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Roll No :- 19

Subject: Artificial Neural Network

Class : TE

Branch: AI & DS

Practical – 3

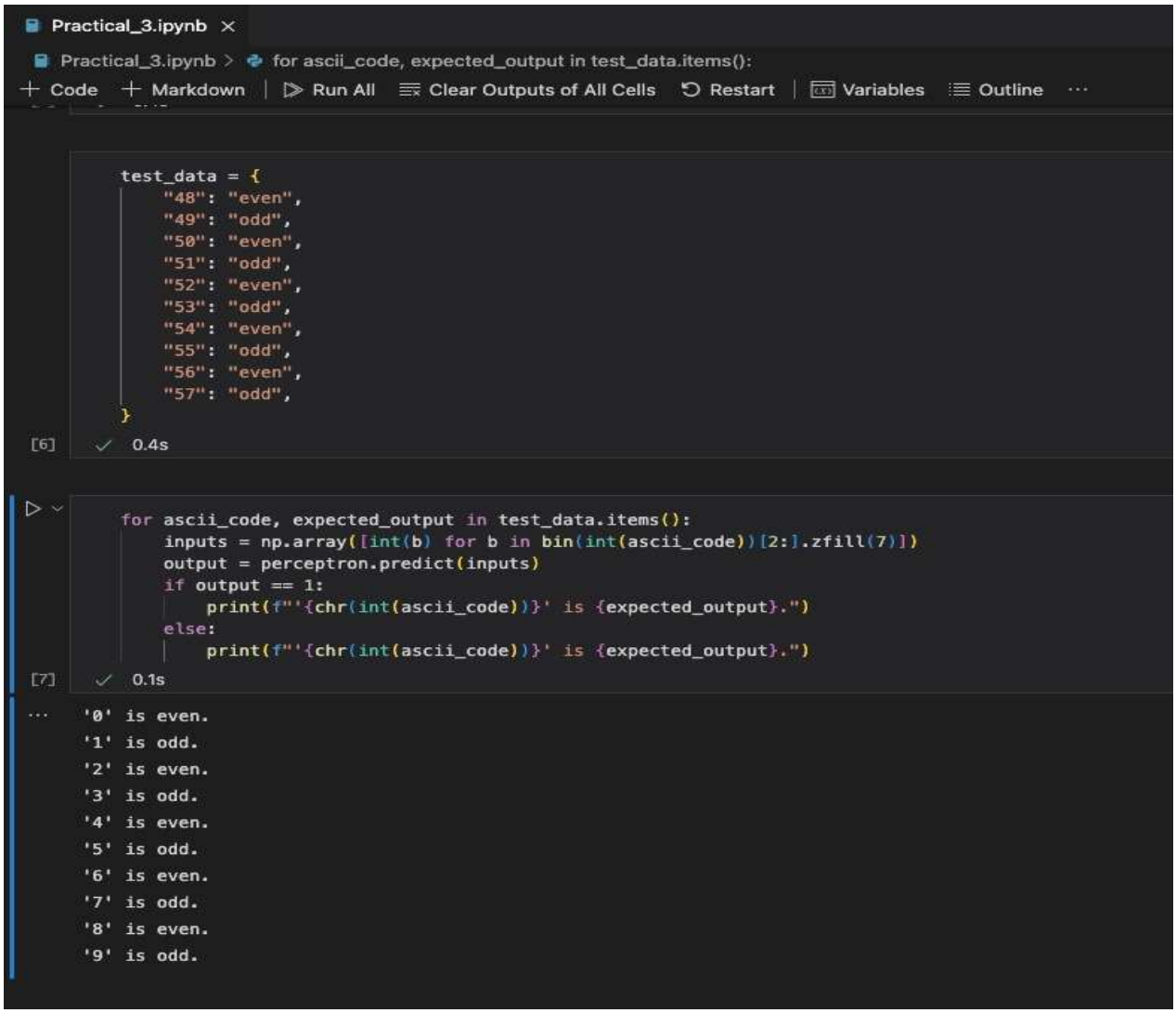
Problem statement : Write a Python Program using Perceptron Neural Network to recognise even and odd numbers. Given numbers are in ASCII form 0 to 9

Code :

```
import numpy as np


class Perceptron:
    def __init__(self, input_size, learning_rate=0.1):
        self.weights = np.zeros(input_size)
        self.bias = 0
        self.learning_rate = learning_rate

    def predict(self, inputs):
        weighted_sum = np.dot(self.weights, inputs) + self.bias
        if weighted_sum >= 0:
            return 1
        else:
            return 0

    def train(self, inputs, label):
        prediction = self.predict(inputs)
        error = label - prediction
        self.weights += self.learning_rate * error * inputs
        self.bias += self.learning_rate * error


training_data = {
    "48": 1,
    "49": 0,
    "50": 1,
    "51": 0,
    "52": 1,
    "53": 0,
    "54": 1,
```

```
    "55": 0,
    "56": 1,
    "57": 0,
}


perceptron = Perceptron(input_size=7)

for ascii_code, label in training_data.items():
    inputs = np.array([int(b) for b in bin(int(ascii_code))[2:].zfill(7)])
    perceptron.train(inputs, label)

test_data = {
    "48": "even",
    "49": "odd",
    "50": "even",
    "51": "odd",
    "52": "even",
    "53": "odd",
    "54": "even",
    "55": "odd",
    "56": "even",
    "57": "odd",
}


for ascii_code, expected_output in test_data.items():
    inputs = np.array([int(b) for b in bin(int(ascii_code))[2:].zfill(7)])
    output = perceptron.predict(inputs)
    if output == 1:
        print(f"'{chr(int(ascii_code))}' is {expected_output}.")
    else:
        print(f"'{chr(int(ascii_code))}' is {expected_output}.")
```

Output :


Practical_3.ipynb
Practical_3.ipynb > for ascii_code, expected_output in test_data.items():
Code
Markdown
Run All
Clear Outputs of All Cells
Restart
Variables
Outline
test_data = {
"48": "even",
"49": "odd",
"50": "even",
"51": "odd",
"52": "even",
"53": "odd",
"54": "even",
"55": "odd",
"56": "even",
"57": "odd",
}
[6] 0.4s
for ascii_code, expected_output in test_data.items():
inputs = np.array([int(b) for b in bin(int(ascii_code))[2:].zfill(7)])
output = perceptron.predict(inputs)
if output == 1:
print(f"'{chr(int(ascii_code))}' is {expected_output}.")
else:
print(f"'{chr(int(ascii_code))}' is {expected_output}.")
[7] 0.1s
'0' is even.
'1' is odd.
'2' is even.
'3' is odd.
'4' is even.
'5' is odd.
'6' is even.
'7' is odd.
'8' is even.
'9' is odd.