

Harnessing deep learning to prevent blindness



EyeArt



Accurately Identify Referable DR Patients in Minutes

With No Human Grading Needed



"I believe that an automated, reliable DR screening tool such as EyeArt™ would empower primary care providers to better manage their patients with diabetes."

- **Srinivas Sadda, MD**, President and CSO, Doheny Eye Institute

Diabetic Retinopathy

Currently diabetic retinopathy (DR) causes 12,000 to 24,000 new cases of blindness each year in the U.S. and is the leading cause of blindness among adults aged 20–74 years. By 2030, an estimated 550 million people across the globe will have diabetes, with half expected to develop some level of retinopathy. In most cases visual loss is preventable through annual screening and early diagnosis. However, due to factors such as lack of awareness, lack of insurance coverage, and lack of access to expert clinicians almost 50% of the people with diabetes in the US do not undergo any form of dilated eye exam. Even if the number of people getting screened increased, there are currently not enough qualified eye-care givers to view and diagnose the images from these screenings. In some regions of the United States there is a backlog of several thousand patients waiting to see an ophthalmologist, causing very long appointment wait times (often over six months).

What is EyeArt™?

EyeArt™ combines automated image analysis tools with a user-friendly telemedicine/cloud-based interface to address the need for faster screening of more diabetic patients, and at the same time provide eye care professionals with greater confidence in finding the right patients. With evidence on tens of thousands of patients, it has been shown to have higher sensitivity at identifying referable DR patients than typically found with human grading, with grading in accordance with internationally recognized standards, such as International Clinical Diabetic Retinopathy (ICDR) severity scale which is endorsed by the American Academy of Ophthalmology (AAO). The technology allows all DR screening to be performed in the office, in a single visit, without the inconvenience of sending images for outside grading.

Images from diabetic patients are notoriously inconsistent in quality, and automated screening systems often exclude many of these images from analysis. EyeArt™ has been studied in large-scale, demanding, real world settings using images captured in everyday practice, demonstrating the ability to work effectively with images of



varying quality. EyeArt's flexibility also allows for its use with standard imaging protocols used in eye-care practices.

**Clinically validated with 78,685 patient cases*
using 627,490 real world, color retinal fundus images demonstrating:**

- **98.5% sensitivity** in identifying treatable DR patients
- **Instant Refer/No-refer** recommendations based on internationally recognized standards
- **91.7% sensitivity** in identifying referable DR patients
- **91.5% specificity** in identifying referable DR patients

* Study presented at EASD 2016 on a consecutive patient cases obtained during 2014-2015 in the EyePACS telemedicine DR screening platform. Conclusions found while screening for referable DR (moderate NPDR or worse) and surrogate markers for CSME.

EyeArt™ Product Highlights

• Completely Automated

Fully automated DR screening, including imaging, grading for DR in accordance with internationally recognized standards and reporting, in a single office visit.

• Extensive Clinical Validation

Tested in clinical validation studies on one of the largest data sets of patients of any available DR screening technology, in demanding, real world settings using images captured in everyday practice.

• Flexible Design

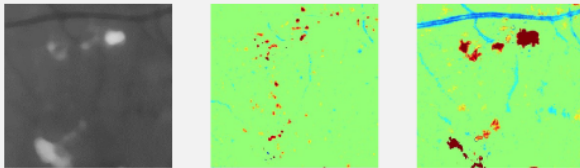
The technology is designed to work effectively with image quality commonly found in diabetes patients and with imaging protocols/cameras typically used in screening setups.

• High sensitivity and specificity

Demonstrates over 91% screening sensitivity and specificity in a retrospective study of 78,685 consecutive patient visits, with over 98.5% sensitivity in identifying patients with potentially treatable DR.

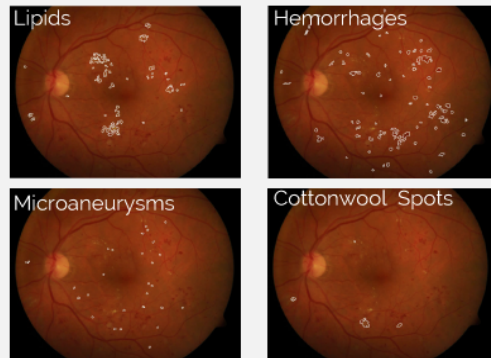
Technology behind EyeArt™

Our image analysis algorithms represent cutting-edge of research in image processing, computer vision, and machine learning. Technological innovations like morphology-inspired filter bank descriptors can automatically analyze fundus images to detect and localize lesions resulting from diabetic retinopathy. Combined with deep learning techniques, they can help accurately triage patients at risk of vision loss due to diabetic retinopathy. With web-based RESTful API design, EyeArt can be tightly integrated into existing electronic health record (EHR) systems and picture archival and communication systems (PACS).



Morphology-inspired filter bank descriptors

Automated Lesion Detection and Localization



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** This device is covered by one or more of the following US patents and their foreign counterparts: 8,978,028; 8,988,000; 8,988,001; and

This device is covered by one or more of the following US patents and their foreign counterparts: 0079013, 0005901, 9002005, and 9008391. Additional patents are pending.

EyeArt™ has been cleared for sales as a Class IIa medical device by EU

In the United States, EyeArt™ is limited by federal law to investigational use only and is not available for sale.

Company

Eyenuk Inc., headquartered in Los Angeles, California, is focused on quickly and accurately identifying patients suffering from potentially blinding eye diseases and preserving their vision. Using computer vision and image analysis expertise, the company is developing a portfolio of products based on its proprietary retinal image analysis technology combined with deep learning to identify and track the progression of eye diseases.




Video





EyeArt in 60 Seconds


We took the challenge: EyeArt explained in under a minute's time.

Get in touch

 Eyenuk Inc.
21860 Burbank Blvd, Suite 160
Woodland Hills, CA 91367

 +1 818 835 3585

 info@eyenuk.com

 [eyenuk](#)