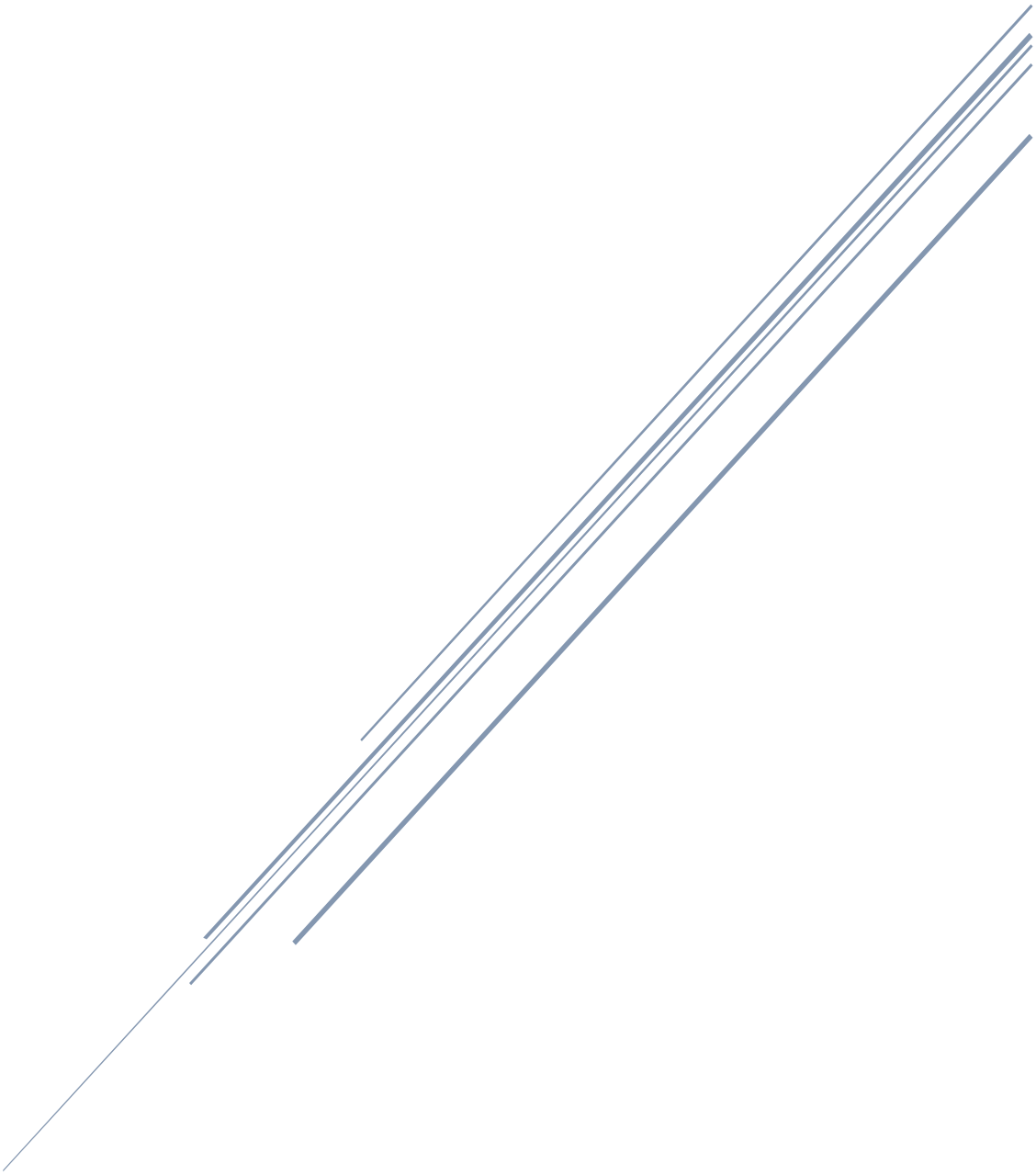
MACHINE LEARNING LAB

Department of Mechatronics Engineering



Submitted by 190973 Muhammad Shahab
Submitted to Ma’am Iraj Kainaat

Lab#2: Finding S-Algorithm

Objective:

- Familiarize students with basic hypothesis generation in Machine Learning.
- To find a general hypothesis in S Algorithm.

Introduction:

In Every Machine Learning algorithm, the goal is to generate a hypothesis from the available data. This hypothesis will be in form of Mathematical Equation, which in return output the result depending upon the new Input. In Finding S Algorithm, we are given a dataset with target values as positive and negative class. We consider the positive examples to create a hypothesis. That hypothesis predicts the valuable outcome depending upon the certain input parameters.

Lab Tasks:

Question #1:

Write a program to find the Hypothesis using the available dataset.

Dataset:

	A	B	C	D	E	F
1	Weather	Tempretu	Humidity	Wind	Mood	Target
2	Sunny	Warm	Normal	Normal	Same	Yes
3	Sunny	Warm	High	Strong	Same	Yes
4	Rainy	Cold	High	Normal	Change	No
5	Sunny	Warm	High	Strong	Change	Yes

Figure 1: Dataset in CSV

Description:

The most popular source to get the dataset for any machine learning algorithm is Kaggle. The above dataset was also taken from this source and downloaded as a CSV file. In the next step, we will read the file using csv and let the algorithm create a general hypothesis.

Code Snippet:

Uni_Labs > S Algo-Lab2.py > ...

```python
#Finding S algorithm Lab#2 ML
import pandas as pd
import numpy as np

#reading file and mking dataframe
data = pd.read_csv('data/findingSdataset.csv')
#taking only positive examples and dropping the example type column
data = data[data.Target !="No"].drop(columns=["Target"],axis=1)
#initializing the hypothesis array
inthyp = np.array(data.head(1))
#iterating the row and replacing the value
dataarray = np.array(data.tail(len(data)-1))
compared = (inthyp == dataarray)
len = compared.shape[0]
for i in range (len):
    inthyp = inthyp * compared[i]
inthyp = np.where(inthyp=='','?',inthyp)
#braodcasting
inthyp = inthyp.reshape(inthyp.shape[1],)
#output
print(inthyp)
```

Figure 2 Code Snippet

Output:

PROBLEMS 42 OUTPUT DEBUG CONSOLE TERMINAL Python

```
PS C:\Users\19097\Desktop\vs_pyto> conda activate base
PS C:\Users\19097\Desktop\vs_pyto> & C:/Users/19097/anaconda3/python.exe "c:/Users/19097/Desktop/vs_pyto/Uni_
Labs/S Algo-Lab2.py"
['Sunny' 'Warm' '?' '?' '?']
PS C:\Users\19097\Desktop\vs_pyto>
```

Figure 3 Terminal Output

Conclusion:

In this lab, we have successfully created a hypothesis for the given dataset using the positive examples only. The hypothesis shows that the person will go outside with two fixed conditions of sunny and Warm weather. As far rest of the things are concerned it will yield yes on any kind of the input.