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COSC 320

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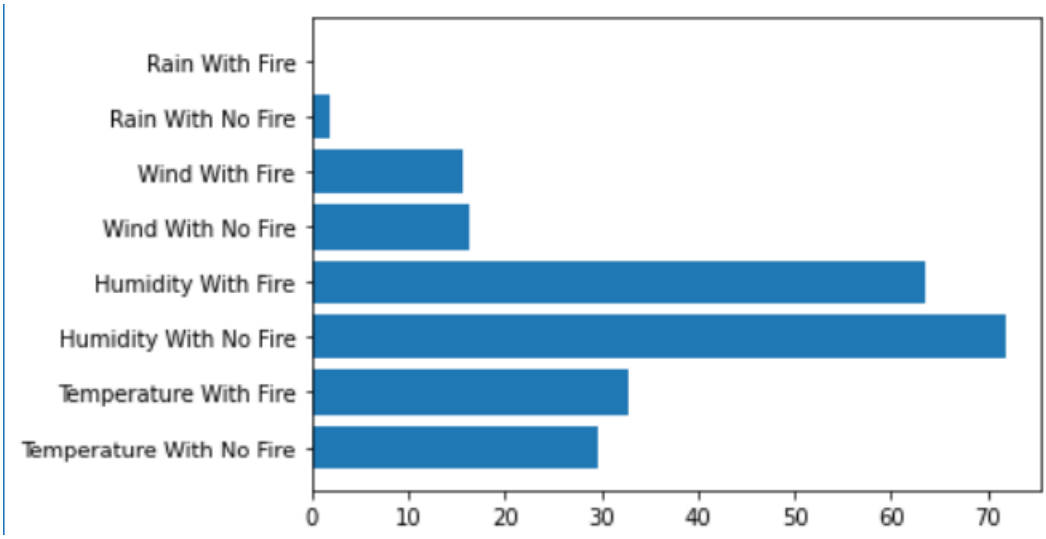
Lab 3 Report

1.

```
Mean Temperature with no fire: 29.609375
Mean Temperature with fire: 32.91379310344828
Mean Humidity with no fire: 71.953125
Mean Humidity with fire: 63.58620689655172
Mean Wind with no fire: 16.296875
Mean Wind with fire: 15.672413793103448
Mean Rain with no fire: 1.9615384615384608
Mean Rain with fire: 0.2
```



Based on the results above I can see several phenomenon when comparing the four selected variables based on if there was a fire for not. To start with temperature, it appears that days where a fire is reported was hotter than days where no fire is reported by a few degrees Celsius. This could mean that fires are more likely to happen on hotter days. Next variable is the humidity, where we see that days with lower humidity have a greater chance to have a fire. This makes sense, as higher humidity means more water in the atmosphere, which would make starting fires a bit harder. Next variable is the wind, where we see a very small difference

between the average wind speed on days where there is a fire and where there is no fire, which could mean that the wind has no meaningful impact on the chance of starting a fire. The final variable is the rain, and this is the biggest difference between the two groups. The difference in rain amount between days with fire and days with no fire is almost ten times each other. This clearly shows that days with very little, if any, rain greatly increases the chance of a fire.

2.

```
Input Lab Task Number: 2
Median value of FFMC: 84.85, Median value of DMC: 13.15, Median Value of DC:31.5, Median Value of ISI: 4.6
```

3.

```
Input Lab Task Number: 3
Temperature: (29, 32, 34), Relative Humidity: (60, 73, 78), Wind: (14, 17, 18), Rain: (0.0, 0.1, 0.5)
```

4.

```
Input Lab Task Number: 4
Temperature: 3.66051, Rain: 1.48065, BUI: 13.81382, FWI: 8.10401
```

5.

```
Input Lab Task Number: 5
Temperature: -0.6601505504342499, Wind: 0.24577445895806885, Rain: 0.3291626170356644, FFMC: -0.6531529118901973, DMC: -0.34708013592219367
DC: -0.3142712238307086, ISI: -0.5864099949298507, BUI: -0.33823263630375583, FWI: -0.4760673581458338
```

The attribute with the strongest positive correlation with itself and relative humidity is rain, but with a poor correlation value of 0.329, this is a very weak correlation.

The attribute with the strongest negative correlation with itself and relative humidity is temperature, with a stronger correlation value of -0.66, it is still a poor negative correlation between the two variables.

6. To better classify fires in terms of the two data sets, I would change the ‘Classes’ variable to add more fire types. In the currently available data set, fires are set up into one of two categories: fire and not fire. The main issue with this classification is that it lumps all fires into one variable, which can make it hard to judge how the environment affects the risk of fires occurring. To help remedy this, I would implement a new set of variables to better judge the size of fires. I would break up the fire category into three new sizes: small fires, medium fires, and large fires. By doing this, we can use the environmental variables to better judge and determine what variables

are the most impactful in causing fires. I've seen this in question one, where the rain difference between fires and no fires was huge. If we were to better classify the size of fires, we can better see the impact of rain has on the chances of fires occurring and determine any other variables which has an impact on the chance of a certain type of fire developing.