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CSE341 PROGRAMMING LANGUAGES HW4 DOCUMENTATION

Part 1 – Expert System :

- The works hours part was not clear and I could not get an answer from lecturer and assistant so interpreted this part. The delivery personnels have work hours which they can accept an object in these hours and these work hours in 4-hours format like [0, 4, 8, 12, 16, 20]. When querying status of an object, the current time should be passed to query to check if a delivery personnel can transit the object according to work hours.

- The delivery time is calculated by formula : Time to go pickup place + Time to go delivery place

- The shortest path is found while finding times to go from one place to another.

- Query Example:

  status(obj2, 20).

  (PersonnelId, Time) List = [(p1,2),(p3,5)]

Part 2 – Classifier :

- I trained a model in python using the given data and according to these results I wrote prolog classify predicate. You can find how I code python and get the result from the screenshots below.

Model.py

HW5 > Model.py > tree_rules

```python
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier, export_text

import matplotlib.pyplot as plt
from sklearn.tree import plot_tree

data = pd.read_csv('iris_dataset.csv', header=None, names=['sepal_length', 'sepal_width', 'petal_length', 'petal_width', 'class'])

print(data.shape)

X = data.iloc[:, :-1]
y = data.iloc[:, -1]

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

clf = DecisionTreeClassifier()
clf.fit(X_train, y_train)

tree_rules = export_text(clf, feature_names=list(X.columns))
print(tree_rules)

```

```
PS C:\Users\Emre\Desktop\Desktop2\Advanced Algorithms> & C:/Users/Emre/AppData/Local/Programs/Python/Python310/python.exe "c:/Users/Emre/
ithms/HW5/Model.py"
(150, 5)
|--- petal_length <= 2.45
|   |--- class: Iris-setosa
|--- petal_length >  2.45
|   |--- petal_length <= 4.75
|   |   |--- petal_width <= 1.65
|   |   |   |--- class: Iris-versicolor
|   |   |--- petal_width >  1.65
|   |   |   |--- class: Iris-virginica
|   |--- petal_length >  4.75
|   |   |--- petal_width <= 1.75
|   |   |   |--- petal_length <= 4.95
|   |   |   |   |--- class: Iris-versicolor
|   |   |   |--- petal_length >  4.95
|   |   |   |   |--- petal_width <= 1.55
|   |   |   |   |   |--- class: Iris-virginica
|   |   |   |   |--- petal_width >  1.55
|   |   |   |   |   |--- petal_length <= 5.45
|   |   |   |   |   |   |--- class: Iris-versicolor
|   |   |   |   |   |--- petal_length >  5.45
|   |   |   |   |   |   |--- class: Iris-virginica
|   |   |--- petal_width >  1.75
|   |   |   |--- petal_length <= 4.85
|   |   |   |   |--- sepal_width <= 3.10
|   |   |   |   |   |--- class: Iris-virginica
|   |   |   |   |--- sepal_width >  3.10
|   |   |   |   |   |--- class: Iris-versicolor
|   |   |   |--- petal_length >  4.85
|   |   |   |   |--- class: Iris-virginica
```