🎤 **Opening Line:**

"Good [morning/afternoon], everyone.

In this project, my focus was on building intuitive dashboards using Streamlit and Plotly to help users clearly understand how mobility trends, pandemic severity, and government policies evolved across time and geography."

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Chart** | **What It Shows** | **Why This Chart** | **Insight** | | --- | --- | --- | --- | | **Global Line Chart** | Global average mobility trend over time. | Line chart best shows continuous time series and trend changes. | Mobility dropped sharply in early 2020; slow recovery began post-2021. | | **Global Yearly Bar Chart** | Year-over-year comparison of mobility. | Bar charts compare magnitudes better than pie charts, especially with small differences. | 2020 had the lowest mobility; slight recovery in 2021 and 2022. | | **Global Treemap (Policy)** | Mobility vs policy stringency for each country. | Treemap compactly shows two variables — size (mobility) and color (policy score). | Countries with stricter policies generally had lower mobility. | | **Pareto Chart (Top Countries)** | COVID-19 cases vs mobility for top countries. | Dual-axis bar + line allows comparing count vs percentage clearly. | Some countries had high cases but not low mobility, showing varied compliance. | | **Funnel Chart (Top Mobility Countries)** | Rank of countries by mobility index. | Funnel naturally emphasizes ranking/drop-off better than bars/pies. | Certain countries maintained higher mobility despite pandemic conditions. | | **Single Country Dual-Axis Chart** | Mobility and new COVID-19 cases over time for a selected country. | Dual-axis line chart helps correlate two trends over the same dates. | Sharp mobility drops aligned with case surges; reopening periods visible. | | **Multi-Country Line Chart** | Compare monthly mobility trends for selected countries. | Line chart best for comparing multiple country trajectories over time. | Different reopening patterns across regions. | | **Multi-Country Yearly Bar Chart** | Yearly average mobility by country. | Bar chart easily ranks countries and shows mobility differences. | Some countries recovered mobility faster than others in 2021–22. | |

**📚 Cheat Sheet – COVID-19 Mobility Visualizations**

**Global Overview Tab**

* **Global Line Chart**
  + **What**: Shows global average mobility over time.
  + **Why**: Line charts best capture time series trends and turning points.
  + **Insight**: Major dip during early 2020 lockdowns; gradual recovery afterward.
* **Global Yearly Bar Chart**
  + **What**: Compares average mobility across years.
  + **Why**: Bar charts compare magnitudes clearly, better than pie charts for multiple years.
  + **Insight**: 2020 had lowest mobility; signs of recovery in 2021 and 2022.
* **Treemap – Mobility vs Policy Strength**
  + **What**: Shows mobility and policy strictness per country.
  + **Why**: Treemaps display two variables (size and color) compactly.
  + **Insight**: Countries with stricter policies usually had lower mobility.

**Top Countries Tab**

* **Pareto Chart – Top Countries**
  + **What**: Mobility vs total COVID-19 cases for most affected countries.
  + **Why**: Dual-axis (bar + line) needed to show two different scales (counts vs percentages).
  + **Insight**: Some countries had high cases but relatively moderate mobility reductions.
* **Funnel Chart – Top Mobility Countries**
  + **What**: Ranks countries based on highest mobility.
  + **Why**: Funnel chart emphasizes ranking and "drop-off" better than simple bar charts.
  + **Insight**: A few countries maintained much higher mobility compared to others.

**Single Country Tab**

* **Dual-Axis Chart – Single Country Mobility vs Cases**
  + **What**: Mobility and new COVID-19 cases over time for a selected country.
  + **Why**: Dual y-axes allow showing different units (mobility % vs case counts) together.
  + **Insight**: Mobility dips typically align with peaks in new COVID-19 cases.

**Multi-Country Tab**

* **Line Chart – Multi-Country Monthly Trend**
  + **What**: Mobility trends of selected countries over time (monthly).
  + **Why**: Line charts make it easy to compare trends across multiple countries.
  + **Insight**: Different countries show different patterns of recovery and restrictions.
* **Bar Chart – Yearly Country Comparison**
  + **What**: Yearly average mobility index for selected countries.
  + **Why**: Bar charts rank countries clearly; pie charts would distort small differences.
  + **Insight**: Some countries restored mobility faster post-2020 than others.

**🎨 Design Choices – Quick Answers**

**Why Streamlit?**

*Streamlit is lightweight, fast, and designed specifically for building interactive data apps without complex frontend coding. It allowed us to focus purely on analytics and user interaction with minimal overhead.*

**Why Plotly and not some other library (like Matplotlib, Seaborn)?**

*Plotly offers interactive, zoomable, hoverable charts out-of-the-box, which is critical for an exploratory dashboard. Unlike static libraries like Matplotlib or Seaborn, Plotly makes the user experience dynamic and engaging.*

**Why use Dual-Axis Charts?**

*Dual-axis charts allow us to compare two different units — like Mobility % and COVID-19 case counts — together without confusion. It helps highlight relationships (e.g., when higher cases correlate with lower mobility) which a single axis would distort.*

**Why use Treemap instead of other plots?**

*Treemaps efficiently show two dimensions: size (mobility) and color (policy strength) in one compact space. Scatter plots or bar charts cannot show hierarchical drill-down and comparative magnitude simultaneously like a treemap.*

**Why Monthly Aggregation instead of Daily?**

*Daily data was too noisy — small fluctuations made the trends hard to interpret. Aggregating by month smoothed the trends naturally and made cross-country comparisons easier and more meaningful.*

**Why add Hover Tooltips?**

*Hover tooltips enhance user experience by providing precise numbers (e.g., exact mobility %, number of new cases) without cluttering the chart visually. It keeps the interface clean but still informative.*

**Why add Date Range Selectors, Dropdowns, and Filters?**

*Giving users the ability to filter dates, countries, or policy strength allows for personalized exploration. It empowers users to focus on specific periods, regions, or events they care about.*

**⚡ Limitations (Be Honest and Smart)**

**📅 Data Discontinuity after October 15, 2022**

*Google Mobility Reports were discontinued after October 15, 2022.  
As a result, mobility values appear flat beyond this point because no new data was published.*

✅ *I added clear information notes inside the app so users are aware and don’t misinterpret the flat trends.*

**🔥 Minor Missing Data**

*Some countries or dates had missing mobility or policy data.  
These were handled gracefully using aggregation (mean values) or interpolation where needed.*

✅ *We chose not to artificially fill or fabricate missing information — only real, existing data was visualized.*

**📈 About Smoothing**

*We briefly tested smoothing (like Savitzky-Golay filters) to reduce noise.  
However, we kept the original unsmoothed trend as default to preserve data authenticity.*

✅ *Users were given an option to view the smoothed line, but we did not manipulate the original values.*

**🎤 Demo Walkthrough Script**

**🌍 Global Overview Tab**

"This tab gives a worldwide view of mobility trends.  
First, the line chart shows how global average mobility changed over time — we clearly see major drops during early lockdowns and gradual recovery afterward.  
The treemap combines mobility data with policy strictness scores, showing how stricter governments generally saw lower mobility."

**🌟 Top Countries Tab**

"Here we focus on the top countries most impacted by COVID-19.  
The Pareto chart compares total case counts and average mobility side-by-side on dual axes — helping us spot interesting patterns like countries with high mobility and high cases.  
The funnel chart then ranks countries purely by how much movement their populations maintained."

**🏳️ Single Country Tab**

"This section lets users explore any individual country in detail.  
The dual-axis line chart overlays mobility trends and new COVID-19 case trends, helping analyze whether movement restrictions aligned with infection waves.  
For example, the United States shows clear mobility dips during major COVID-19 surges."

**🌐 Multi-Country Tab**

"This final tab allows for country-to-country comparisons.  
We can compare monthly mobility trends across multiple countries to see how different regions behaved.  
The bar chart further shows average annual mobility, letting us rank countries by their overall movement in a selected year."

At the end of your part, close with something like:

"Overall, the goal was to not just present the data, but to tell a clear story through visualization — and I believe this dashboard successfully achieves that."