IT314 Software Engineering
Lab 5

Name: Parva Dhami
ID: 202001117
Date: 16/03/2023

Static Analysis Using Static Analyzing tool

For the static analysis I chose the tool ‘mypy’ in order to analyze the python code. Many files have been analyzed in this tool.
Source of the Git repository from which the code is taken:
https://github.com/madhug-nadig/Machine-Learning-Algorithms-from-Scratch

1. Here, the snippet is missing the ‘:’ which is required for the function:

```
48      # choosing the best feature to split
49      def chooseBestFeatureToSplit(self, dataSet, labels)
50          numFeatures = len(dataSet[0]) - 1
51          baseEntropy = self.calcShannonEnt(dataSet)
52          bestInfoGain = -1
53          bestFeature = 0
54          for i in range(numFeatures):
55              featList = [example[i] for example in dataSet]
56              uniqueVals = set(featList)
57              newEntropy = 0.0
```

```
Failed (exit code: 2) (1049 ms)

main.py:49: error: expected ':'  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```

2. Here, right curly bracket is missing, hence the bracket remains unclosed

```
80          return self.majorityCnt(classList)
81      featureVectorList = [row[:len(row)-1] for row in dataSet]
82      bestFeat = self.chooseBestFeatureToSplit(featureVectorList, labels)
83      bestFeatLabel = labels[bestFeat]
84      myTree = {bestFeatLabel: {}
85      del(labels[bestFeat])
86      featValues = [example[bestFeat] for example in dataSet]
87      uniqueVals = set(featValues)
88      for value in uniqueVals:
89          subLabels = labels[:]
```

```
Failed (exit code: 2) (899 ms)

main.py:84: error: '{' was never closed  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```

3. The ‘:’ is missing for the function:

```
25      def __init__(self):
26          self.intercept = 0
27          self.slope = 0
28
29      #arithmetic mean
30      def am(self, arr)
31          tot = 0.0
32          for i in arr:
33              tot+= i
34          return tot/len(arr)
35
36      #finding the slope in best fit line
37      def best_fit(self, dimOne, dimTwo):
38          self.slope = ( (self.am(dimOne) * self.am(dimTw
39          return self.slope
```

Failed (exit code: 2) (924 ms)

```
main.py:30: error: expected ':'  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```

4. Indentation is not done for the function:

```
22  class CustomLogisticRegression:
23
24      def __init__(self, x, y, tolerence = 0.00001):
25      self.tolerence = tolerence
26          self.cost = []
27          self.alpha = 0.1
28          self.lambd = 0.25
29          self.iter = 2500
30          self.x = x
31          self.y = y
32
```

Failed (exit code: 2) (952 ms)

```
main.py:25: error: expected an indented block after function definition on line 24  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```

5. Required files are not available for import:

```
10  import math
11  import numpy as np
12  import matplotlib.pyplot as plt
13  from matplotlib import style
14  import pandas
15  import datetime
16
17  #Quandl for getting stock data
18  import quandl
19
20  #for plotting
21  plt.style.use('ggplot')
22
23  class CustomLinearRegression:
24
25      def __init__(self):
26          self.intercept = 0
27          self.slope = 0
28
29      #arithmetic mean
30      def am(self, arr):
31          tot = 0.0
32          for i in arr:
```

Failed (exit code: 1) (3244 ms)

```
main.py:11: error: Cannot find implementation or library stub for module named "numpy"  [import]
main.py:12: error: Cannot find implementation or library stub for module named "matplotlib.pyplot"  [import]
main.py:12: note: See https://mypy.readthedocs.io/en/stable/running_mypy.html#missing-imports
main.py:12: error: Cannot find implementation or library stub for module named "matplotlib"  [import]
main.py:14: error: Cannot find implementation or library stub for module named "pandas"  [import]
main.py:18: error: Cannot find implementation or library stub for module named "quandl"  [import]
Found 5 errors in 1 file (checked 1 source file)
```

6. Missing comma to separate parameters for the given function:

```
58              for value in uniqueVals:
59                  subDataSet = self.splitDataSet(dataSet i, value)
60                  prob = len(subDataSet)/float(len(dataSet))
61                  newEntropy += prob * self.calcShannonEnt(subDataSet)
62              infoGain = baseEntropy - newEntropy
63              print(infoGain, bestInfoGain)
64              if (infoGain > bestInfoGain):
65                  bestInfoGain = infoGain
66                  bestFeature = i
67
68      print("the best feature to split is" labels[bestFeature])
```

Failed (exit code: 2) (913 ms)

```
main.py:59: error: invalid syntax. Perhaps you forgot a comma?; you likely need to run mypy using Python 3.11 or newer  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```

7. Name of the function is used before it gets initialized:

```
30 ) as fp:
31     exec(fp.read(), version)
32 version = version["__version__"]
33
34 if version[0] == "0":
35     release_status = "Development Status :: 4 - Beta"
36 else:
37     release_status = "Development Status :: 5 - Production/Stable"
38
39 dependencies = [
40     "google-cloud-logging>=1.14.0, <4.0.0dev",
41     "google-api-core[grpc] >= 1.34.0, <3.0.0dev,!=2.0.,!=2.1.,!=2.2.,!=2.3.,!=2.4.
```

```
Failed (exit code: 1) (3123 ms)

main.py:31: error: Cannot resolve name "version" (possible cyclic definition)  [misc]
main.py:31: error: Name "version" is used before definition  [used-before-def]
main.py:32: error: Cannot resolve name "version" (possible cyclic definition)  [misc]
Found 3 errors in 1 file (checked 1 source file)
```

8. Syntax error, as only '=' is used instead of '==' for comparison:

```
113     print(custom_DTree.createTree(dataset, labels))
114
115
116 if __name__ = "__main__":
117     main()
```

```
Failed (exit code: 2) (1019 ms)

main.py:116: error: invalid syntax. Maybe you meant '==' or ':=' instead of '='?; you likely need to run mypy using Python 3.11 or newer  [syntax]
Found 1 error in 1 file (errors prevented further checking)
```