Assignment Report of Machine Vision

Evaluation of RVFL Networks

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1 Introduction

Following the requirements of the assignment, the influences of the following various issues on the performance of RVFL Networks are evaluated:

1. With and without direct links from the input layer to the output layer.
2. With and without the bias in the output neuron.
3. Effect of scaling the random features before feeding them into the activation function.
4. Performances of radbas and hardlim activation functions.
5. Performance of Moore-Penrose pseudoinverse and ridge regression for the computation of the output weights.

2 Datasets

11 datasets are used in the evaluation, showed in Table 1.

3 Evaluation Results

3.1 Evaluation Ranks

3.2 Direct Links

The evaluation rank values considering (i) with or without direct links, (ii) with or without bias, (iii) using radbas or hardlim activation function, is showed in Table 2.

Table 1: Datasets used

Dataset_id	Dataset_name	Patterns	Features	Classes
1	Abalone	4177	8	3
2	Car	1728	6	4
3	Chess_krvkp	3196	36	2
4	Contrac	1473	9	3
5	Magic	19020	10	2
6	Molec_biol_splice	3190	60	3
7	Monks_3	3190	6	2
8	Mushroom	8124	21	2
9	Musk_2	6598	166	2
10	Nursery	12960	8	5
11	Optical	3823	62	10

Table 2: Average Rank Values

Computation Method	Act Func	-bias,-link	+bias,-link	-bias,+link	+bias,+link
Ridge Regression	Radbas	4177	8	3	
	Hardlim	6	4		
Moore-Penrose Pseudoinverse	Radbas	36	2		
	Hardlim	1473	9	3	

3.3 Bias

3.4 Radbas and Hardlim Activation Functions

3.5 Moore-Penrose Pseudoinverse and Ridge Regression

3.6 Scaling of Random Features