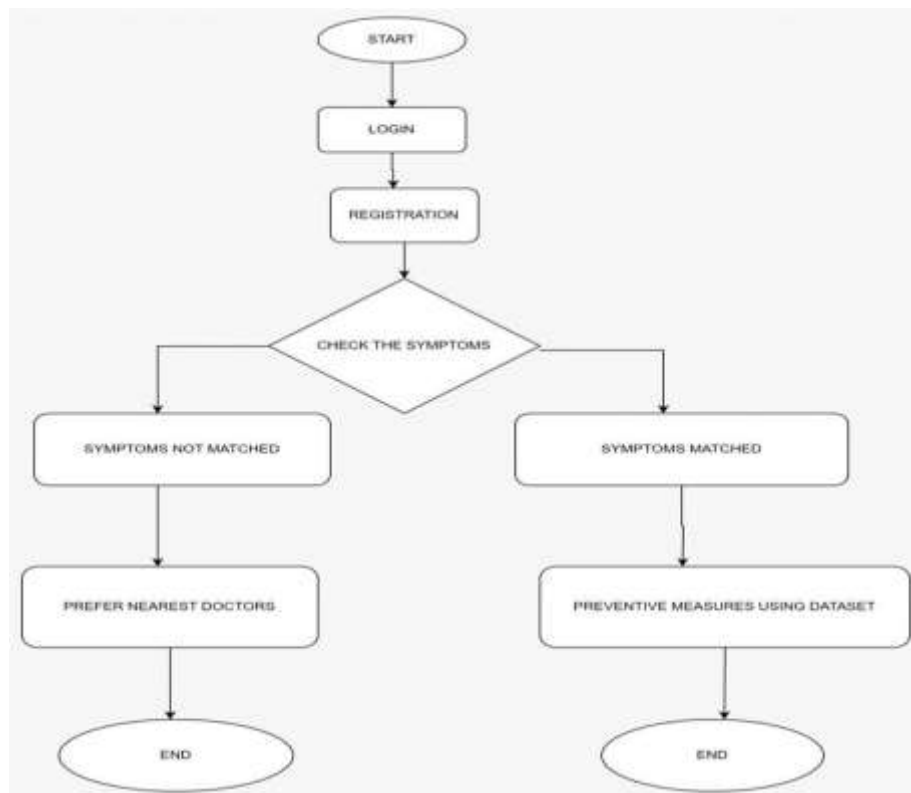


FIG-1 Flow chart of procedure of Optiwell website

5. Conclusion:

Being able to create an eye test that can scan images and compare them to images in our database was made achievable by Project Optiwell. Furthermore, assess the illness. This webpage was made using artificial intelligence and machine learning techniques. This website was made particularly for people who live in distant places where it can be expensive to travel, see a doctor, or receive eye exams. The scanner uses artificial intelligence to read an ocular image, compare it to a dataset, decide on an illness, and offer medical advice and a prescription. Apart from an additional registration fee, almost all of the procedures are finished online.

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