



Source : Kaggle

# DIABETIC RETINOPATHY DETECTION USING EYE IMAGES

Mohit Singh Solanki  
Group-14

# THE DISEASE

- DR is ocular manifestation of diabetes
- Growth of blood vessels
- Retina lacks oxygen
- Blood vessels may bleed, cloud vision, may cause blindness



Source : National Eye  
Institute, National Institutes  
of Health

# SOME STATS

- 29.1 million in US and 347 in world have diabetes
- 40-45% of patient have some level of DR
- Affects to 80% who has 10 or more year diabetes
- So around 150 million have DR
- Accounts for 12% of all new cases of blindness

But things are still done manually

# THE TASK AND CHALLENGES

- To classify a given image set as 0-4
- Large Datasets, high resource requirement
- Different kind of images



# DATASET

Dataset is generated by Eyepacs and Available at Kaggle.

<http://www.kaggle.com/c/diabetic-retinopathy-detection/data>

Dataset consists of-

- ~35,000 Images with different shades different camera
- score by trained professional.

# PREVIOUS WORK

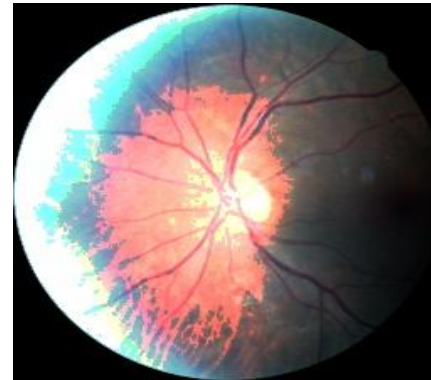
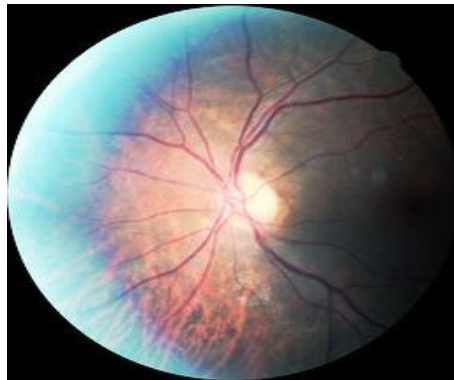
- Some work has been done on fundus images which varied accuracy (60-90%)
- No work has been done with random photographs.

# METHODOLOGY

- Image processing and texture analysis
- Training with neural networks

# IMAGE PROCESSING AND TEXTURE ANALYSIS

- Removed blanc space and reduced
- Created different classes of various versions highlighting features.





# TRAINING WITH NEURAL NETWORKS

- Implemented using Dato's GRAPHLAB
- Used different feature highlighting images from previous part
- To speed up deep learning is used

# INITIAL RESULTS

	Dataset used for training	Dataset used for testing	classification	Correct classification
0 (No DR)	32	36	39	28
1 (Mild)	23	23	27	17
2 (Moderate)	21	25	23	18
3 (Severe)	12	6	3	3
4 (Proliferative DR)	2	4	2	2

# FUTURE WORK

- Cuda can be used with NVIDIA GPU
- Will run for larger iterations
- Will try to apply better feature extraction techniques

# REFERENCES

- M. Usman Akram , Shehzad Khalid , Shoab A. Khan ,” Identification and classification of microaneurysms for early detection of diabetic retinopathy”
- Wong Li Yun, U. Rajendra Acharya, Y.V. Venkatesh , Caroline Chee , Lim Choo Min, E.Y.K. Ng “Identification of different stages of diabetic retinopathy using retinal optical images”
- G G Gardner, D Keating, T H Williamson, A T Elliott “Automatic detection of diabetic retinopathy using an artificial neural network: a screening tool”

# TOOLS USED

- GNU parallel
- Dato's Graphlab
- Numpy

# QUESTIONS AND SUGGESTIONS

