

Data Analysis of Historical Forest Fire in Brazil

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What is Forest Fire?

Wildfire, also called forest, bush or vegetation fire can be described as any uncontrolled and non-prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brush land or tundra, which consumes the natural fuels and spreads based on environmental conditions.



Brazil

Satellites have monitored historical deforestation and associated fire activity in Brazil for decades. More than one million square kilometers (~13%) of natural forest cover was lost across Brazil since 1985.

Three Critical Consequences Of Brazil Forest Fires:

- Biodiversity Loss
- Climate Change
- Health



Timeline

1965

2012

2018 on >>>

Actualization of the Brazil Forest Code

New Forest Code

Brazil created and passed the first Forest Code

Hypotheses

Knowing all this scenario, I came in with two hypotheses to test:

- The first decade of forest fire incidents equal to the second decade of forest fire incidents.
- Forest fire incidents in North of Brazil equal to forest fire incidents in South of Brazil.

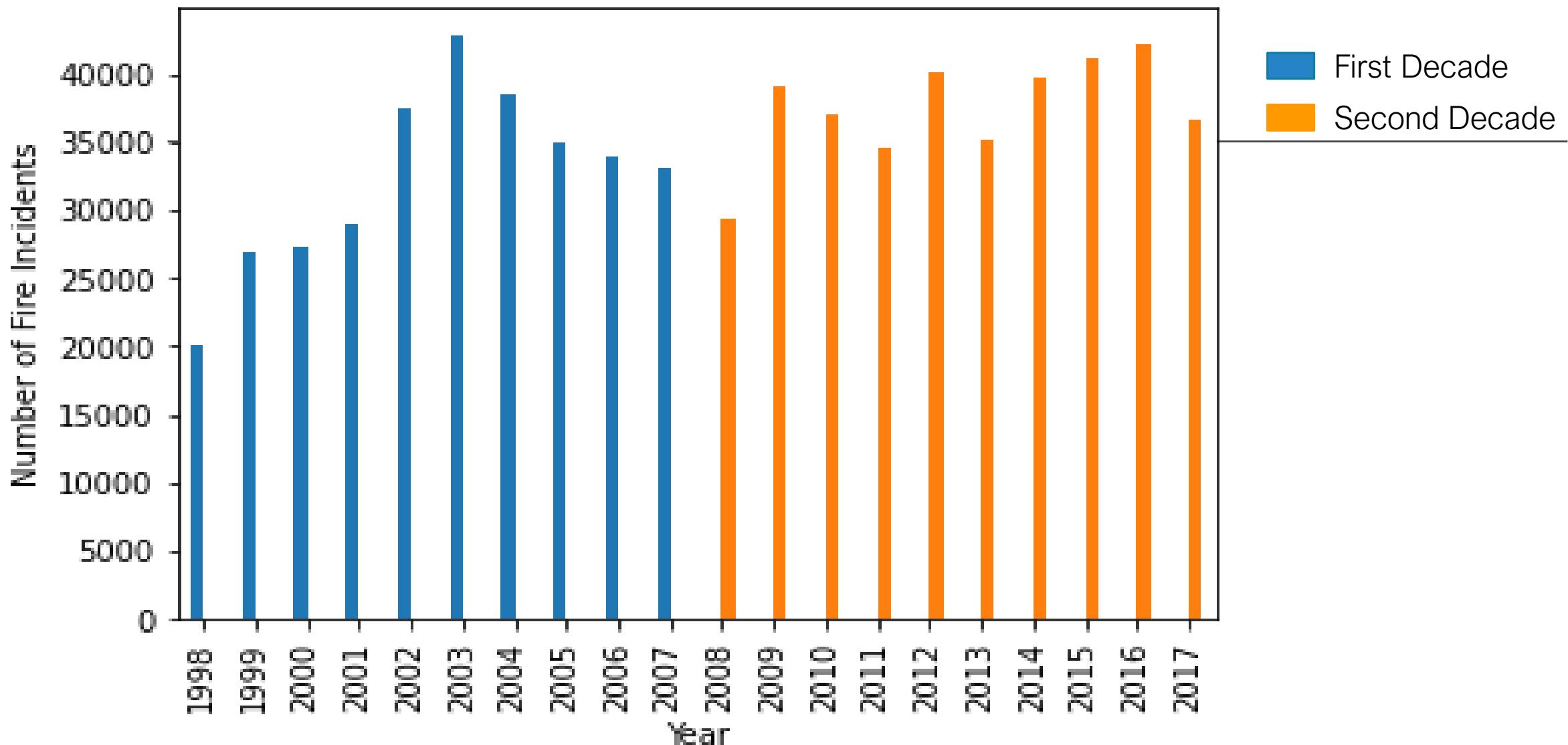
Method:

I imported a dataset from Kaggle with the forest fire incidents of Brazil from 1998 to 2017.

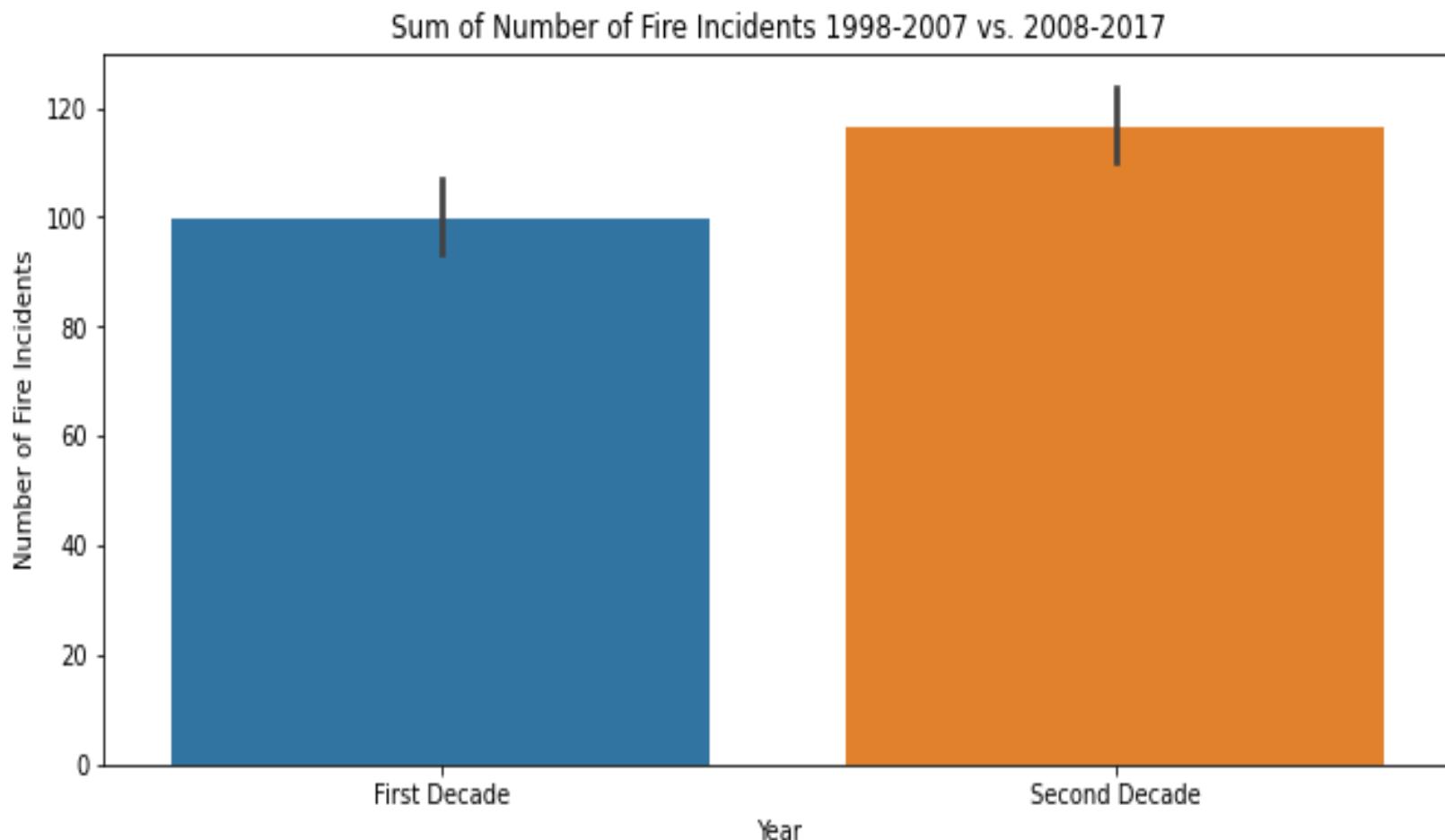
I conducted an initial analysis importing libraries such as Pandas, MatPlotLib, Seaborn, Numpy, Scipy and Statsmodels in Jupyter notebook to test and visualize the data.

I used a t-test to verify the statistical difference from the number of forest fire incidents over the decades and between north and south of Brazil, and also calculated the Confidence Level.

Number of Forest Fire incidents from North and South over the years

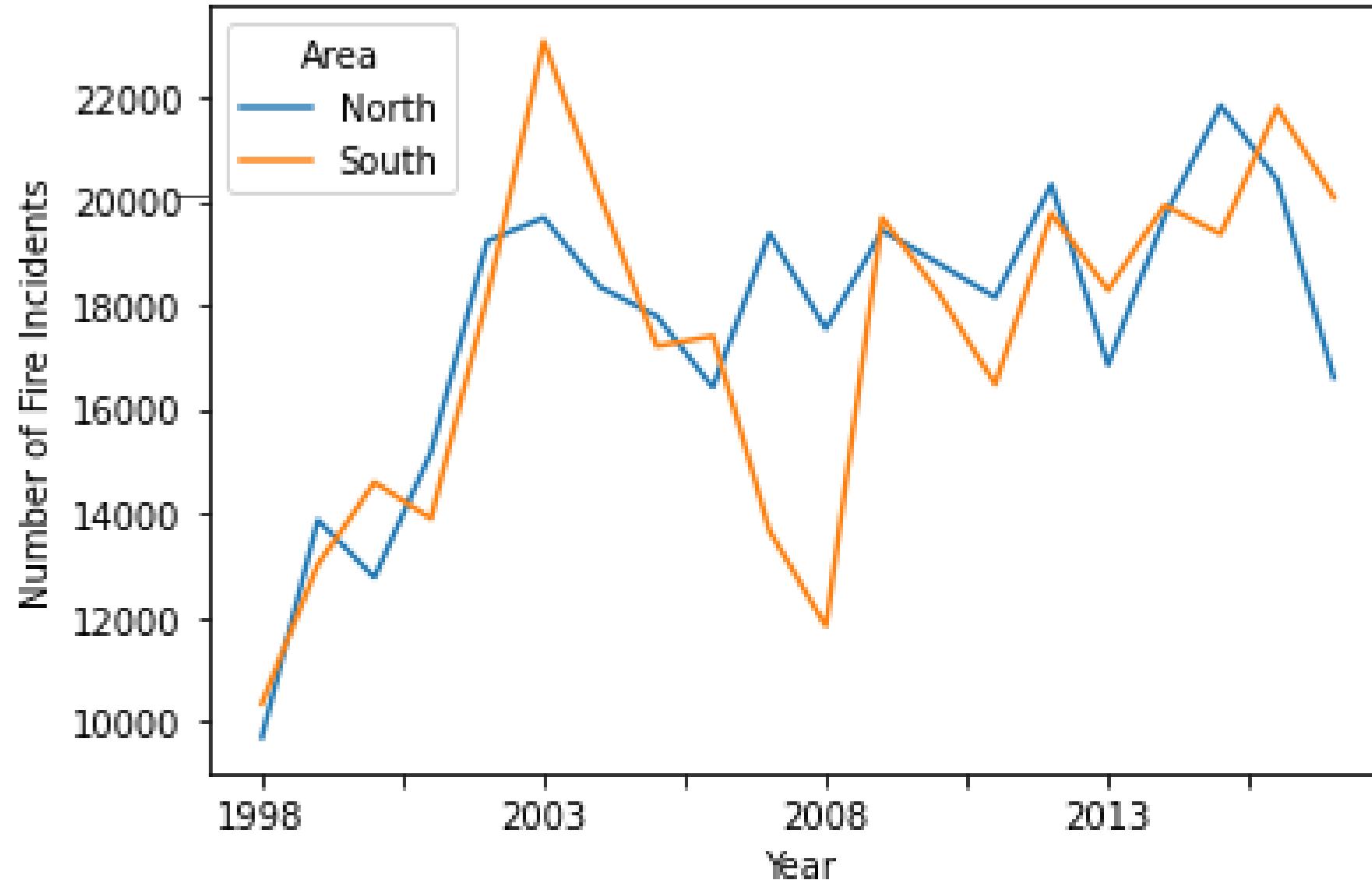


Decades – Hypothesis test results

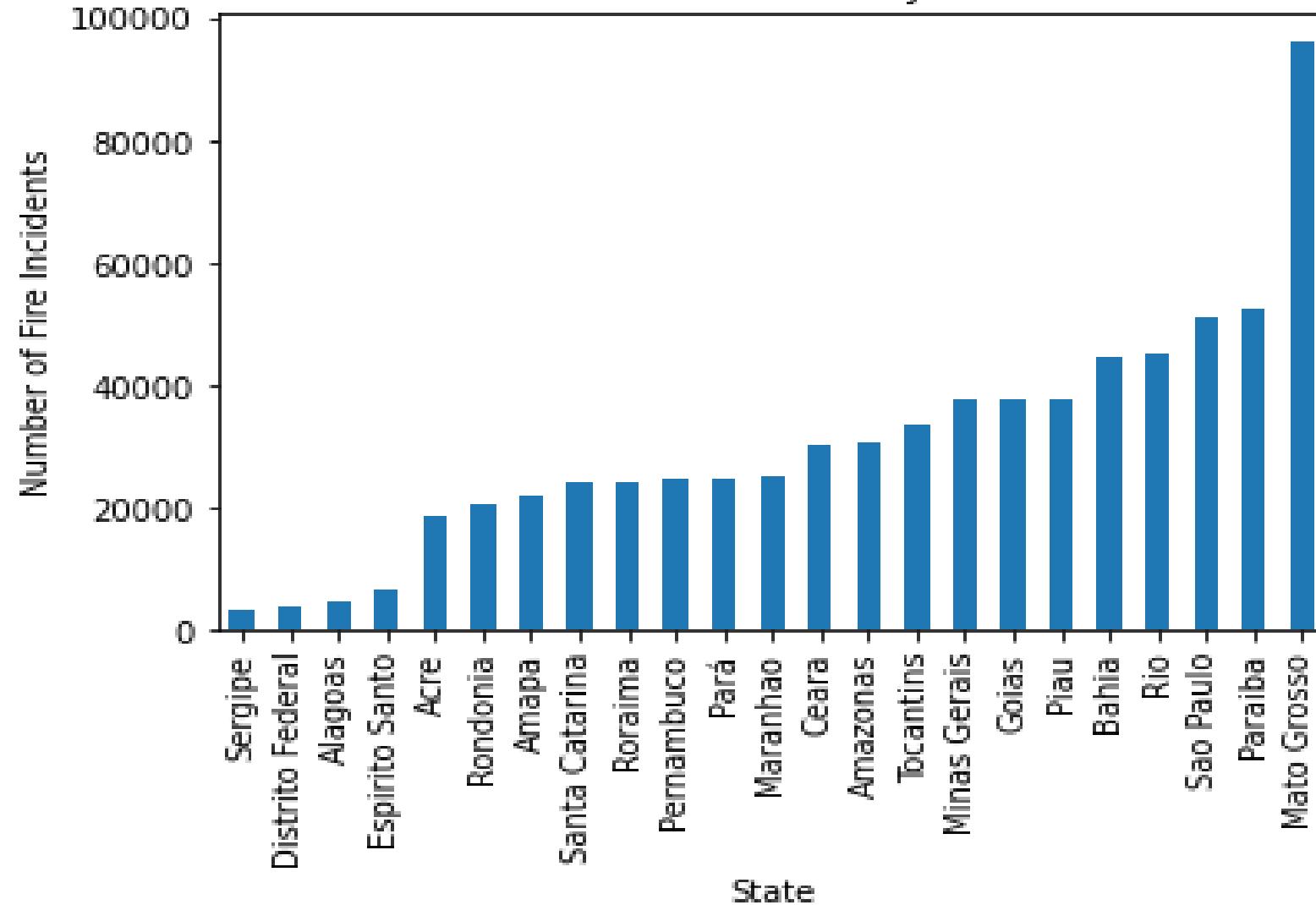


- $H_0: \mu_1 - \mu_2 = 0$
- $H_a: \mu_1 - \mu_2 \neq 0$
- P-Value = 0.0004
- With the P-value at 0.0004 , I will reject the null hypothesis that there's no difference between the means and conclude that a significant difference does exist.

Number of Forest Fire incidents from North and South over the years



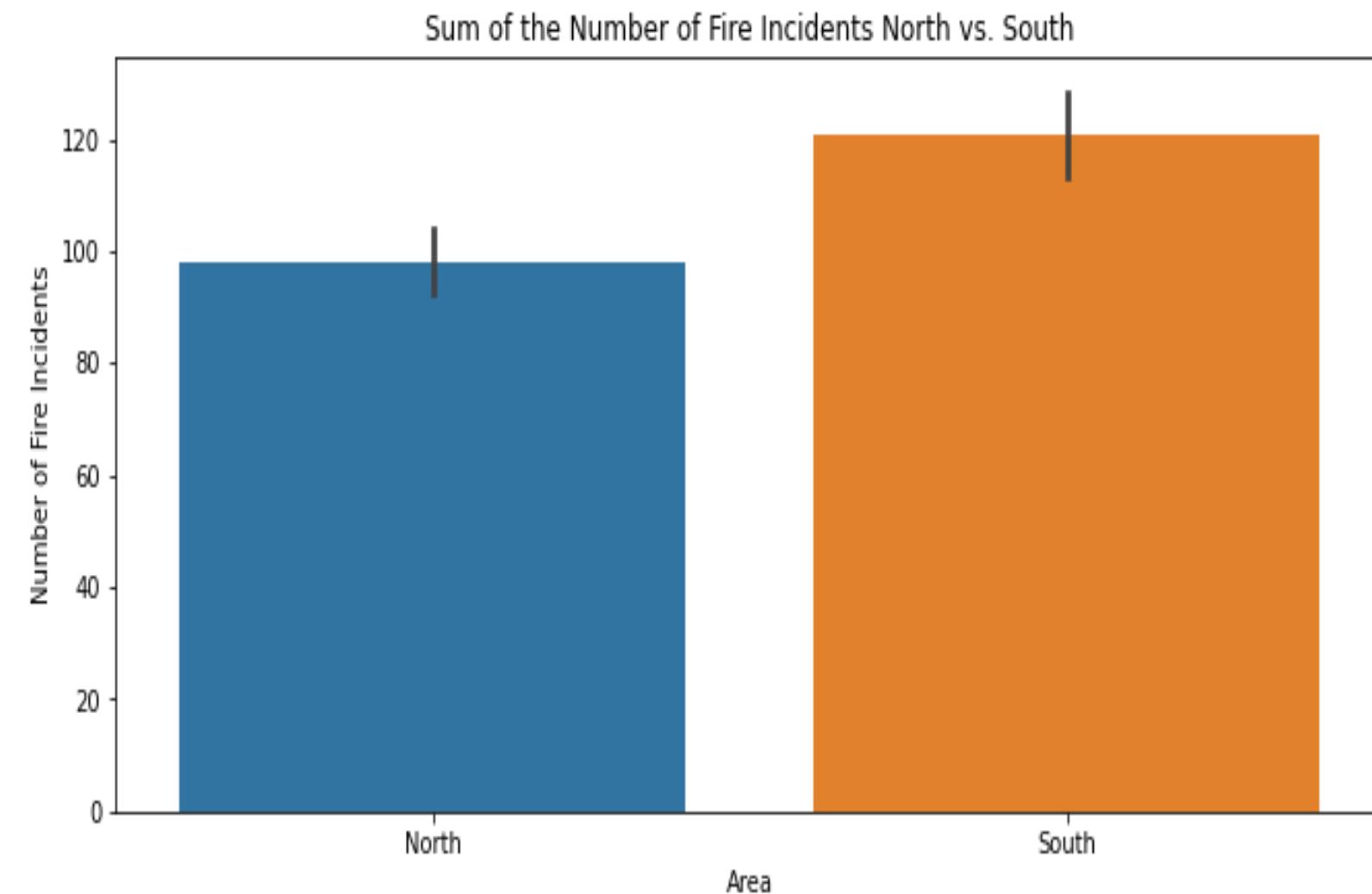
Forest Fire incidents by States



The State of Mato Grosso has a significantly higher rate of fires than any other state.

Region – Hypothesis test results

- $H_0: \mu_1 - \mu_2 = 0$
- $H_a: \mu_1 - \mu_2 \neq 0$
- P-Value = 1.816
- With the P-value at $1.81e-06$ I will reject the null hypothesis that there's no difference between the means and conclude that a significant difference does exist.



Conclusion

- In my first analysis I rejected the null hypothesis. Over decades the forest fire incidents is increasing.
- In the second analysis I will reject the null hypothesis that there's no difference between the means and conclude that a significant difference does exist.

Recommendations

I recommend:

1. SNIF(National Forest Information System)and SINIMA(National Environment Information System) provide focus their resource allocation on Mato Gross to prevent future forest firest and encourage forest conservation since Mato Grosso has a significantly higher rate of fires than any other state.
2. SNIF and SINIMIA increase oversight and surveillance of agriculture to reduce increasing rate of forest fires.
3. that SNIF and SINIMIA allocate resources on educating people to prevent fires as the rate of fires is increasing over time.