README

Course: Data Storytelling and Visualization

Course Code: DA103

Topic: Technology and Innovation

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Date: 24-07-2025

1. Problem Statement
The smartphone industry continues to evolve rapidly, with brands racing to deliver the most innovative features at competitive prices. This project explores how key technological features such as battery capacity, fast charging, CPU speed, display size, and overall pricing impact smartphone positioning in the market.

2. Objective
The primary objectives of this analysis are:
- To clean and prepare real-world smartphone data for analysis
- To treat outliers and missing values accurately
- To uncover patterns between smartphone features and their market prices
- To identify standout trends in specifications across different brands
- To create visuals and narratives that help stakeholders understand current technology trends and consumer value perception

3. Dataset Overview
- 100 smartphones entries
- 35 columns
- Includes: Brand, Model, Price (INR), Rating, Grade, Release Year, Battery (mAh), Charging Speed (W), Processor Brand, CPU Speed (GHz), Display Size, Front & Rear Camera MP, OS Version, Connectivity (e.g., 5G), Boolean features like NFC, IR Blaster, Face Unlock, etc.

4. Data Inserting & Cleaning Summary
- The dataset was generated using Python and Pandas in CSV format, which was later converted to Excel for further analysis
- ChatGPT was used to reference GSMArena and assist in creating the spec sheet for each phone in JSON format, helping to minimize potential errors
- Manually filled missing values using trusted sources
- Replaced 0W charging speed conditionally based on fast charging availability
- Treated outliers using IQR; created Before/After columns

- Standardized logical values to Yes/No
- Added CPU speed column manually based on processor

5. Key Questions Answered
- Which brands offer the best price-to-spec value?
- What are the common outliers in smartphone pricing?
- Is there a link between fast charging and high price segments?
- Which processor brands lead in performance?
- Do large displays correlate with premium pricing?

6. Visuals and Charts Created
- Boxplots (before/after) for Price, Battery, etc.
- Pivot Charts for: Price by Brand, Battery by Brand, Charging Speed by Brand, CPU Speed by Processor, Display Size by Brand
- Pie Chart: Phones shipping with charger
- Histogram: Price distribution (after outlier treatment)
- Rating Chart

7. Key Observations
- Most smartphones fall within the ₹15,000–₹40,000 range post outlier treatment
- Fast charging speed varies widely; only few brands push above 80W
- Brands like HiSilicon and Google offer higher average CPU speeds
- Display sizes have grown, with 6.5"+ being the norm in newer models
- Not all expensive phones have high ratings — brand value plays a role

8. Dashboard & Interactivity
An Excel-based dashboard was created using pivot tables, charts, filters, and slicers to enable interactive brand-wise and metric-wise analysis.

9. Conclusion
With so many smartphones out there, it really comes down to one question: what are you getting for the price? Is that extra cash buying you better performance, more battery life, or just a fancy name? This project breaks down the specs, like speed, screen size, and battery, alongside the price, so you can actually see what's worth it and what's not. It's all about helping you compare, spot the real value, and avoid overpaying for features you don't need.

10. Bibliography
- Microsoft Excel 2019
- Python with Pandas library
- ChatGPT
- GSMArena