Experiment 05: Implement Neural Networks algorithms for Cognitive Computing.

Learning Objective: Students should be able to apply Neural Network Algorithms for Cognitive Computing and solve problems.

Tools: IBM Watson,Python

Theory:

Neural networks are a type of machine learning algorithm inspired by the structure and function of the human brain. They are used in cognitive computing to enable systems to learn from data and improve their performance over time. Here are the steps for implementing neural networks algorithms for cognitive computing:

- Define the problem
- Gather data
- Preprocess the data
- Define the neural network architecture
- Train the neural network
- Evaluate the neural network
- Test the neural network
- Deploy the neural network
- Monitor and improve

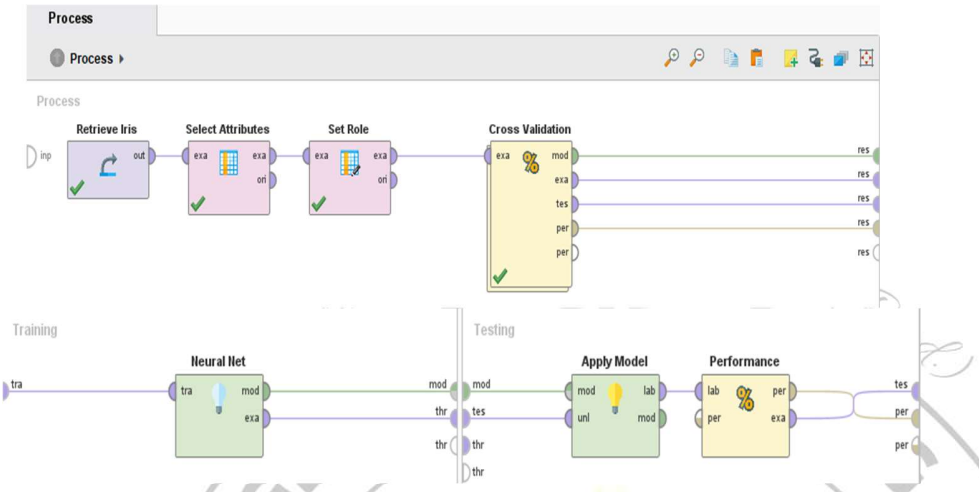
Implementing neural networks algorithms for cognitive computing requires a combination of machine learning expertise, programming skills, and domain knowledge. It can be a challenging but rewarding process that enables intelligent systems to learn and improve from experience.

Analysis and Design

(1) Data Analysis:

Row No.	id	label	a1	a2	a3	a4
1	id_1	Iris-setosa	5.100	3.500	1.400	0.200
2	id_2	Iris-setosa	4.900	3	1.400	0.200
3	id_3	Iris-setosa	4.700	3.200	1.300	0.200
4	id_4	Iris-setosa	4.600	3.100	1.500	0.200
5	id_5	Iris-setosa	5	3.600	1.400	0.200
6	id_6	Iris-setosa	5.400	3.900	1.700	0.400
7	id_7	Iris-setosa	4.600	3.400	1.400	0.300
8	id_8	Iris-setosa	5	3.400	1.500	0.200
9	id_9	Iris-setosa	4.400	2.900	1.400	0.200
10	id_10	Iris-setosa	4.900	3.100	1.500	0.100
11	id_11	Iris-setosa	5.400	3.700	1.500	0.200
12	id_12	Iris-setosa	4.800	3.400	1.600	0.200
13	id_13	Iris-setosa	4.800	3	1.400	0.100
14	id_14	Iris-setosa	4.300	3	1.100	0.100
15	id_15	Iris-setosa	5.800	4	1.200	0.200
16	id_16	Iris-setosa	5.700	4.400	1.500	0.400
17	id_17	Iris-setosa	5.400	3.900	1.300	0.400
18	id_18	Iris-setosa	5.100	3.500	1.400	0.300
19	id_19	Iris-setosa	5.700	3.800	1.700	0.300

(2) Data Modelling:

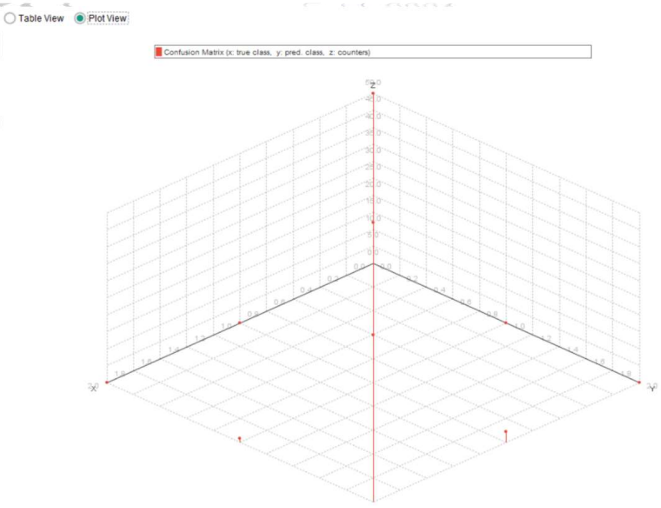


(3) Optimization:

Table View Plot View

accuracy: 97.33% +/- 3.44% (micro average: 97.33%)

	true Iris-setosa	true Iris-versicolor	true Iris-virginica	class precision
pred. Iris-setosa	50	0	0	100.00%
pred. Iris-versicolor	0	47	1	97.92%
pred. Iris-virginica	0	3	49	94.23%
class recall	100.00%	94.00%	98.00%	



Result and discussion: The confusion matrix came out to be

PerformanceVector

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PerformanceVector:
accuracy: 97.33% +/- 3.44% (micro average: 97.33%)
ConfusionMatrix:
True:   Iris-setosa     Iris-versicolor Iris-virginica
Iris-setosa:    50      0       0
Iris-versicolor:        0       47      1
Iris-virginica: 0       3       49
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Learning Outcomes: Students should have the ability to
LO1: Formulate the problem using AI and CC Approach.
LO2: Solve the problem using Neural Network Algorithm

Course Outcomes: Students will able to

CO2: Understand Natural language processor role in Cognitive computing.

Conclusion: Implemented a neural network on the Iris dataset in Rapid Miner, achieving satisfactory results. The model demonstrated effective classification, showcasing the power of neural networks in handling diverse datasets like Iris.

Viva Questions:

Q. 1 How do you deploy a trained neural network in a cognitive computing system, and what factors do you need to consider?
Q.2 How do you preprocess unstructured data such as text or images before training a neural network in cognitive computing?
Q.3 How do you choose the number of layers and nodes in a neural network for a given problem in cognitive computing?

For Faculty Use

Correction Parameters	Formative Assessment [40%]	Timely completion of Practical [40%]	Attendance / Learning Attitude [20%]	
Marks Obtained				