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Batch	L
Aim	Designing Interactive Dashboards and Storytelling using D3.js on Environment/Forest Cover Dataset

About Dataset:

This dataset captures detailed ecological observations of flora and fauna across various years and regions. It includes species type, species name, count, canopy cover, tree height, soil pH, temperature, rainfall, CO2 sequestration (kg), and biodiversity index. Remarks highlight endangered species and canopy density. It is ideal for analyzing biodiversity trends, CO2 sequestration, and environmental factors affecting species, offering valuable insights for conservationists and ecologists.

Column Attributes:

- **Sample_ID:** A unique identifier for each observation (numeric).
- **Species_Type:** Categorizes the species as either flora or fauna (categorical).
- **Species_Name:** The name of the species being observed (text).
- **Count:** The number of individuals or occurrences of the species (numeric).
- **Canopy_Cover (%):** The percentage of canopy cover provided by the species (numeric).
- **Tree_Height (m):** The height of trees in meters (numeric, applicable to flora).
- **Soil_PH:** The pH level of the soil in which the species is found (numeric).
- **Avg_Temperature (°C):** The average temperature of the region during the observation period (numeric).
- **Rainfall_mm:** The amount of rainfall in millimeters during the observation period (numeric).
- **Year:** The year of the observation (numeric).
- **Region:** The geographical region where the observation took place (categorical).
- **CO2_Sequestration (kg):** The amount of CO2 sequestration by the species in kilograms (numeric).
- **Biodiversity_Index:** A measure of the biodiversity associated with the species, on a scale from 0 to 1 (numeric).
- **Observation_Remarks:** Additional notes or remarks about the observation, such as conservation status or habitat characteristics (text).
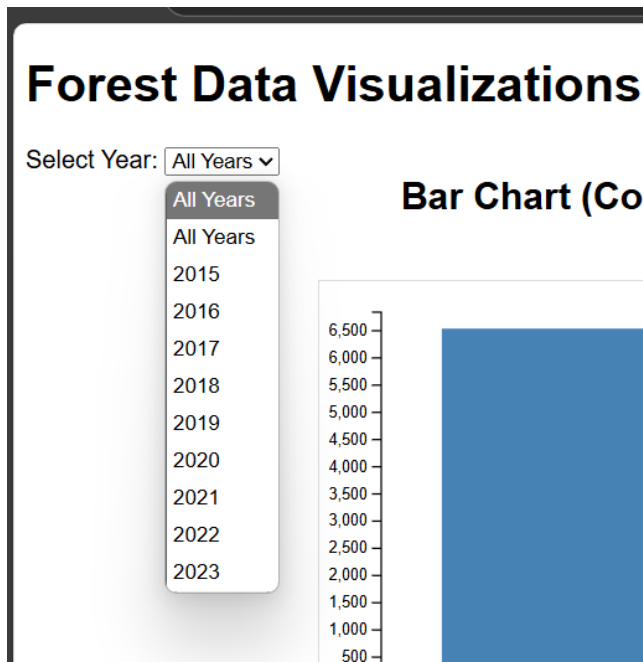
Sample Data:

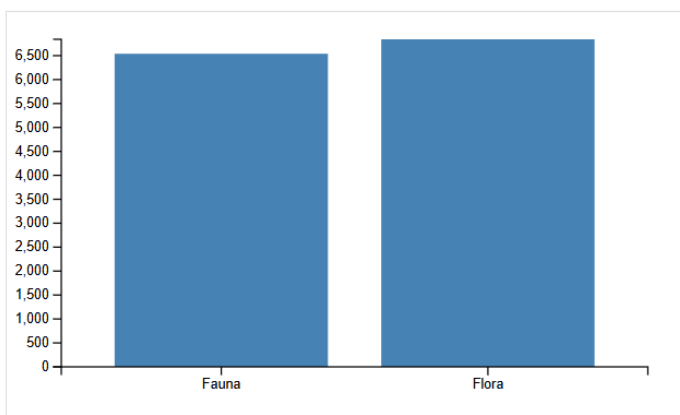| Sample_ID	Species_Type	Species_N	Count	Canopy_C	Tree_Heig	Soil_PH	Avg_Temp	Rainfall_m	Year	Region	CO2_Sequ	Biodiversit	Observation_Remark
1	Fauna	Bengal Tig	51	71	27.6	6.5	28.3	1723	2021	East	1796.3	0.84	Endangered Species
2	Fauna	Elephant	77	70.7	22.5	7	26.1	1716	2021	East	2455	0.77	Common Herbivore
3	Flora	Banyan Tre	9	80.6	14.9	7.2	29.9	2419	2017	East	2345.7	0.9	Common Herbivore
4	Fauna	Banyan Tre	29	77.5	15	7.3	29.5	1809	2023	East	1272.9	0.81	Common Herbivore
5	Flora	Banyan Tre	14	79.6	22	6.8	28.3	2056	2021	East	1291.9	0.84	Common Herbivore
6	Fauna	Mango Tre	95	72.9	10.7	6.5	28.2	1659	2022	East	1317.7	0.83	Common Herbivore
7	Flora	Indian Jack	5	88	24.1	6.6	27.5	2294	2023	East	1047.1	0.9	High Canopy Density
8	Fauna	Teak Tree	20	92.3	11.6	6.8	25.7	2041	2019	East	1865.9	0.94	High Canopy Density
9	Fauna	Mango Tre	36	69.2	20.2	7.3	23.5	1829	2021	East	2158.4	0.88	Common Herbivore
10	Flora	Python	30	62.2	24.5	6.6	23.1	1581	2019	East	1380.4	0.75	Common Herbivore
11	Flora	Peacock	98	67	11.3	7.5	25.8	2283	2019	East	1384.7	0.73	Migratory bird
12	Fauna	Spotted De	33	68.1	25.5	7.4	27.3	1757	2016	East	1368	0.71	Common Herbivore
13	Fauna	Indian Jack	81	72.6	10.9	6.1	23	1599	2023	East	1649.2	0.78	Common Herbivore
14	Fauna	Peacock	17	85.9	12.8	6.1	24.9	2354	2020	East	2419	0.78	Migratory bird

Interactive Dashboard
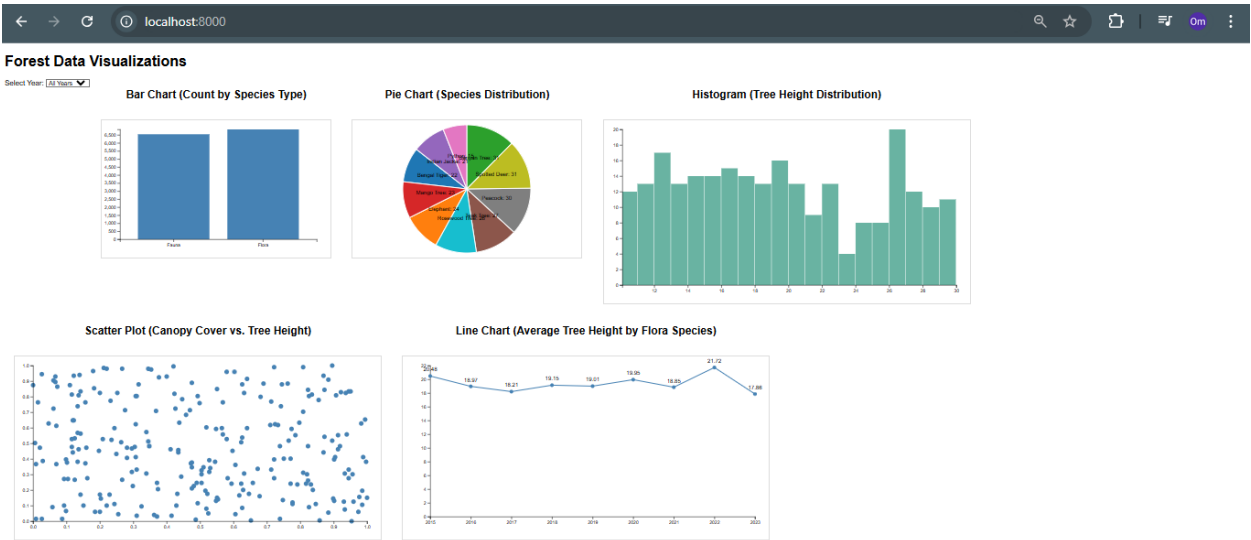
We can change the year of data to visualize, for below graph we are considering for all years

Forest Data Visualizations

Select Year: All Years

| All Years |
|---|
| All Years |
| 2015 |
| 2016 |
| 2017 |
| 2018 |
| 2019 |
| 2020 |
| 2021 |
| 2022 |
| 2023 |

Bar Chart (Co

## Bar Chart (Count by Species Type)

- The total counts for both fauna and flora are almost equal, with no significant disparity between the two.
- Both categories have species counts around 6,500, suggesting balanced biodiversity between flora and fauna in the dataset.
- This indicates that both flora and fauna have been observed at similar frequencies, possibly reflecting equal representation in the region studied.

Pie Chart (Species Distribution)
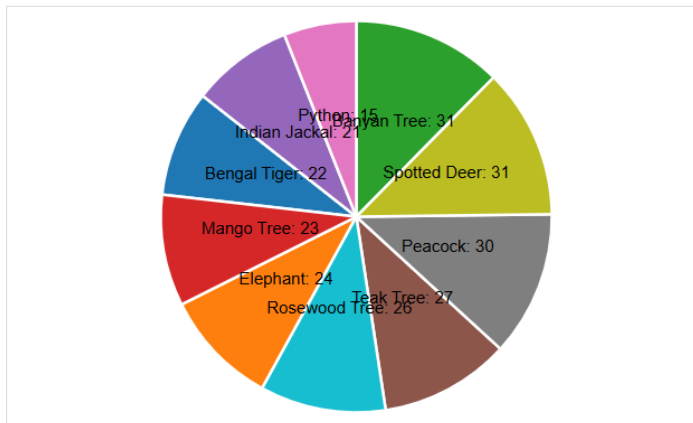
- Banyan Tree and Spotted Deer have the largest shares, each representing 31 instances in the dataset.
- Peacock comes close, with a count of 30, followed by Teak Tree (27) and Rosewood Tree (26).
- Python represents the smallest portion of the chart, with only 15 instances, indicating lower presence compared to other species.

Histogram (Tree Height Distribution)
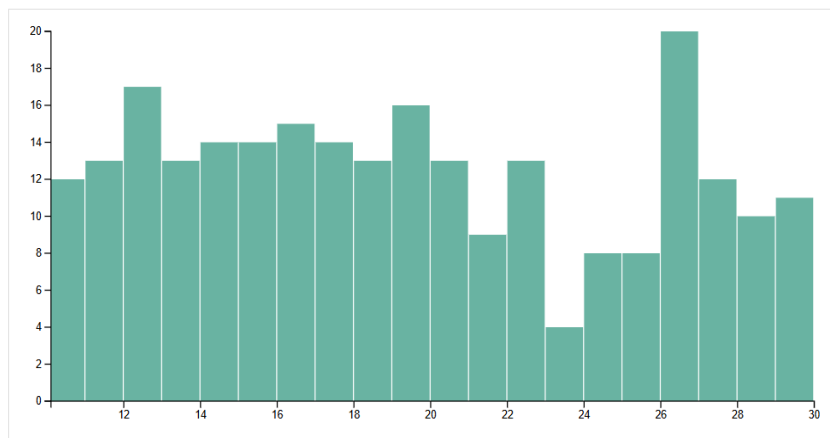
- Tree heights around 26 meters show the highest frequency, with around 19 occurrences, indicating a common height range.
- Heights between 24 and 25 meters have a sharp drop, indicating fewer trees in that range compared to neighboring heights.
- The distribution is relatively spread out, but there are notable dips around 22 meters and 23 meters, suggesting fewer trees in this height range.

Scatter Plot (Canopy Cover vs. Tree Height)
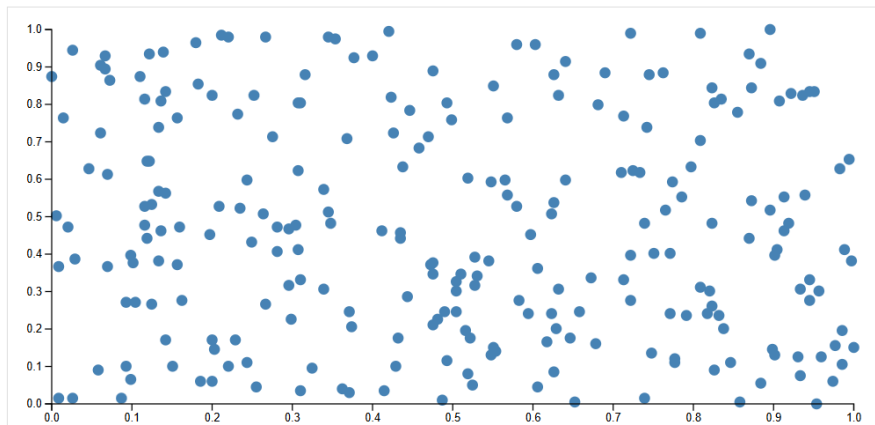
*We have normalized the data
- No clear linear relationship: The data points are scattered widely across the plot, suggesting no strong correlation between canopy cover and tree height.
- Wide range of values: Both canopy cover and tree height show a broad distribution, with values spanning nearly the entire range from 0 to 1 on both axes.

Line Chart (Average Tree Height by Flora Species)
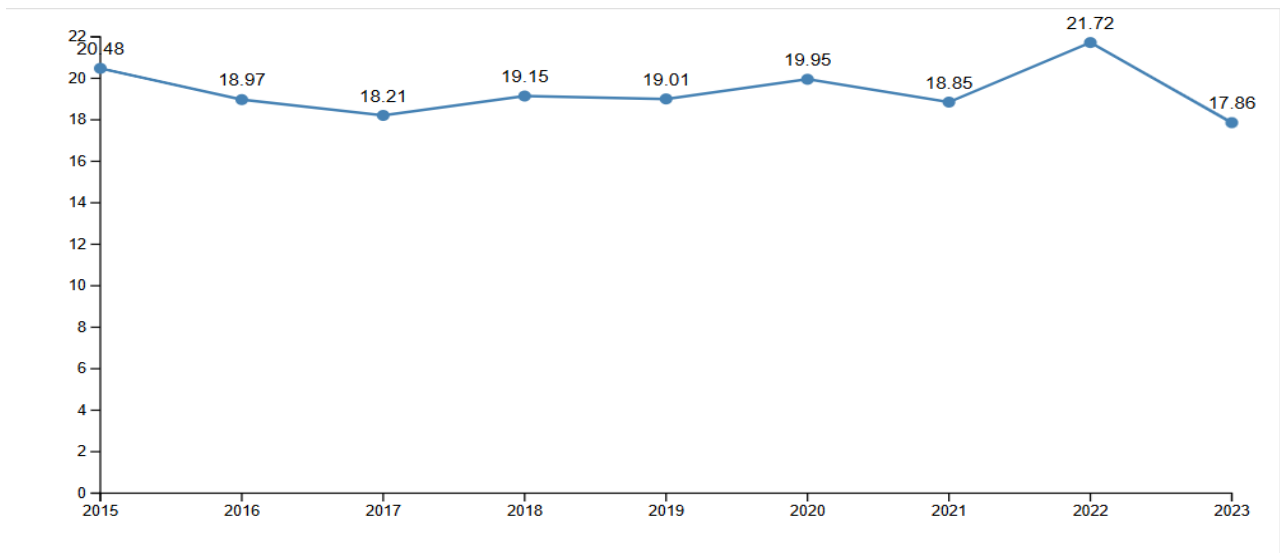
- Peak in 2022: The highest average tree height (21.72 meters) was recorded in 2022.
- Overall fluctuation: Tree heights fluctuate over the years, with no consistent upward or downward trend.
- Range of heights: Average tree heights remain between 17.86 and 21.72 meters throughout the observed period, indicating relatively stable overall growth patterns.

Conclusion: This experiment provided valuable experience in creating and analyzing interactive dashboards using D3.js for visualizing environmental data on forest cover and biodiversity. By exploring data such as species count and tree height across different years, I gained insights into the factors impacting biodiversity. Building these visualizations enhanced my ability to present ecological trends clearly and engagingly, supporting both conservation efforts and ecological research.