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1  # weka_implementation.py
2  from weka.classifiers import Classifier
3  from weka.core.converters import Loader
4  import weka.core.jvm as jvm
5  from weka.core.dataset import create_instances_from_lists
6  from weka.filters import Filter
7  from weka.core.classes import Random
8  from weka.classifiers import Classifier, Evaluation, PredictionOutput
9  import weka.plot.graph as graph
10 import graphviz
11 import time
12 import pandas as pd
13 import numpy as np
14 from graphviz import Digraph
15
16 # Aideen McLoughlin - 17346123
17 # Taking in the data file location, and the train/test split proportion
18 # Build a weka C4.5 implementation using the Python Weka Wrapper API
19 def build_weka_tree(split):
20     jvm.start()
21
22     accuracy, time_to_build = build_weka(split)
23
24     jvm.stop()
25     return accuracy, time_to_build
26
27 def build_weka(split):
28     # Load the data file
29     loader = Loader(classname="weka.core.converters.CSVLoader")
30     train = loader.load_file('train_data_generated.csv')
31     test = loader.load_file('test_data_generated.csv')
32
33     # Store the target values for the test data
34     # so that the accuracy of the formula can be checked
35     test_target = pd.read_csv('test_data_generated.csv')['style'].values
36     # Get the dataset used to train the model,
37     # so that we can identify what the key values for the class are.
38     # As data is split randomly, we cannot assume it is in [ale, lager, stout] order
39     train_classes = pd.read_csv('train_data_generated.csv')['style'].values
40
41     # Set the class to be column 3 - the style column
42     train.class_index = 3
43
44     # Set the class to be column 3 - the style column
45     test.class_index = 3
46
47     # Store the time before starting to build the tree
48     starttime = time.time()
49
50     # initialise the time_to_run and accuracy to 0
51     time_to_run = 0
52     accuracy = 0
53
54     # Build and Train the weka tree
55     cls = Classifier(classname="weka.classifiers.trees.J48")
56
57     # Check that the data is valid
58     # If so, Build and Train the weka tree
59     if len(list(np.unique(train_classes))) != 1:
60         cls.build_classifier(train)
61         graph = cls.graph
62         # Store the time once the tree has been built
63         endtime = time.time()
64
65         # Create a list to store the predicted values in
66         pred = []
67         accurate = []

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68         # Get the class labels in the order that they were allocated when training the
        model
69         classes = pd.Series(train_classes).drop_duplicates().tolist()
70
71         correct = 0
72         total = 0
73         # loop through test dataset, incrementing total every time
74         # and incrementing count if the predicted value was correct
75         for index, inst in enumerate(test):
76             total = total + 1
77             predicted = classes[int(cls.classify_instance(inst))]
78             pred.append(predicted)
79             act = test_target[index]
80             if predicted == test_target[index]:
81                 correct = correct + 1
82                 accurate.append(1)
83             else:
84                 accurate.append(0)
85
86         # Get the accuracy of the weka implementation
87         accuracy = (correct/total)
88
89         # store the results in a csv file - the predicted class and the actual class
90         df = pd.DataFrame()
91         df['Actual'] = test_target
92         df['Predicted'] = pred
93         df['Accuracy'] = accurate
94         filename =
95         "results/weka-results-"+str(round(split,2))+ "-"+str(round(accuracy,2))+ ".csv"
96         df.to_csv(filename,index=False,header=True)
97
98         time_to_run = endtime-starttime
99         # If the data is invalid, create a node to indicate failure
100        elif len(train) == 0:
101            graph = Digraph('python_tree_implementation')
102            graph.node(name='A', label="Fail", shape='box', style='filled')
103        else:
104            graph = Digraph('python_tree_implementation')
105            graph.node(name='A', label=train_classes[0], shape='box', style='filled')
106
107        # Render a png image of the weka tree to display in the PySimpleGUI popup
108        g = graphviz.Source(graph)
109        g.format = "png"
110        g.render('weka-test.gv', view=False)
111        return round(accuracy*100, 2), time_to_run

```