COMSATS University Islamabad, Wah campus

Subject: AI

Final Lab

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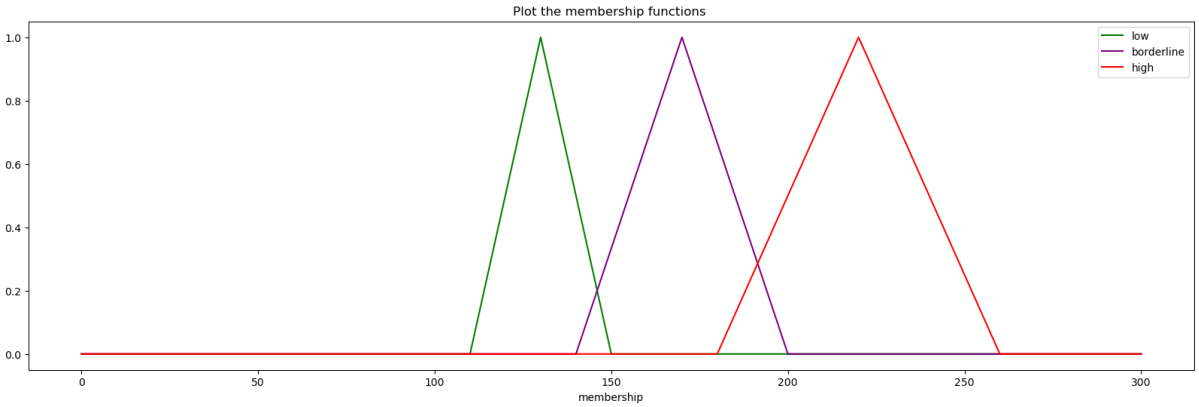
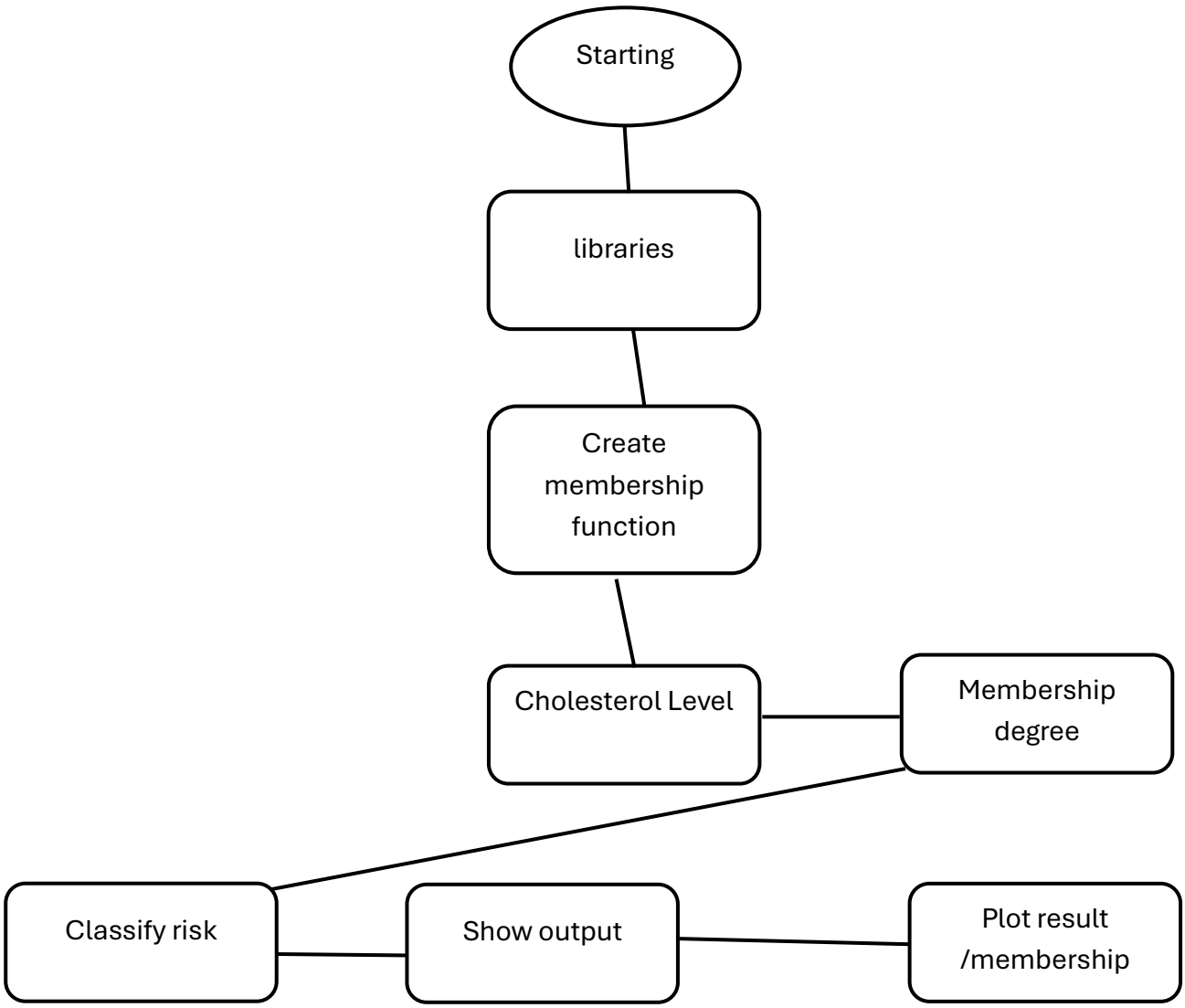
Part A: Fuzzy Logic (Classification of patient risk)

```
** libraries**
import pandas as pd
import numpy as np
import skfuzzy as fuzz
import matplotlib as plt

**Create membership function**
low=fuzz.trimf(np.arange(0,301,1),[110,130,150])
borderline=fuzz.trimf(np.arange(0,301,1),[140,170,200])
high=fuzz.trimf(np.arange(0,301,1),[180,220,260])

Cholesterol_Level=63% 150+120

# Membership degree
low_deg=fuzz.interp_membership(np.arange(0,301,1), low ,Cholesterol_Level)
borderline_deg=fuzz.interp_membership(np.arange(0,301,1), borderline
,Cholesterol_Level)
high_deg=fuzz.interp_membership(np.arange(0,301,1), high ,Cholesterol_Level)

**classify**
if low_deg>borderline_deg and low_deg> high_deg:
   risk="low"
elif borderline_deg>low_deg and borderline_deg> high_deg:
   risk="medium"
else:
   risk="high"


**Output**
print(f"Cholesterol Level.....",{Cholesterol_Level})
print(f"Risk.....",{risk})

x=np.arange(0,301,1)
plt.figure(figsize=(20,6))
plt.plot(x, low,label ='low',color='green')
plt.plot(x, borderline,label='borderline',color='purple')
plt.plot(x, high,label='high',color='red')
plt.title("Plot the membership functions ")
plt.xlabel("Cholesterol")
plt.xlabel("membership")
plt.legend()
plt.show()
```

```
Cholesterol Level..... {183}
Risk..... {'medium'}
```



flow chart:



Part B: Linear Perceptron

**** libraries****

```
import numpy as np
import matplotlib as plt
import tensorflow as tf
from tensorflow.keras.layers import Dense
```

****Data****

```
age=np.array[45,30,50,28]
bp=np.array[130,120,140,110]
cal=np.array[1,0,1,0]
```