

# Diabetic Retinopathy Detection

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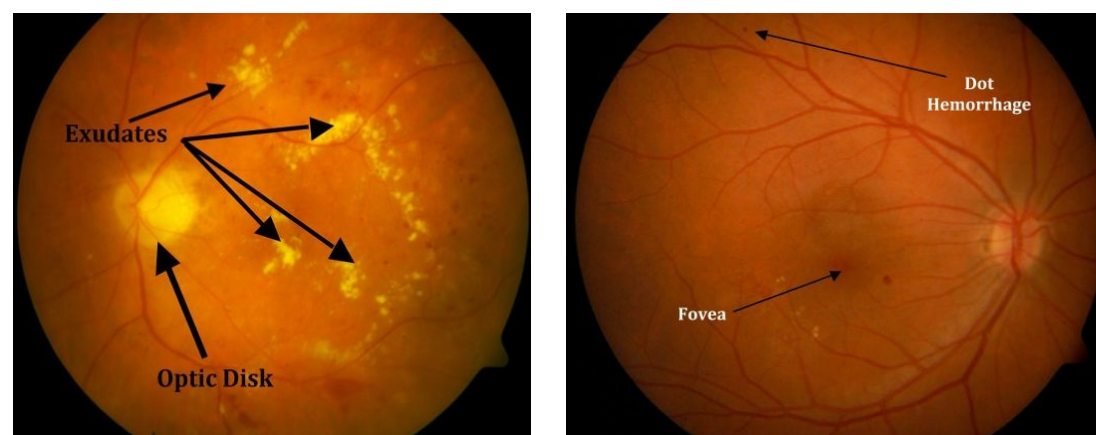
## Summary

Diabetic Retinopathy is the world's leading cause of blindness. On an average, it affects 93 million people. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy. Right now, detection of DR is a time consuming and a manual process which requires a trained Ophthalmologist to examine and evaluate digital fundus photos of the retina. But by the time they submit their reviews, ie. A day or two later, these delayed results lead to lost follow ups, miscommunication and hence delayed treatment. So, there is a need for a screening using computer vision including image classification, pattern recognition and machine learning.

## Background

- The first stage is called *non-proliferative diabetic retinopathy* or NPDR, in which there are no symptoms. The signs are not visible in the eye of the patients and they will have a 20/20 vision.
- The region Macular, in which blood vessels leak their contents, can happen in any stage of NPDR. This causes Macular edema. Its symptoms consists of blurred vision and darkened or distorted images of objects. About 10% of the diabetic patients can have their vision loss due to this macular edema.

- In the second stage, eye repairs itself to form abnormal new blood vessels at the back of the eye, which are very thin and fragile. So, these can burst and bleed (called vitreous hemorrhage) and blurs the vision even more. This forms a part of diabetic retinopathy.



## Results/Outcome

This project will help the Ophthalmologist to detect DR at early stage of a diabetic person and suggest medication early to prevent it from expanding. This will also help in detecting DR in bulk and getting the output in short period of time, thus saving the specialist from the pain of going through each and every image by himself and wasting time, which could have been devoted to the patients.

## References

- [1] Ashish Issac, Rishabh Madan, Malay Kishore Dutta- Automated detection of bright lesions from contrast normalized fundus images, August 11 - 13, 2016, (IC3)
- [2] Anupriyaa Mukherjee- Diagnosis of Diabetic Retinopathy, February 2015, Int. Journal of Engineering Research and Applications
- [3] Dataset: [www.it.lut.fi/project/imageret/diaretdb1](http://www.it.lut.fi/project/imageret/diaretdb1)

## Implementation

