Overview

Diabetic retinopathy is a complication of **diabetes**, caused by high blood sugar levels damaging the back of the eye (retina). It can cause **blindness** if left undiagnosed and untreated.

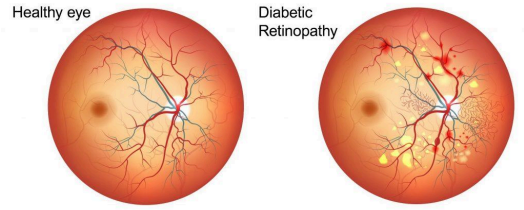
However, it usually takes several years for diabetic retinopathy to reach a stage where it could threaten your sight.

It is a leading cause of **blindness** in developed countries and one of the lead causes of sight loss in the world, even though there are many new therapies and improved treatments for helping people live with diabetes.

Early detection of diabetic retinopathy is vital for successful treatment and improved patient outcomes. Not only does it reduce the need for frequent checkups, but it also aids in lowering healthcare costs. Early detection can also reduce the risk of vision loss for diabetics by 95%

Signs & Symptoms

Over time, progressive retinal damage may appear on a retinal exam, first with small bulges in retinal blood vessels called **microaneurysms**. Then larger abnormalities in retinal vessels: **cotton wool spots, hemorrhages**, lipid deposits called "hard exudates", **intraretinal microvascular abnormalities**, and abnormal-looking retinal veins.



Eventually, many progress to a stage where new blood vessels grow throughout the retina. These new blood vessels often break and bleed. Minor bleeding can cause dark **floating spots** obstructing vision; major bleeding can completely block vision

Data

A clinician has rated the presence of diabetic retinopathy in each image on a scale of 0 to 4, according to the following scale:

0 - No DR
1 - Mild
2 - Moderate
3 - Severe
4 - Proliferative DR

********Your task is to create an automated analysis system capable of assigning a score based on this scale.*

The images in the dataset come from different models and types of cameras, which can affect the visual appearance of left vs. right. Some images are shown as one would see the retina anatomically (macula on the left, optic nerve on the right for the right eye). Others are shown as one would see through a microscope condensing lens (i.e. inverted, as one sees in a typical live eye exam). There are generally two ways to tell if an image is inverted:

- It is inverted if the macula (the small dark central area) is slightly higher than the midline through the optic nerve. If the macula is lower than the midline of the optic nerve, it's not inverted.
- If there is a notch on the side of the image (square, triangle, or circle) then it's not inverted. If there is no notch, it's inverted.

Like any real-world data set, you will encounter noise in both the images and labels. Images may contain artifacts, be out of focus, underexposed, or overexposed. A major aim of this competition is to develop robust algorithms that can function in the presence of noise and variation.

File descriptions

Due to the extremely large size of this dataset, we have separated the files into multi-part archives.

****We recommend using 7zip or keka to extract.*

- train.zip.* - the training set (5 files total)
- test.zip.* - the test set (7 files total) sample.zip - a small set of images to preview the full dataset
- sampleSubmission.csv - a sample submission file in the correct format trainLabels.csv - contains the scores for the training set