Analyzing correlation between climate and number of visitors to Mandai Wildlife Parks

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DSI-SG-42

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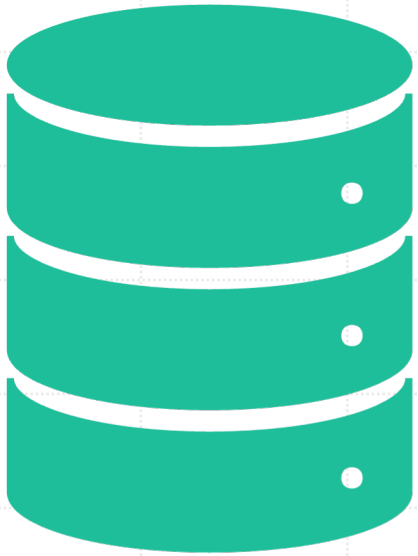


“A warmer Singapore could spell trouble for its tourism industry, say experts”

(CNA, 2024)

Source: CNA 2024

- https://www.channelnewsasia.com/singapore/sg-tourists-climate-change-heat-sea-level-rise-warmer-weather-ecotourism-green-4050806#:~:text=SINGAPORE%3A%20A%20warmer%20and%20wetter,spells%2C%20and%20more%20extreme%20rainfall.

1. Problem statement

- The project aims to investigate whether a correlation exists between historical climate data in Singapore and historical visitor numbers. If a strong correlation is found, the management could include weather forecasts to improve the accuracy of predictive models for visitor numbers.
- This would help optimize staff scheduling, maintenance schedules, and resource allocation, leading to cost savings and improved operational efficiency.

2. Datasets Used

Climate data – obtained from GA:

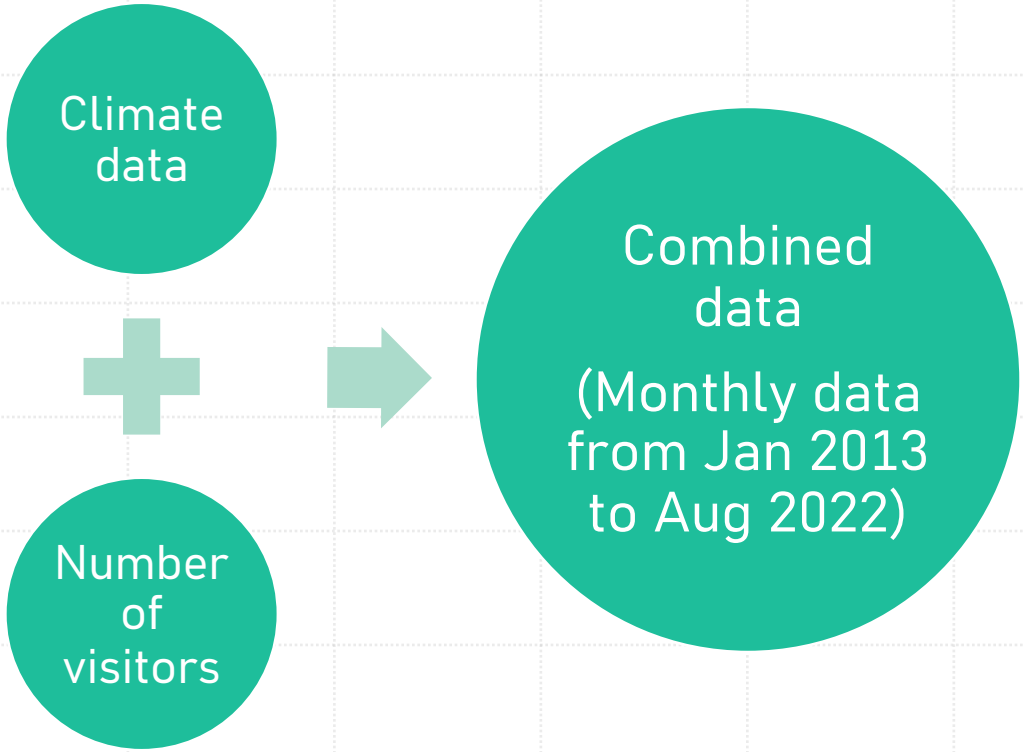
Name	Description
Monthly number of rainy days	Data from Jan 1982 to Aug 2022. A day is considered to have “rained” if the total rainfall for that day is 0.2mm or more.
Hourly wet bulb temperature	Data from Jan 1982 to Nov 2022.
Monthly total rainfall	Data from Jan 1982 to Aug 2022.
Monthly mean of relative humidity	Data from Jan 1982 to Nov 2022
Monthly mean of daily sunshine duration	Data from Jan 1982 to Nov 2022.
Monthly mean of surface air temperature	Data from from Jan 1982 to Nov 2022.

2. Datasets Used (continued)

Visitor data – obtained from Singstat (Department of Statistics Singapore)

Name	Description
Number of visitors	Data from Jan 2011 to Nov 2023. Historical record of number of visitors to Night Safari, River Wonders and Singapore Zoo.

2. Datasets Used (continued)

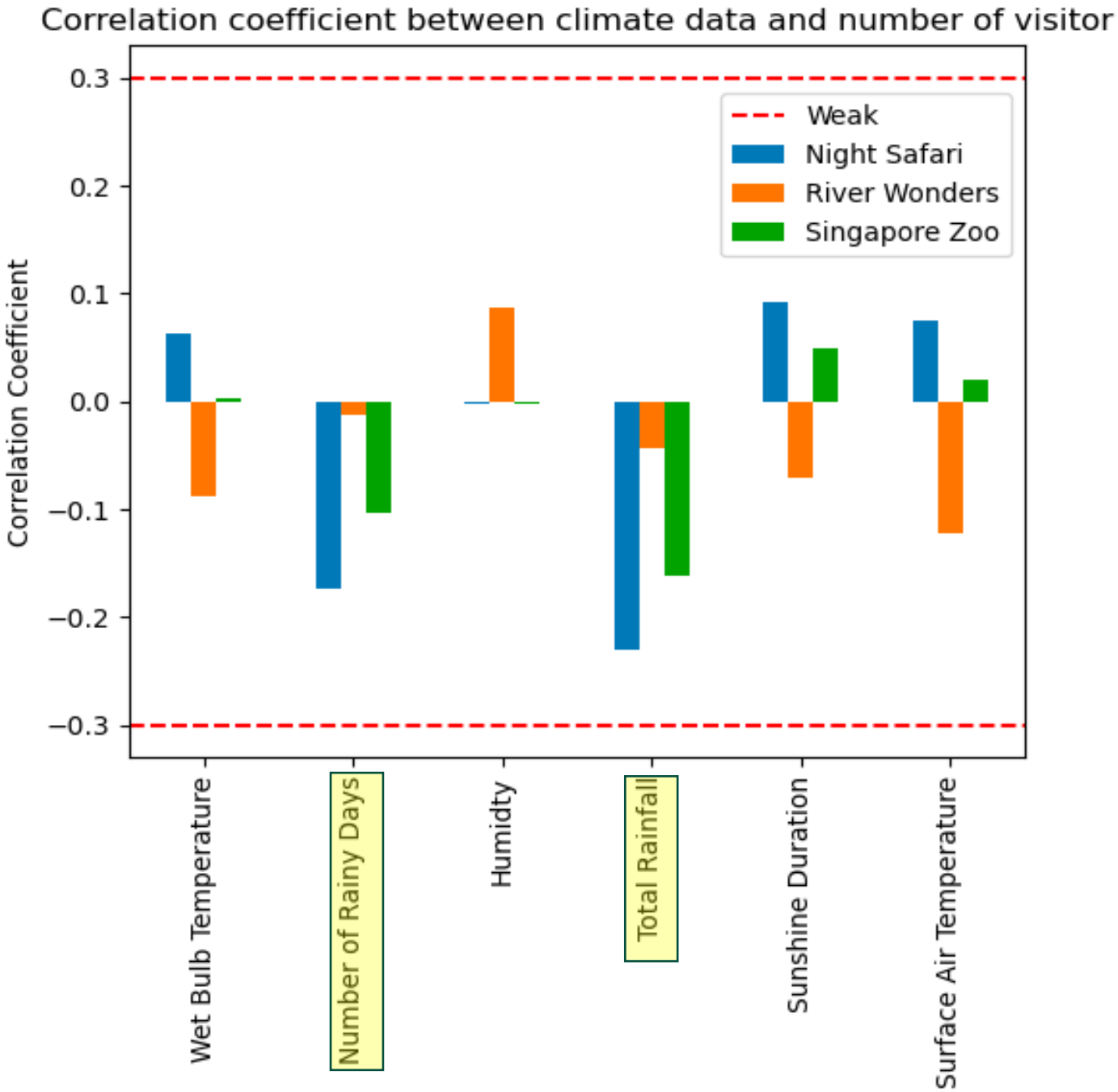


3. Findings

a. Correlation bar chart
b. Scatter plots
c. Line charts for trend analysis
d. Correlation bar chart (Pre-Covid)

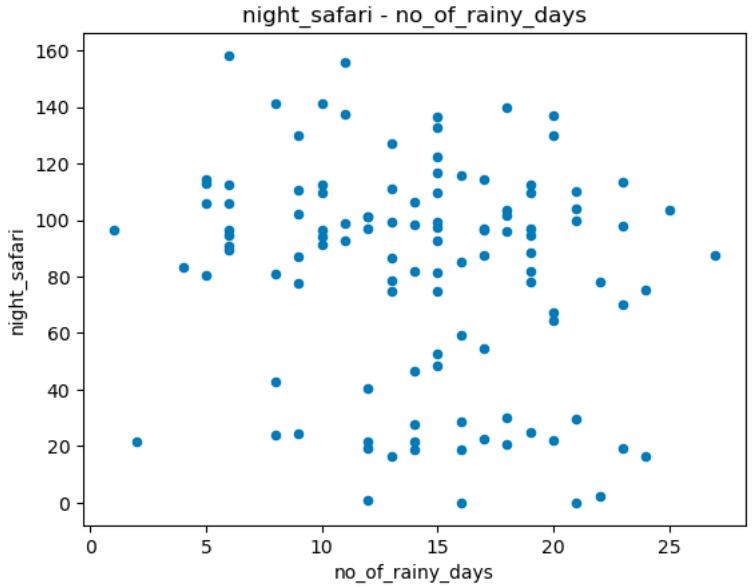
3a. Correlation bar chart

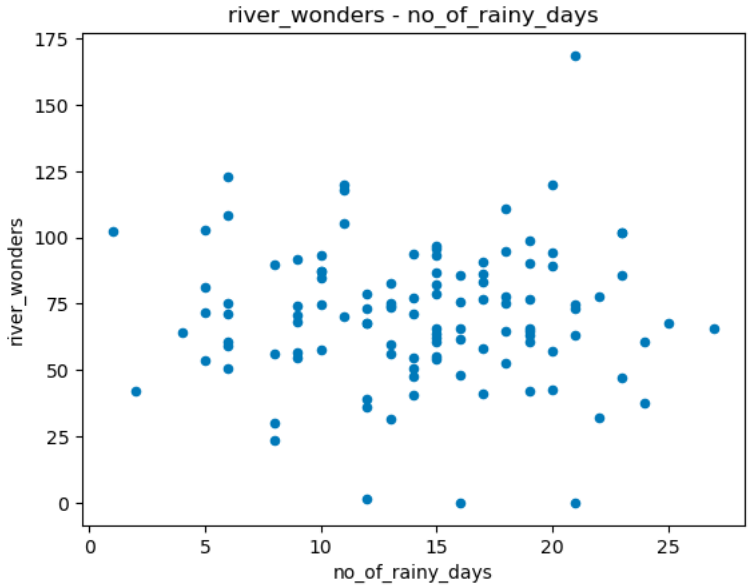
- **<u>Weak correlation observed</u>**
- Generally, correlations below 0.3 are considered weak.
- All correlation values are lower than 0.3 (or -0.3)

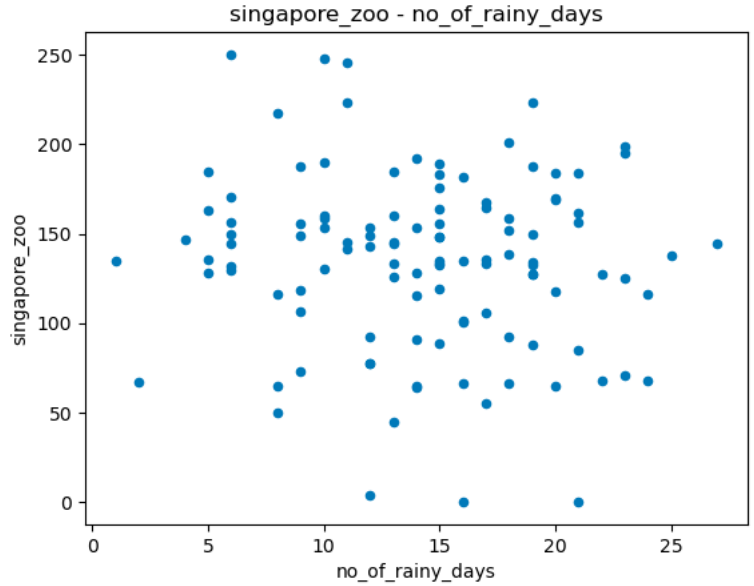


3b. Scatter plots – Number of rainy days

- The scatter plots show the correlation between number of rainy days and the parks
- Weak correlation observed from all 3 parks

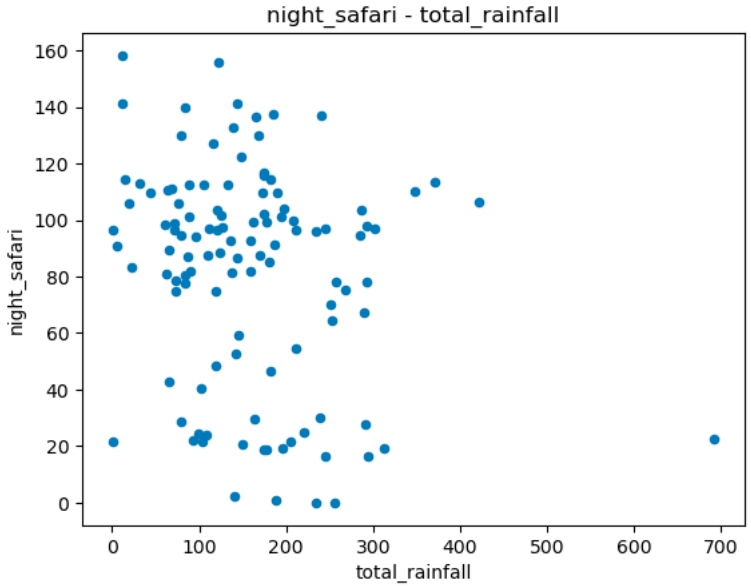


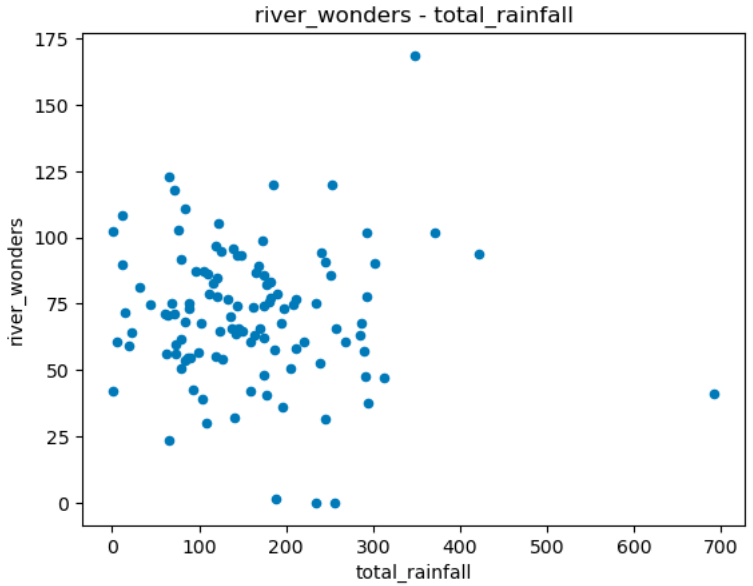


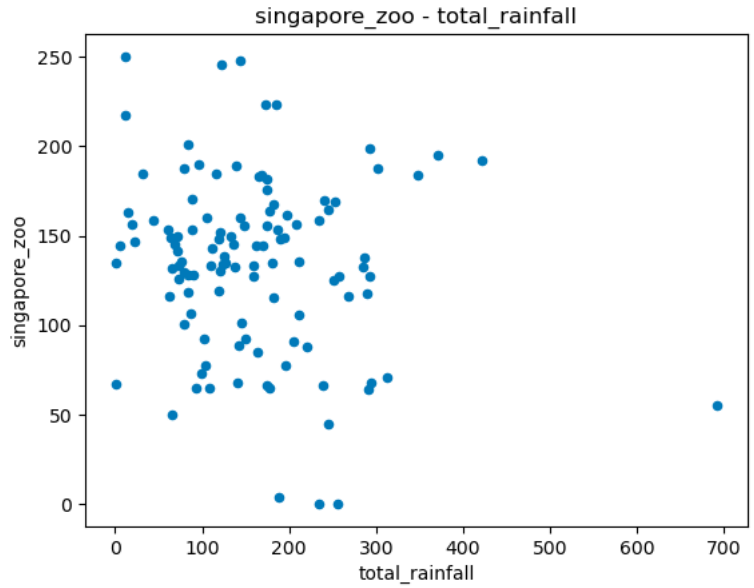


3b. Scatter plots – Total rainfall

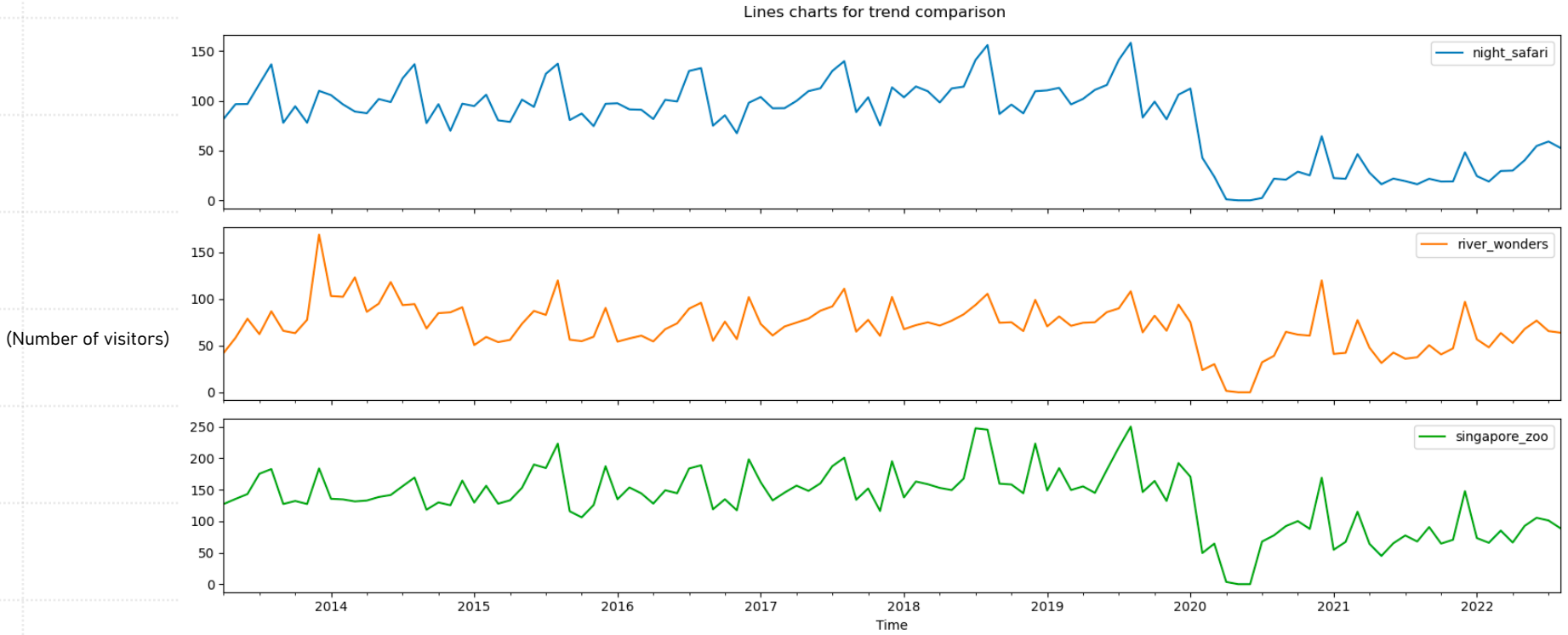
- The scatter plots show the correlation between total rainfall and the parks
- Weak correlation observed from all 3 parks





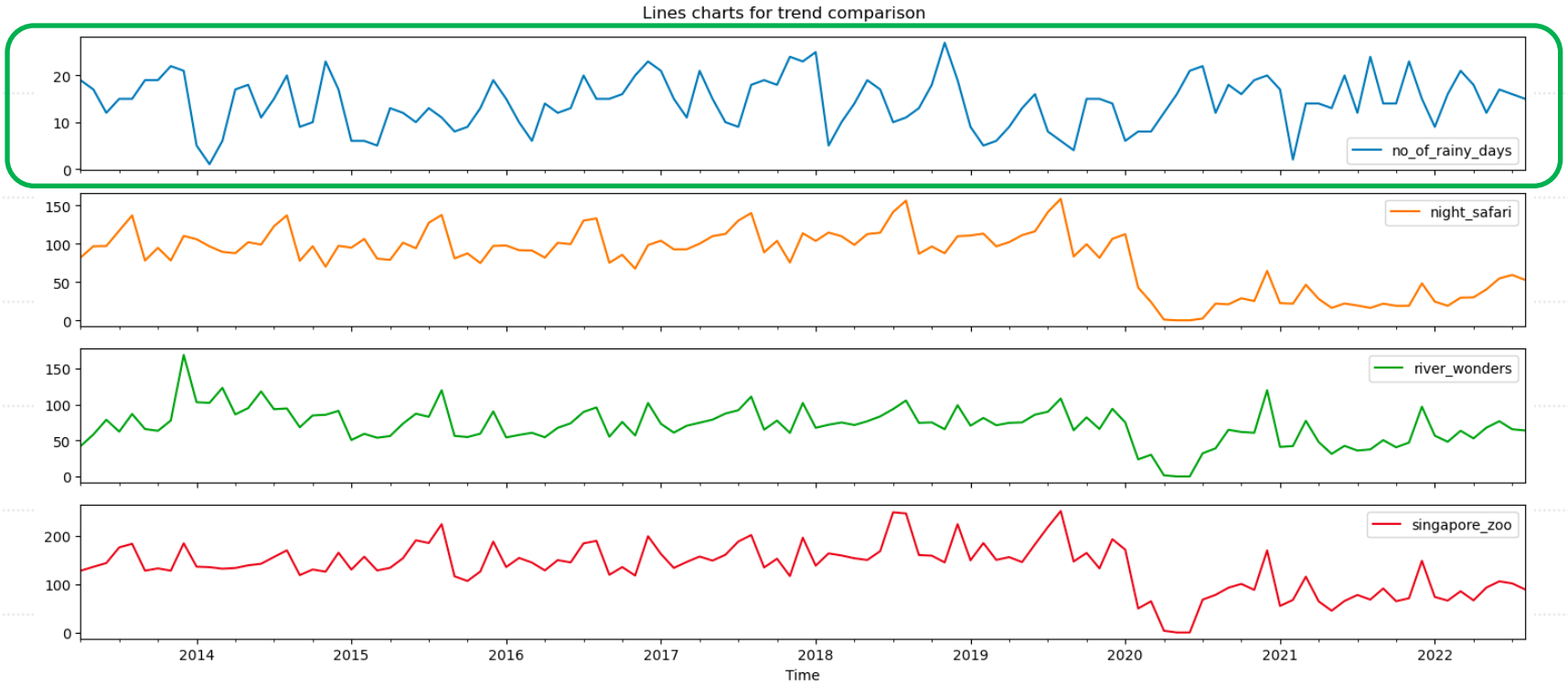


3c. Line charts for trend analysis



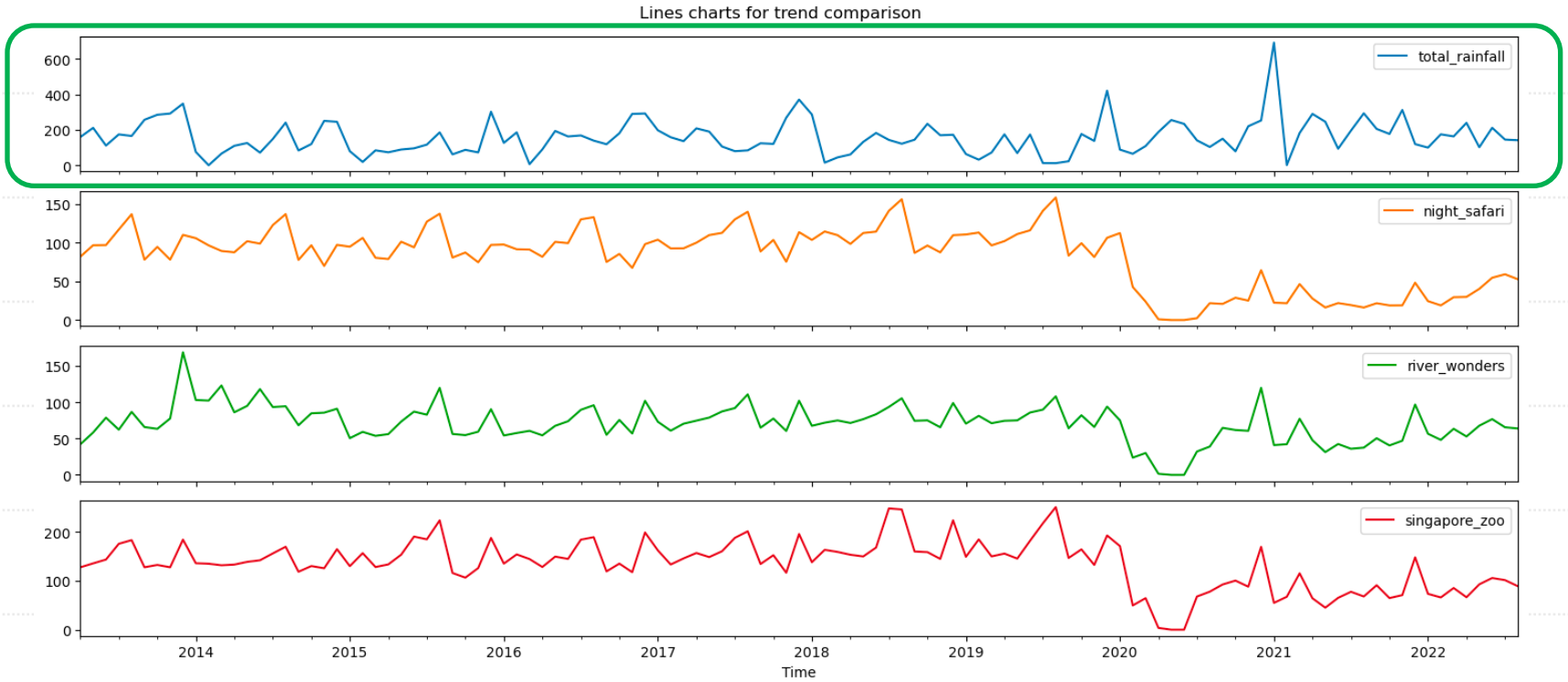
- All of the 3 parks have a very similar trend!
- For example:
  - Number of visitors spike at year end
  - Dropped during covid circuit breaker

3c. Line charts for trend analysis (No. of rainy days)



- Added the data “number of rainy days”
- No correlation found between number of rainy days and number of visitors

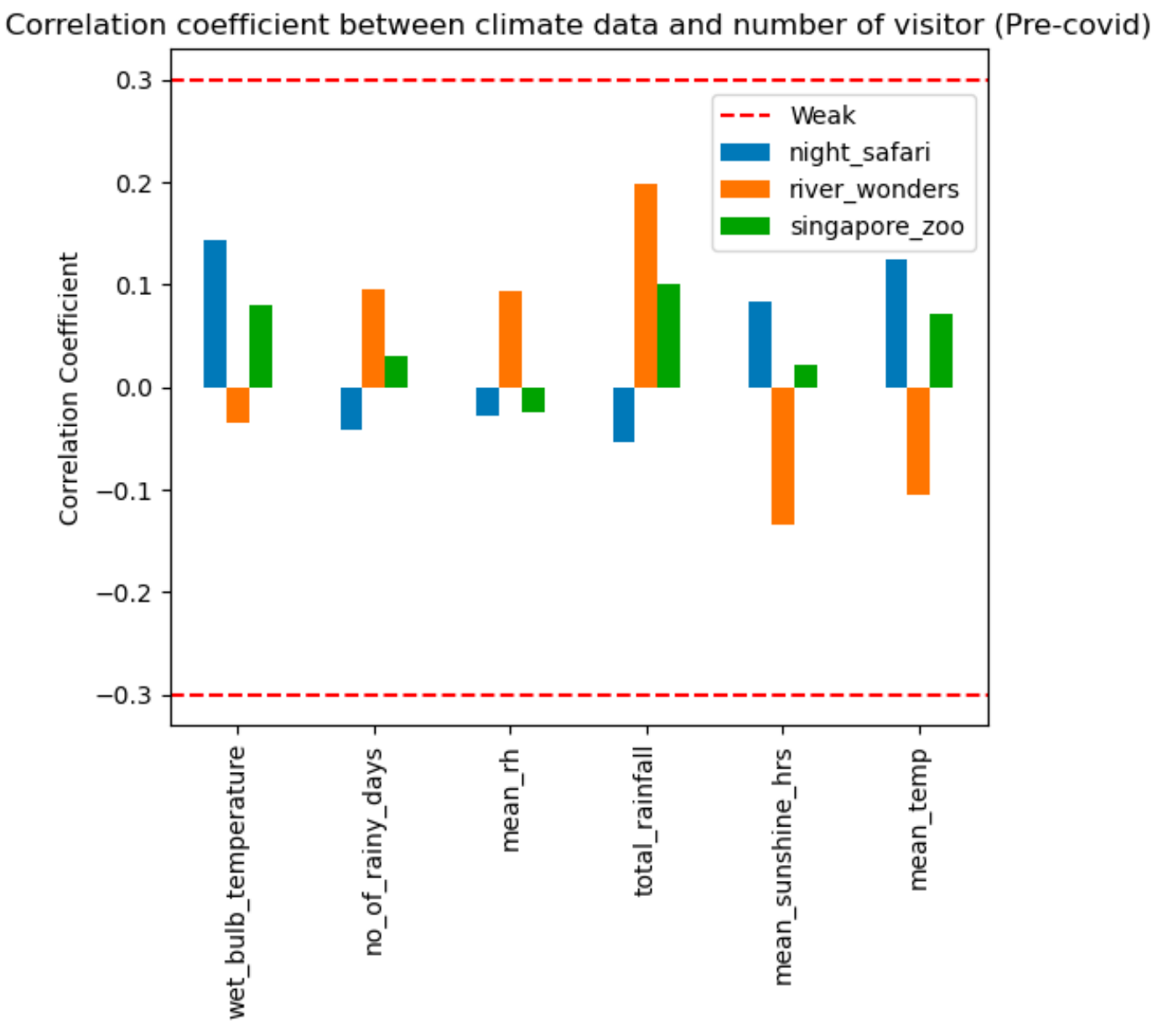
3c. Line charts for trend analysis (Total rainfall)



- Added the data “Total rainfall”
- No correlation found between total rainfall and number of visitors

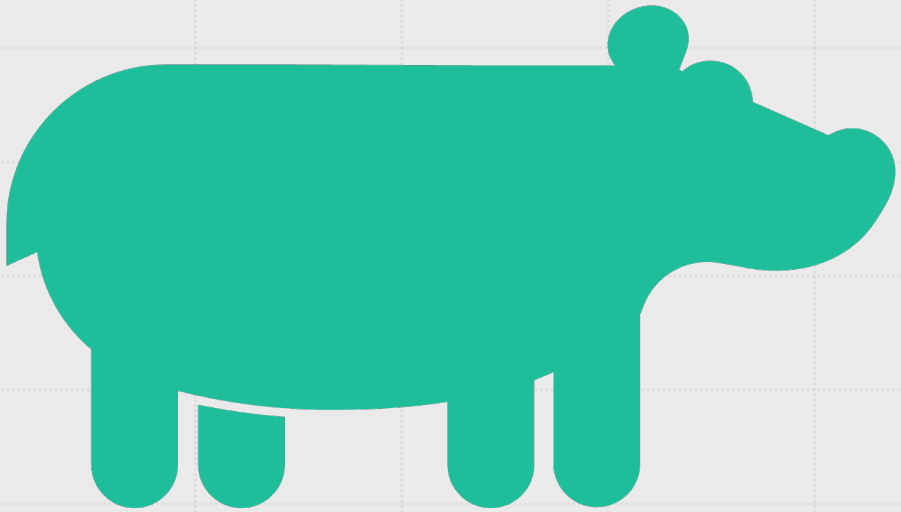
3d. Correlation bar chart (Pre-covid)

- Circuit breaker during covid period affected the number of visitors to the parks.
- To get the normalized data, the heatmap used the data before covid (i.e. before Apr 2020 circuit breaker implemented).
- However, the correlation is still weak with pre-covid data.



4. Conclusion

- Weak correlations between climate and visitor numbers are observed in all the analysis.
  - Correlation coefficient below 0.3 for all climate date and number of visitors
  - No pattern found in scatter plots for correlation
  - No similar trend found in line charts for correlation
- The management should rely on factors other than climate when forecasting visitor numbers.



4. Recommendation

- Consider other factors like school holiday, special event and etc for predicting visitor numbers.
- Given that some visitors come to the zoo regardless of weather conditions, the management should consider enhancing weather-related measures to improve the customer experience, such as adding covered walkways.

Q&A

Thank you!