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COMPS – C31

ML Experiment 3

ML Experiment - 3

Aim: To Implement CART Algorithm

Theory:

CART (classification & Regression tree) is a variation of the decision tree Algorithm.

It can handle both classification & Regression task. It is a predictive Algorithm used in ML & it Explains how the target Variables values can be predicted based on other Parameters.

CART Algorithm

- 1) Tree Structure
- 2) Splitting criteria

$$gini = 1 - \sum_{i=1}^n (p_i)^2$$

- 3) Pruning

Advantages

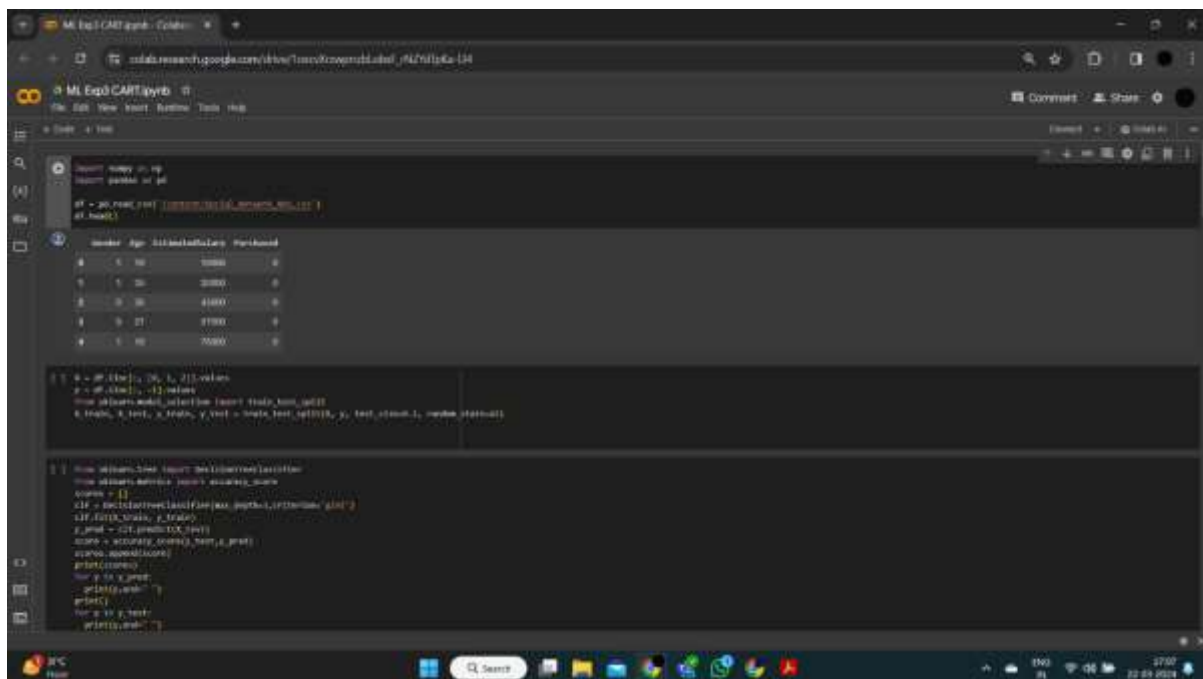
- 1) Results are Simplistic
- 2) Trees are non parametric & non-linear
- 3) Trees implicitly perform feature selection

Disadvantages

- 1) over fitting
- 2) High variance
- 3) low bias.

Conclusion: Thus we Implement CART Algorithm.

Implementation:



The screenshot shows a Jupyter Notebook titled "ML Ego-CART.py". The code in the first cell loads the dataset and performs initial preprocessing. The second cell displays the first five rows of the dataset as a table.

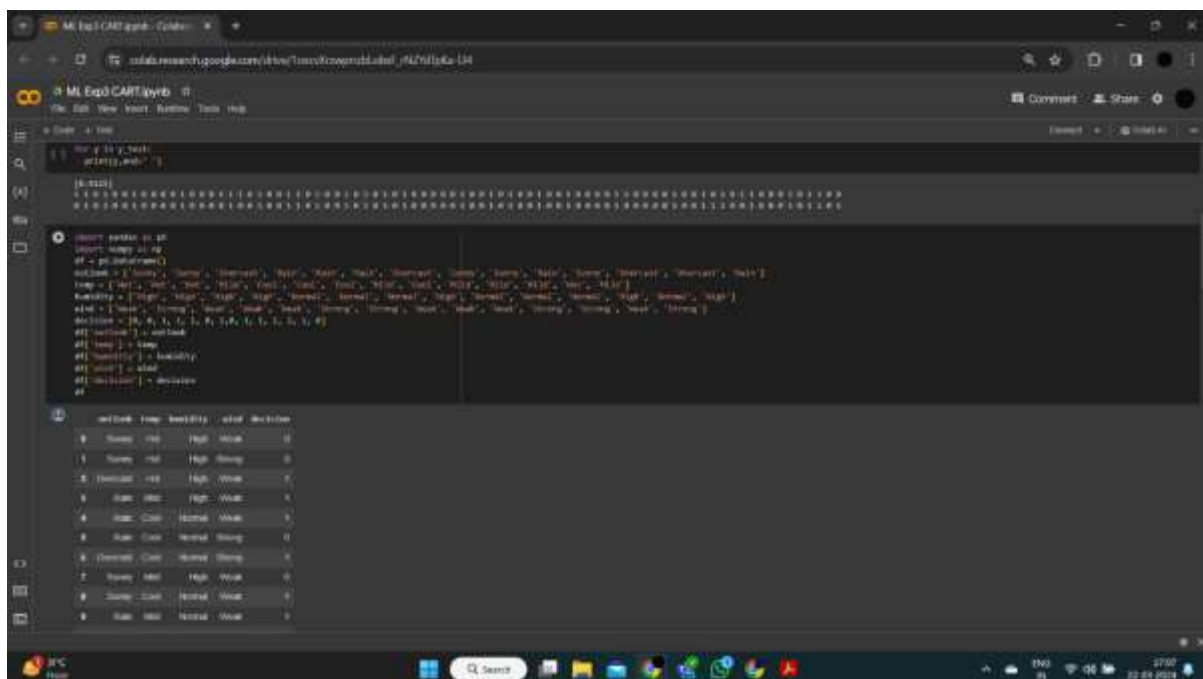
```
import numpy as np
import pandas as pd

df = pd.read_csv('https://raw.githubusercontent.com/MLHofsta/MLHofsta-134/main/data/ego_cart_data.csv')
df.head()
```

	time	lat	lon	heading	speed
0	0.00	40.71	-87.63	0.00	0.00
1	0.01	40.71	-87.63	0.00	0.00
2	0.02	40.71	-87.63	0.00	0.00
3	0.03	40.71	-87.63	0.00	0.00
4	0.04	40.71	-87.63	0.00	0.00

```
df = df[df['time'] > 0.05]
df = df[df['time'] < 1.0]
df = df[df['speed'] > 0.0]
df = df[df['speed'] < 1.0]
df = df[df['heading'] > 0.0]
df = df[df['heading'] < 3.14159]
```

```
df = df[df['time'] > 0.05]
df = df[df['time'] < 1.0]
df = df[df['speed'] > 0.0]
df = df[df['speed'] < 1.0]
df = df[df['heading'] > 0.0]
df = df[df['heading'] < 3.14159]
```



The screenshot shows the final preprocessing steps and the resulting dataset structure. The code in the first cell loads the dataset and performs final preprocessing. The second cell displays the first five rows of the dataset as a table.

```
import numpy as np
import pandas as pd

df = pd.read_csv('https://raw.githubusercontent.com/MLHofsta/MLHofsta-134/main/data/ego_cart_data.csv')
df.head()
```

```
df = df[df['time'] > 0.05]
df = df[df['time'] < 1.0]
df = df[df['speed'] > 0.0]
df = df[df['speed'] < 1.0]
df = df[df['heading'] > 0.0]
df = df[df['heading'] < 3.14159]
```

```
df = df[df['time'] > 0.05]
df = df[df['time'] < 1.0]
df = df[df['speed'] > 0.0]
df = df[df['speed'] < 1.0]
df = df[df['heading'] > 0.0]
df = df[df['heading'] < 3.14159]
```

	time	lat	lon	heading	speed
0	0.00	40.71	-87.63	0.00	0.00
1	0.01	40.71	-87.63	0.00	0.00
2	0.02	40.71	-87.63	0.00	0.00
3	0.03	40.71	-87.63	0.00	0.00
4	0.04	40.71	-87.63	0.00	0.00

ML Exp CART.pyrb - Colab

colab.research.google.com/drive/1mcdZwqmdLdof_jA2N0tj6x-UM

ML Exp CART.pyrb

File Edit View Insert Runtime Tools Help

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