

Pattern Recognition Assignment 2: Neural Network

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1 Introduction

In this assignment, I will develop a classifier by implementing multilayer neural network including one input layer, several hidden layers (can be self-defined) and one output layer. Fundamentals and ideas are basically followed by course content. To obtain better classifying result, I did some feature engineering, which includes outlier filtering and data normalization. For instance, data normalization is very important since neurons activations are calculated applying some activation function on a weighted sum (linear combination) of it's inputs. A value of 0.01 and a value of 10000000 in a weighted sum will always have a large value if the weights are at the same scale. Theoretically neural network could learn how to deal with such discrepancies on the input values but in a practical sense normalization can make learning faster.

The contents of this report will be organized as parts: neural network implementation, Dataset and feature engineering, choice of the number of nodes and layers, simulation, visualization, conclusion and discussion.

2 Neural Network Implementation

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