EX NO 8. XOR GATE IMPLEMENTATION

Aim:

To implement XOR logic gate using ANN

Equipments Required:

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Moodle-Code Runner /Google Colab

Related Theory Concept:

Logic gates are neural networks help to understand the mathematical computation by which a neural network processes its input s to achieve at a certain output. This neural network will deal with the XOR logic problem. An XOR (exclusive OR gate) is a digital logic gate that gives a true output only when both its inputs differ from each other.

The information of a neural network is stored in the interconnections between the neurons i.e. the weights. A neural network learns by updating its weights according to a learning algorithm that helps it converge to the expected output .The learning algorithm is a principled way of changing the weights and biases based on the loss function.

Algorithm:

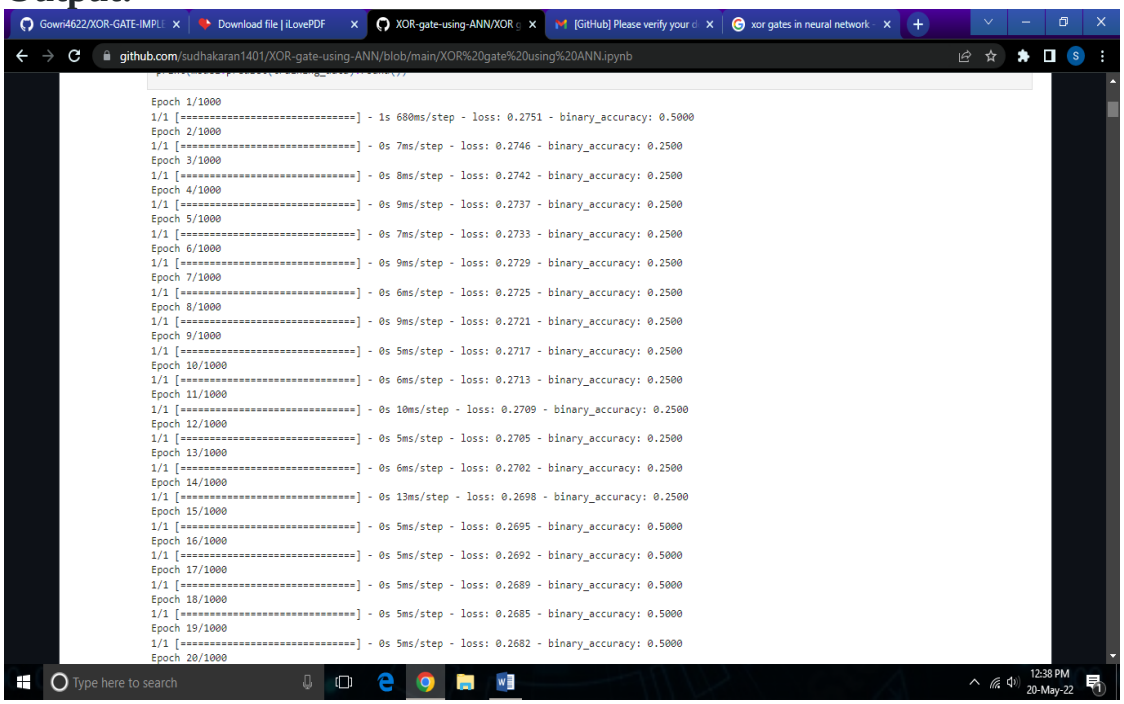
1. Import necessary Packages.
2. Set the four different states of the XOR gates.
3. Set the four expected results in the same order.
4. Get the accuracy.
5. Train the model with training data.
6. Test the model with testing data.

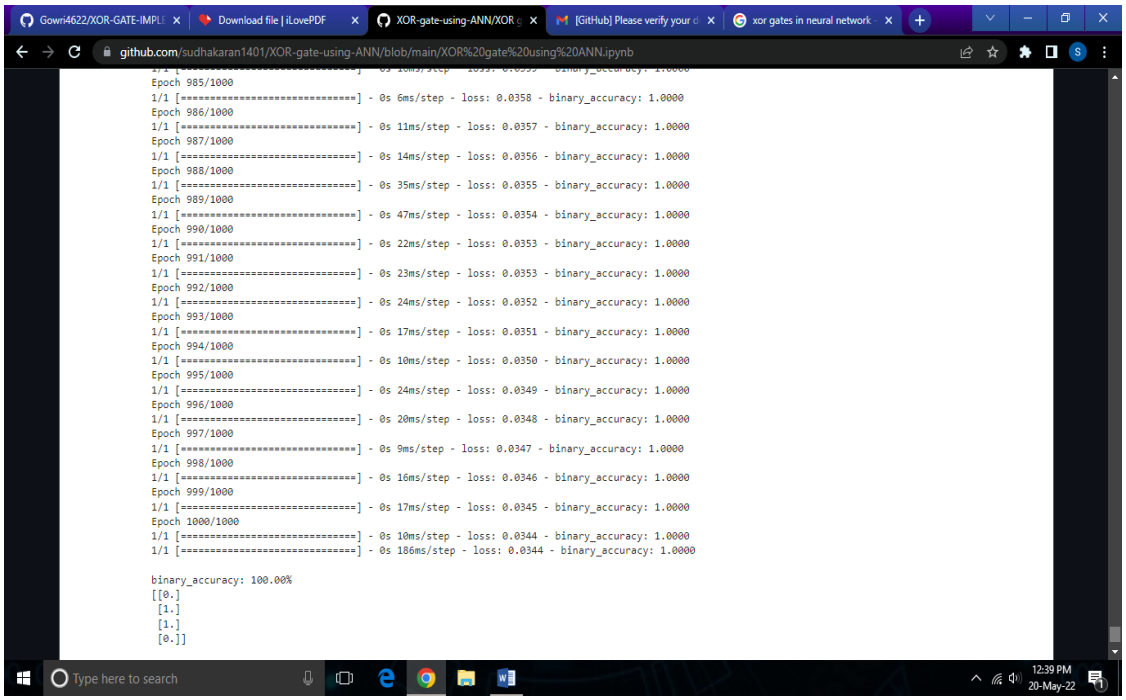
Program:

```
/*
Program to implement ANN by back propagation algorithm.
Developed by : S.SUDHAKARAN
RegisterNumber : 212219040155
*/
# XOR Logic Gate Implementation using ANN
import numpy as np
from keras.models import Sequential
from keras.layers.core import Dense
training_data = np.array([[0,0],[0,1],[1,0],[1,1]], "float32")
target_data = np.array([[0],[1],[1],[0]], "float32")
model = Sequential()
model.add(Dense(16,input_dim=2, activation='relu'))
```

```
model.add(Dense(1, activation='sigmoid'))
model.compile(loss='mean_squared_error',optimizer='adam',metrics=['binary_accuracy
])
model.fit(training_data, target_data, epochs=1000)
scores = model.evaluate(training_data, target_data)
print("\n%s: %.2f%%" % (model.metrics_names[1], scores[1]*100))
print(model.predict(training_data).round())
```

Output:





Result:

Thus the python program successfully implemented XOR logic gate.