

## M.L Lab\_Assignment\_2

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QUESTION: Implement the candidate elimination algorithm using python programming to list out the consistent candidates of the training dataset.

ANS:

### Algorithm:

Step1: Load Data set

Step2: Initialize General Hypothesis and Specific Hypothesis.

Step3: For each training example

Step4: If example is positive example

if attribute\_value == hypothesis\_value:

Do nothing

else:

replace attribute value with '?' (Basically generalizing it)

Step5: If example is Negative example

Make generalize hypothesis more specific.

### Code & Output:

Importing required libraries & the dataset in the local machine.

```
import pandas as pd
import numpy as np

df = pd.read_csv("DATA2.csv")
df.head()
```

✓ 1.2s

	Sky	Temperature	Humid	Wind	Water	Forest	Output
0	sunny	warm	normal	strong	warm	same	Yes
1	sunny	warm	high	strong	warm	same	Yes
2	rainy	cold	high	strong	warm	change	No
3	sunny	warm	high	strong	cool	change	Yes

Deviding the whole dataset into concept and target.

```
concepts=np.array(df.iloc[:, :-1])
target=np.array(df.iloc[:, -1])
```

✓ 0.0s

```
print(concepts),print(target)
```

✓ 0.0s

```
[['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'high' 'strong' 'warm' 'same']
['rainy' 'cold' 'high' 'strong' 'warm' 'change']
['sunny' 'warm' 'high' 'strong' 'cool' 'change']]
['Yes' 'Yes' 'No' 'Yes']
```

Final code for Candidate elimination Algorithm.

```
def CEA(concepts,target):
    specific_h=concepts[0].copy()
    general_h=[["?" for i in range(len(specific_h))] for i in range(len(specific_h))]
    print("specific hypothesis",specific_h)
    print("general hypothesis",general_h)

    for i,h in enumerate(concepts):
        if target[i]=='Yes':
            for x in range(len(specific_h)):
                if h[x] != specific_h[x]:
                    specific_h[x] = "?"
                    general_h[x][x]="?"
        if target[i]=="No":
            for x in range(len(specific_h)):
                if h[x] != specific_h[x]:
                    general_h[x][x]=specific_h[x]
                else:
                    general_h[x][x]="?"
    indices=[i for i,val in enumerate(general_h) if val==["?","?","?","?","?","?"]]
    for i in indices:
        general_h.remove(["?","?","?","?","?","?"])
    return specific_h,general_h

final_specific_h,final_gen_h=CEA(concepts,target)

print("Final Specific Hypothesis~",final_specific_h)
print("Final Genaral Hypothesis~",final_gen_h)
```

```
specific hypothesis ['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
general hypothesis [['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]
Final Specific Hypothesis~ ['sunny' 'warm' '?' 'strong' '?' '?']
Final Genaral Hypothesis~ [['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?']]
```