

पेटेंट कार्यालय
शासकीय जर्नल

OFFICIAL JOURNAL
OF
THE PATENT OFFICE

निर्गमन सं. 41/2022
ISSUE NO. 41/2022

शुक्रवार
FRIDAY

दिनांक: 14/10/2022
DATE: 14/10/2022

पेटेंट कार्यालय का एक प्रकाशन
PUBLICATION OF THE PATENT OFFICE

The Patent Office Journal No. 41/2022 Dated 14/10/2022

65167



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(12) PATENT APPLICATION PUBLICATION

(21) Application No.202241057064 A

(19) INDIA

(22) Date of filing of Application :04/10/2022

(43) Publication Date : 14/10/2022

(54) Title of the invention : Automatic recognition of eye's state using deep learning approach

(51) International classification :A61P0017040000, G06N0003080000, A61P0037080000,
A61F0009020000, A61B0003100000
(86) International Application :PCT//
No :01/01/1900
Filing Date :
(87) International Publication : NA
No :
(61) Patent of Addition to :NA
Application Number :NA
Filing Date :
(62) Divisional to Application :NA
Number :NA
Filing Date :

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(57) Abstract :

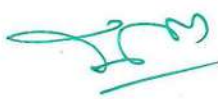
Automatic recognition of eye's state using deep learning approach Abstract Many people neglect eye related problems by giving their own reasons for all these problems like swelling in the eyes, heat, itching, allergies, tears, stress. That is very wrong. Things that you think are normal like a lump, tear, itch can have a different background. It is important to detect and treat them in time. A lot of people come to the ophthalmologist saying that there are frequent lumps and tears in the eyes. They themselves will come up with a reason like "heat". Immediate medical examination is necessary if children have frequent eye lumps or itching. The first task for such children is to find out if they have power in their eyes. If there is a problem with the vision or if it is not clear, children do not know how to feel it and say it out. They think that it is normal to be like that. When this happens to adults, they immediately recover. They will sense that something is different.

No. of Pages : 7 No. of Claims : 8

<p align="center">FORM 2 THE PATENTS ACT 1970 39 OF 1970 & THE PATENT RULES 2003 COMPLETE SPECIFICATION (SEE SECTIONS 10 & RULE 13)</p>		
<p>1. TITLE OF THE INVENTION Automatic recognition of eye's state using deep learning approach</p>		
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2. PREAMBLE TO THE DESCRIPTION		
<p style="text-align: center;">COMPLETE SPECIFICATION</p> <p>The following specification particularly describes the invention and the manner in which it is to be performed</p>		


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Automatic recognition of eye's state using deep learning approach

Abstract

Many people neglect eye related problems by giving their own reasons for all these problems like swelling in the eyes, heat, itching, allergies, tears, stress. That is very wrong. Things that you think are normal like a lump, tear, itch can have a different background. It is important to detect and treat them in time. A lot of people come to the ophthalmologist saying that there are frequent lumps and tears in the eyes. They themselves will come up with a reason like "heat". Immediate medical examination is necessary if children have frequent eye lumps or itching. The first task for such children is to find out if they have power in their eyes. If there is a problem with the vision or if it is not clear, children do not know how to feel it and say it out. They think that it is normal to be like that. When this happens to adults, they immediately recover. They will sense that something is different.

Background problem for the innovation

Children with these symptoms should be checked to see if they need glasses. Adults can also get this from time to time. They may have cylinder power called Astigmatism. Unknowingly, they are more likely to get bumps, itches and tears when they work on the computer without wearing glasses. Apart from this, some people may have low immune system. As a result, eyeballs can often appear. Next is the cleaning of the eyelids. Any allergy or infection in the eyelash hairs can cause itchy eyes. Dry eye syndrome is a condition where your tears can't provide enough lubrication to your eyes, causing you to feel uncomfortable. This can happen when your eyes don't produce enough tears, or when they produce low-quality tears that can't lubricate the eyes. Such "prolonged dryness" can lead to eye inflammation and damage to the surface of the eye.

Although this can happen under many reasons, it is increasing because we wear masks more and more these days. A study published in the journal Scientific Reports confirmed that wearing a mask is associated with a risk of dry eye syndrome. Redness and swelling of the inner eyelid covering the white part of the eye is called inflammation. It appears and disappears suddenly. Although it goes away on its own, it sometimes requires treatment by a doctor. Eye redness does not necessarily mean conjunctivitis. A sudden increase in pressure inside the eye is called Acute Angle Closure Glaucoma. Even with this the eyes soon turn red. If the pressure is reduced at an



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early stage, the vision will recover quickly, but if it is delayed, it will cause permanent damage to the eye sight. So immediate treatment is necessary.

Generally we all are more likely to get allergy in eyes because we can wear cover to avoid allergy through nose through mouth through hands and feet but eyes are not like that we live our daily life with our eyes. Allergy to the eyes due to dust, dirt etc. Conjunctivitis is an allergic reaction to the surface of the eye. This is a common condition that occurs when your eyes come into contact with allergens. Pollen and smoke are examples of allergens. Most of the time there is no way to prevent eye inflammation, but it is better to avoid going to a place where there is a lot of dust, going outside when the wind blows a lot, etc. Avoid using the fan in dirty and dusty areas. Allergens can also be airborne, such as dust, animal dander, smoke, or plant pollen. When your eyes are repeatedly exposed to allergens, the body reacts and produces antibodies. When allergens in the air contact antibodies in the eye, an allergic reaction begins. The eye releases chemicals including histamine. These chemicals cause symptoms of allergic conjunctivitis. Itchy, watery, and red eyes may occur. Sometimes the eyes may be swollen. Some medications can cause allergies, so inflammation in one eye can affect both eyes.

Innovation Model

Anyone who wears a mask for long periods of time is at risk of developing this condition. It is more likely to occur especially among people who wear glasses and contact lenses. Besides, people who work on computer screen for long periods of time without breaks, people who spend time in air conditioner and people who live in hot environment are more likely to develop dry eye syndrome. Some common symptoms of dry eye syndrome include the followings are shown in fig 1:

- Itchy, irritated or scratchy sensation in the eyes
- Eyes being 'light sensitive'
- Eye redness
- Sensation of something in the eyes
- Continuous tears coming from the eyes
- Blurred vision or eye strain
- Eyelid swelling



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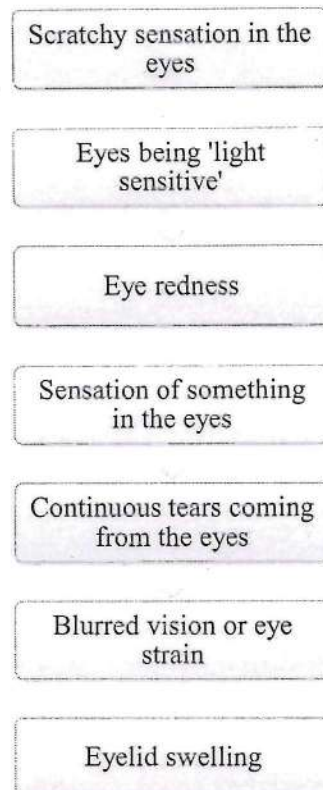


Fig 1: Innovation model

Summary of the Innovation

If left untreated, dry eye syndrome can become a serious problem and can seriously damage the eyes. However, if you experience the above symptoms, don't panic too much. Here are some things you can do to avoid or get relief from dry eye syndrome:

- Avoid smoke, direct ventilation and wind
- Drink enough water daily
- Humidifier can be used.
- Apply warm compresses on the eyes
- Take occasional breaks from screens
- Keep your laptop below eye level
- Always use artificial tears

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The first choice of treatment is to identify the cause of the allergy and avoid it. Some may be advised to take antihistamine tablets. Doctors may only prescribe eye drops for eye allergies, especially if you have other allergy symptoms. These eye drops have anti-inflammatory, decongestant and antihistamine properties. This eye drop has anti-inflammatory, decongestant and antihistamine properties. However, in case of severe eye allergy, steroid medication may be recommended for a short period of time under medical supervision. Sodium cromoglycate eye drops are great for preventing eye allergies. Glaucoma is a disease of the optic nerve, the nerve that connects your eye to the brain. This nerve sends visual information from the eye to the brain, allowing you to see. As optic nerve damage progresses your vision may weaken and you begin to lose side vision. In most cases, glaucoma progresses very slowly over many years. However, sometimes this damage can progress rapidly. Due to damage to the nerve, a person begins to lose vision. This vision loss begins with side, or peripheral, vision. You may be less aware of this part of your vision. Peripheral vision is critical in everyday activities such as walking and driving, preventing you from running into objects around you. Peripheral vision loss will progress unless the disease is treated. If left untreated, vision loss may progress to include central or reading vision. At this stage, a glaucoma sufferer may begin to notice impaired vision.

If left untreated, it can lead to loss of all vision in the eye. Vision loss caused by glaucoma is irreversible. Because vision lost to glaucoma can never be restored, it is critical to diagnose glaucoma before significant damage to the nerve occurs. Glaucoma can be properly treated to prevent further vision loss.

Claims,

1. **Automatic recognition of eye's state using deep learning approach in claims,** Avoid squeezing and rubbing the eyes. That will only make the problem worse. In case of allergy, take proper medical treatment.
2. **Automatic recognition of eye's state using deep learning approach in claims,** If you are an eye makeup artist, use quality makeup products. Remove makeup before sleeping.
3. **Automatic recognition of eye's state using deep learning approach in claims,** Your eyes may be exposed to allergens indoors or outdoors. Pollen from plants, vines, grass,



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dust from shrubs etc. Indoors, invisible insects, mold and pet dander can cause allergies and cause itchy and watery eyes. Apart from these, some types of perfumes, chemicals, cigarette smoke can also cause it.

4. **Automatic recognition of eye's state using deep learning approach in claims,** Itchy and watery eyes are also common in people with conjunctivitis or madras eye known as pink eye.
5. **Automatic recognition of eye's state using deep learning approach in claims,** Blepharitis is an inflammation of the eyelids. The fine oil glands under the eyelids become clogged, causing the eyes to become red and itchy. This requires proper eye examination and treatment.
6. **Automatic recognition of eye's state using deep learning approach in claims,** If the oil, water, and mucous film needed to secrete tears in the eyes are not properly secreted, the eyes become dry. Due to which the itching will increase. Exercises to prevent dry eyes are important.
7. **Automatic recognition of eye's state using deep learning approach in claims,** Contact lens wearers should clean them properly and wear them only for a limited period of time. If not, it may cause allergic reactions, itching and watery eyes
8. **Automatic recognition of eye's state using deep learning approach in claims,** If you are an eye makeup artist, use quality makeup products. Remove eye makeup before going to sleep. Do not share your eye liner, mascara etc with anyone.



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