



## **Veermata Jijabai Technological Institute, Mumbai 400019**

### **Assignment No.: 02**

**Aim :** Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

**Name :** Kiran K. Patil

**Enrollment No.:** 211070904

**Branch :** Computer Engineering

**Course:** Machine Learning Lab

**Batch :** IV

```
from google.colab import files
files.upload()
```

```
# Attributes
# survival - Survival (0 = No; 1 = Yes)
# class - Passenger Class (1 = 1st; 2 = 2nd; 3 = 3rd)
# name - Name
# sex - Sex
# age - Age
# sibsp - Number of Siblings/Spouses Aboard
# parch - Number of Parents/Children Aboard
# ticket - Ticket Number
# fare - Passenger Fare
# cabin - Cabin
# embarked - Port of Embarkation (C = Cherbourg; Q = Queenstown; S = Southampton)
```

```
import pandas as pd
import numpy as np
```

```
#to read the data in the csv file
data = pd.read_csv("titanic_dataset.csv")
# print(data,"n")
```

```
data = data[5:15]
print(data)
```

	PassengerId	Survived	Pclass	\
5	897	0	3	
6	898	1	3	
7	899	0	2	
8	900	1	3	
9	901	0	3	
10	902	0	3	
11	903	0	1	
12	904	1	1	
13	905	0	2	
14	906	1	1	

	Name	Sex	Age	SibSp	\
5	Svensson, Mr. Johan Cervin	male	14.0	0	
6	Connolly, Miss. Kate	female	30.0	0	
7	Caldwell, Mr. Albert Francis	male	26.0	1	
8	Abraham, Mrs. Joseph (Sophie Halaut Easu)	female	18.0	0	
9	Davies, Mr. John Samuel	male	21.0	2	
10	Ilieff, Mr. Ylio	male	NaN	0	
11	Jones, Mr. Charles Cresson	male	46.0	0	
12	Snyder, Mrs. John Pillsbury (Nelle Stevenson)	female	23.0	1	
13	Howard, Mr. Benjamin	male	63.0	1	
14	Chaffee, Mrs. Herbert Fuller (Carrie Constance...	female	47.0	1	

	Parch	Ticket	Fare	Cabin	Embarked
5	0	7538	9.2250	NaN	S
6	0	330972	7.6292	NaN	Q
7	1	248738	29.0000	NaN	S
8	0	2657	7.2292	NaN	C
9	0	A/4 48871	24.1500	NaN	S
10	0	349220	7.8958	NaN	S
11	0	694	26.0000	NaN	S
12	0	21228	82.2667	B45	S
13	0	24065	26.0000	NaN	S
14	0	W.E.P. 5734	61.1750	E31	S

```
data.drop('PassengerId', inplace=True, axis=1)
```

```
data.head()
```

```
Survived Pclass Name Sex Age SibSp Parch Ticket Fare Cabin Embarked
data.drop('Name', inplace=True, axis=1)
data.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
5	0	3	male	14.0	0	0	7538	9.2250	NaN	S
6	1	3	female	30.0	0	0	330972	7.6292	NaN	Q
7	0	2	male	26.0	1	1	248738	29.0000	NaN	S
8	1	3	female	18.0	0	0	2657	7.2292	NaN	C
9	0	3	male	21.0	2	0	A/4 48871	24.1500	NaN	S

```
data.drop('Ticket', inplace=True, axis=1)
data.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Fare	Cabin	Embarked
5	0	3	male	14.0	0	0	9.2250	NaN	S
6	1	3	female	30.0	0	0	7.6292	NaN	Q
7	0	2	male	26.0	1	1	29.0000	NaN	S
8	1	3	female	18.0	0	0	7.2292	NaN	C
9	0	3	male	21.0	2	0	24.1500	NaN	S

```
data.drop('Fare', inplace=True, axis=1)
data.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
5	0	3	male	14.0	0	0	NaN	S
6	1	3	female	30.0	0	0	NaN	Q
7	0	2	male	26.0	1	1	NaN	S
8	1	3	female	18.0	0	0	NaN	C
9	0	3	male	21.0	2	0	NaN	S

```
#making an array of all the attributes
d = np.array(data)[:,:]
print("\n The attributes are: ",d)
```

```
The attributes are: [[0 3 'male' 14.0 0 0 nan 'S']
[1 3 'female' 30.0 0 0 nan 'Q']
[0 2 'male' 26.0 1 1 nan 'S']
[1 3 'female' 18.0 0 0 nan 'C']
[0 3 'male' 21.0 2 0 nan 'S']
[0 3 'male' nan 0 0 nan 'S']
[0 1 'male' 46.0 0 0 nan 'S']
[1 1 'female' 23.0 1 0 'B45' 'S']
[0 2 'male' 63.0 1 0 nan 'S']
[1 1 'female' 47.0 1 0 'E31' 'S']]
```

```
target = np.array(data)[: ,0]
print("\n The target is: ",target)
```

```
The target is: [0 1 0 1 0 0 0 1 0 1]
```

```
print(data)
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
5	0	3	male	14.0	0	0	NaN	S
6	1	3	female	30.0	0	0	NaN	Q
7	0	2	male	26.0	1	1	NaN	S
8	1	3	female	18.0	0	0	NaN	C
9	0	3	male	21.0	2	0	NaN	S
10	0	3	male	NaN	0	0	NaN	S

11	0	1	male	46.0	0	0	NaN	S
12	1	1	female	23.0	1	0	B45	S
13	0	2	male	63.0	1	0	NaN	S
14	1	1	female	47.0	1	0	E31	S

```
def train(c,t):
    for i, val in enumerate(t):
        if val == 1:
            specific_hypothesis = c[i].copy()
            break

    for i, val in enumerate(c):
        if t[i] == 1:
            for x in range(len(specific_hypothesis)):
                if val[x] != specific_hypothesis[x]:
                    specific_hypothesis[x] = '?'
            else:
                pass

    return specific_hypothesis
```

```
print("\n The final hypothesis is:",train(d,target))
```


The final hypothesis is: [1 '?' 'female' '?' '?' 0 '?' '?']

The second Hypothesis After applying diffrent filters on the data

```
data_frame = pd.read_csv("titanic_dataset.csv")
data_frame.head()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	NaN	Q
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272	7.0000	NaN	S
2	894	0	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276	9.6875	NaN	Q
3	895	0	3	Wirz, Mr. Albert	male	27.0	0	0	315154	8.6625	NaN	S

```
# print(data_frame)
data_frame.drop('PassengerId', inplace=True, axis=1)
data_frame.drop('Name', inplace=True, axis=1)
data_frame.drop('Ticket', inplace=True, axis=1)
data_frame.drop('Fare', inplace=True, axis=1)
data_frame.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked	
0	0	3	male	34.5	0	0	NaN	Q	
1	1	3	female	47.0	1	0	NaN	S	
2	0	2	male	62.0	0	0	NaN	Q	
3	0	3	male	27.0	0	0	NaN	S	
4	1	3	female	22.0	1	1	NaN	S	

```
data_frame.sort_values('Age')
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
354	1	3	female	0.17	1	2	NaN	S
201	0	3	male	0.33	0	2	NaN	S
281	0	3	male	0.75	1	1	NaN	S
307	0	3	male	0.83	0	1	NaN	S
250	1	2	female	0.92	1	2	NaN	S

```
valid_df=data_frame.dropna()
valid_df.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
12	1	1	female	23.0	1	0	B45	S
14	1	1	female	47.0	1	0	E31	S
24	1	1	female	48.0	1	3	B57 B59 B63 B66	C
26	1	1	female	22.0	0	1	B36	C
28	0	1	male	41.0	0	0	A21	S

```
sorted_df=valid_df.sort_values('Age')
sorted_df.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
117	1	3	female	1.0	1	1	G6	S
196	0	1	male	6.0	0	2	E34	C
326	1	2	female	12.0	2	1	F4	S
64	0	1	male	13.0	2	2	B57 B59 B63 B66	C
395	1	1	female	18.0	1	0	C31	S

```
sorted_df.head()
sorted_df=sorted_df[:25]
```

```
#making an array of all the attributes
d1 = np.array(sorted_df)[:,:]
```

```
print("\n The attributes are: ",d1)
```

```
The attributes are: [[1 3 'female' 1.0 1 1 'G6' 'S']
[0 1 'male' 6.0 0 2 'E34' 'C']
[1 2 'female' 12.0 2 1 'F4' 'S']
[0 1 'male' 13.0 2 2 'B57 B59 B63 B66' 'C']
[1 1 'female' 18.0 1 0 'C31' 'S']
[1 1 'female' 18.0 1 0 'D30' 'S']
[0 2 'male' 18.5 0 0 'F' 'S']
[0 2 'male' 20.0 0 0 'D38' 'C']
[1 1 'female' 22.0 0 1 'B36' 'C']
[1 2 'female' 22.0 0 0 'F33' 'S']
[1 1 'female' 23.0 0 1 'C54' 'C']
[1 1 'female' 23.0 1 0 'B45' 'S']
[0 1 'male' 23.0 0 0 'B24' 'S']
[0 1 'male' 24.0 1 0 'C31' 'S']
[0 1 'male' 24.0 1 0 'B45' 'S']
[1 1 'female' 25.0 1 0 'E50' 'C']
[0 3 'male' 25.0 0 0 'F E57' 'C']
[0 3 'male' 25.0 0 0 'F G63' 'S']
[1 1 'female' 26.0 1 0 'C89' 'C']
[0 2 'male' 26.0 0 0 'F2' 'S']
[1 1 'female' 27.0 1 1 'B58 B60' 'C']
[0 1 'male' 27.0 1 0 'C89' 'C']
[1 1 'female' 27.0 1 2 'B71' 'S']
[1 1 'female' 28.0 3 2 'C23 C25 C27' 'S']
[0 1 'male' 28.5 0 0 'D43' 'C']]
```

```
target1 = np.array(sorted_df)[:,:0]
print("\n The target is: ",target1)
```

The target is: [1 0 1 0 1 1 0 0 1 1 1 1 0 0 0 1 0 0 1 0 1 0 1 1 0]

```
print("\n The final hypothesis is:",train(d1,target1))
```

The final hypothesis is: [1 '?' 'female' '?' '?' '?' '?' '?']

### Grouping by Age with interval of 10 and then applying Find-s on it

```
# sorted_df.where(sorted_df <= 9, 10, inplace=True)
sorted_df['Age'].values[sorted_df['Age'].values < 9] = 10
sorted_df['Age'].values[(sorted_df['Age'].values > 10) & (sorted_df['Age'].values < 20)] = 20
sorted_df['Age'].values[(sorted_df['Age'].values > 20) & (sorted_df['Age'].values < 30)] = 30
```

```
# sorted_df.head()
# print(sorted_df)
sorted_df=sorted_df[10:25]
# print()
sorted_df.head()
```

	Survived	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
150	1	1	female	30.0	0	1	C54	C
12	1	1	female	30.0	1	0	B45	S
390	0	1	male	30.0	0	0	B24	S
50	0	1	male	30.0	1	0	C31	S
287	0	1	male	30.0	1	0	B45	S

```
#making an array of all the attributes
d2 = np.array(sorted_df)[:,:]
print("\n The attributes are: ",d2)
```

```
target2 = np.array(sorted_df)[:,:0]
print("\n The target is: ",target2)
```



```
The attributes are: [[1 1 'female' 30.0 0 1 'C54' 'C']
[1 1 'female' 30.0 1 0 'B45' 'S']
[0 1 'male' 30.0 0 0 'B24' 'S']
[0 1 'male' 30.0 1 0 'C31' 'S']
[0 1 'male' 30.0 1 0 'B45' 'S']
[1 1 'female' 30.0 1 0 'E50' 'C']
[0 3 'male' 30.0 0 0 'F E57' 'C']
[0 3 'male' 30.0 0 0 'F G63' 'S']
[1 1 'female' 30.0 1 0 'C89' 'C']
[0 2 'male' 30.0 0 0 'F2' 'S']
[1 1 'female' 30.0 1 1 'B58 B60' 'C']
[0 1 'male' 30.0 1 0 'C89' 'C']
[1 1 'female' 30.0 1 2 'B71' 'S']
[1 1 'female' 30.0 3 2 'C23 C25 C27' 'S']
[0 1 'male' 30.0 0 0 'D43' 'C']]
```

The target is: [1 1 0 0 0 1 0 0 1 0 1 0 1 1 0]

```
print("\n The final hypothesis is:",train(d2,target2))
```

The final hypothesis is: [1 1 'female' 30.0 '?' '?' '?' '?']