

Assignment 1

Your assignment is to create an ANN to predict if a person in test is subject to diabetic retinopathy or not. You need to use 75% of the examples as the training set, 10% as the validation set and the rest (15%) as the test set.

The data set can be found in the file 'Diabetic.txt'. This data set consists of 1150 examples (one per row inside the document). Each of these rows has 19 input features depicted by numbers and one target feature representing one of the two classes.

Information about the input features (No. 0-18) and the target feature are as follows:

- 0) The binary result of quality assessment. 0 = bad quality, 1 = sufficient quality.
 - 1) The binary result of pre-screening, where 1 indicates severe retinal abnormality and 0 its lack.
 - 2-7) The results of MA detection. Each feature value stands for the number of MAs found at the confidence levels $\alpha = 0.5, \dots, 1$, respectively.
 - 8-15) contain the same information as 2-7) for exudates. However, as exudates are represented by a set of points rather than the number of pixels constructing the lesions, these features are normalized by dividing the number of lesions with the diameter of the ROI to compensate different image sizes.
 - 16) The Euclidean distance between the center of the macula and the center of the optic disc, which provides important information regarding the patient condition. This feature is also normalized with the diameter of the ROI.
 - 17) The diameter of the optic disc.
 - 18) The binary result of the AM/FM-based classification.
- Target feature: {0,1}, diabetic retinopathy or not.

Requirement: The neural network you build has to get the classification accuracy not lower than 70% on the test data

Your report has to cover the key parts as follows:

1. Give the structure of your ANN.
2. Explain the learning method that you used to update the weights of the network
3. Give a figure showing how the validation accuracy was changing during the learning process.
4. Give the classification accuracy of your ANN on the test data set.

Before submitting the report, you should present this assignment first to Ning Xiong. After that, and only if your work is approved, you can submit the report in CANVAS.