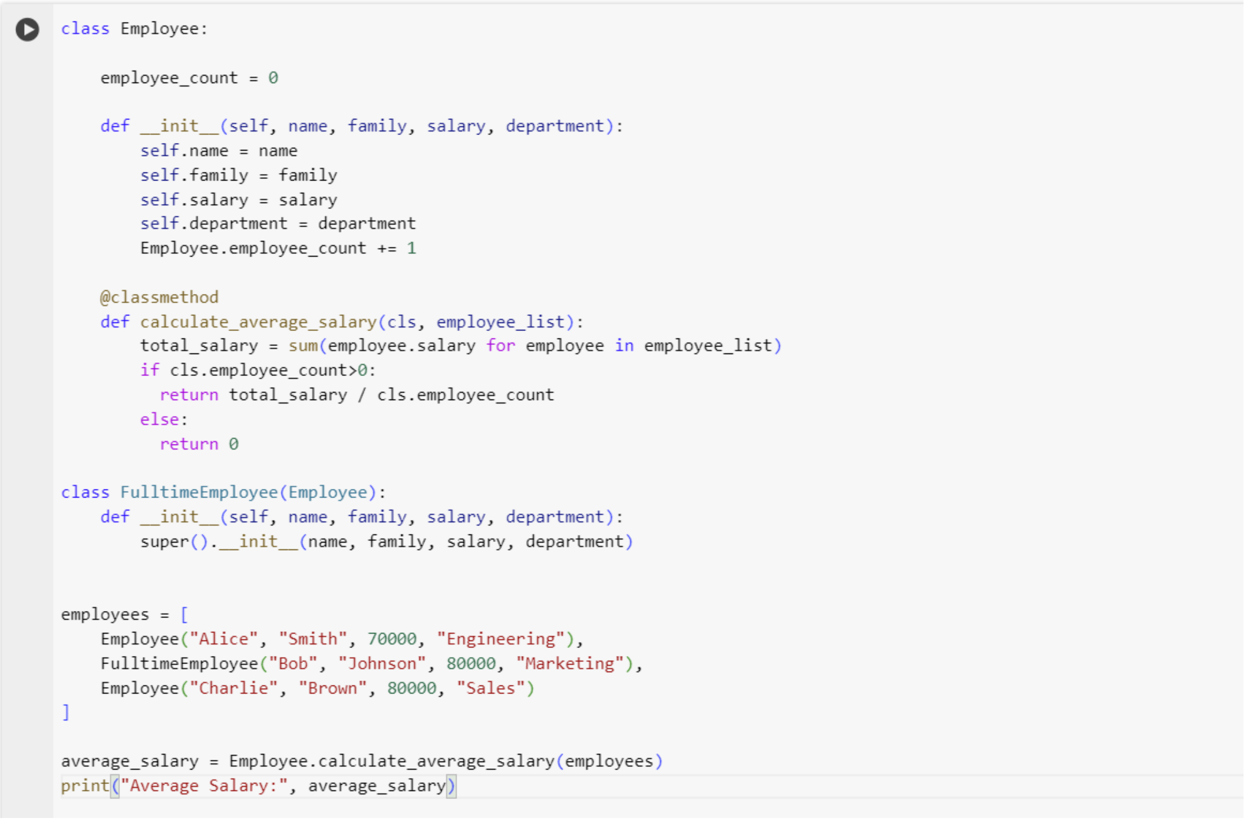
Neural Network Deep Learning (23442)

Assignment_2

https://github.com/niteesh0301/Assignment-_3.git

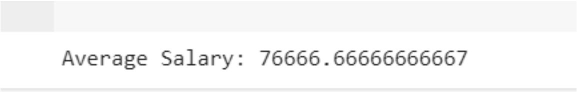
1(a) Solution:-

Code:-



```
class Employee:

    employee_count = 0

    def __init__(self, name, family, salary, department):
        self.name = name
        self.family = family
        self.salary = salary
        self.department = department
        Employee.employee_count += 1

    @classmethod
    def calculate_average_salary(cls, employee_list):
        total_salary = sum(employee.salary for employee in employee_list)
        if cls.employee_count>0:
          return total_salary / cls.employee_count
        else:
          return 0

class FulltimeEmployee(Employee):
    def __init__(self, name, family, salary, department):
        super().__init__(name, family, salary, department)


employees = [
    Employee("Alice", "Smith", 70000, "Engineering"),
    FulltimeEmployee("Bob", "Johnson", 80000, "Marketing"),
    Employee("Charlie", "Brown", 80000, "Sales")
]

average_salary = Employee.calculate_average_salary(employees)
print("Average Salary:", average_salary)
```

Output:-



```
Average Salary: 76666.66666666667
```

Explanation :- The code defines a class Employee with attributes such as name, family, salary, and department. It also has a class variable employee_count to keep track of the total number of employees.

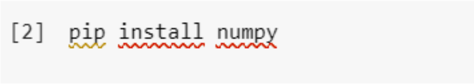
The __init__ method initializes instances of the Employee class with the provided attributes and increments the employee count.The class method calculate_average_salary takes a list of employees and calculates the average salary of all employees by summing up their salaries and dividing by the total number of employees.The code then defines a subclass FulltimeEmployee that inherits from the Employee class, and its constructor uses the super() function to initialize the inherited attributes. An array employees is created with instances of both the Employee and FulltimeEmployee classes.

The calculate_average_salary method is called on the Employee class with the employees array as an argument, and the result is stored in the variable average_salary.

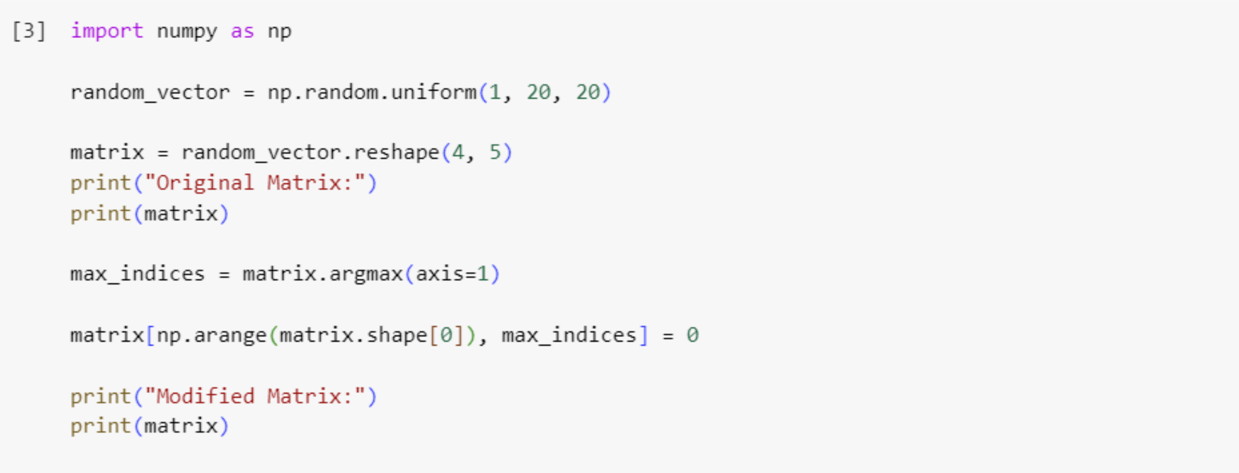
Finally, the average salary is printed to the console using the print statement. The code provides a basic structure for managing and calculating average salaries for different types of employees.

2(a) Solution:-

Code:-

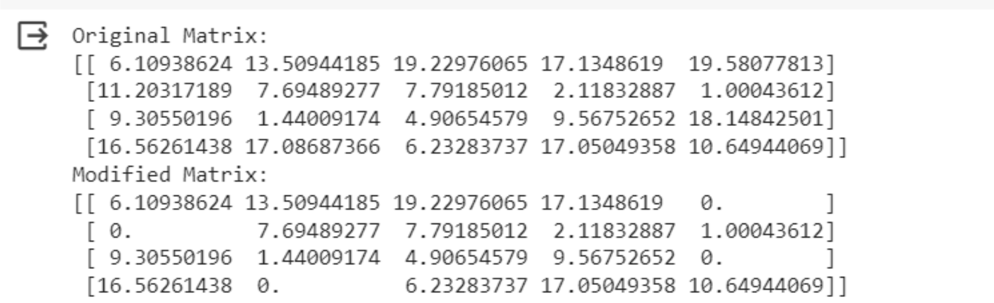


```
[2]  pip install numpy
```



```
[3] import numpy as np

    random_vector = np.random.uniform(1, 20, 20)

    matrix = random_vector.reshape(4, 5)
    print("Original Matrix:")
    print(matrix)

    max_indices = matrix.argmax(axis=1)

    matrix[np.arange(matrix.shape[0]), max_indices] = 0

    print("Modified Matrix:")
    print(matrix)
```

Output:-



```
Original Matrix:
[[ 6.10938624 13.50944185 19.22976065 17.1348619  19.58077813]
 [11.20317189  7.69489277  7.79185012  2.11832887  1.00043612]
 [ 9.30550196  1.44009174  4.90654579  9.56752652 18.14842501]
 [16.56261438 17.08687366  6.23283737 17.05049358 10.64944069]]
Modified Matrix:
[[ 6.10938624 13.50944185 19.22976065 17.1348619   0.        ]
 [ 0.          7.69489277  7.79185012  2.11832887  1.00043612]
 [ 9.30550196  1.44009174  4.90654579  9.56752652  0.        ]
 [16.56261438  0.          6.23283737 17.05049358 10.64944069]]
```

Explanation :- When you run pip install numpy, it downloads the latest version of the NumPy library from the Python Package Index (PyPI) and installs it on your Python environment, making NumPy available for use in your Python scripts and applications.

The code imports the NumPy library as np and generates a random 1-dimensional array named random_vector containing 20 elements uniformly distributed between 1 and 20.

It reshapes the random_vector into a 4x5 matrix using the reshape method.The original matrix is printed to the console.The code finds the indices of the maximum values along each row of the matrix using argmax(axis=1) and stores them in the max_indices array.

It then sets the values at these maximum indices to 0 in the original matrix, resulting in a modified matrix, which is printed to the console. This effectively replaces the maximum value in each row with 0.