Graphic Displays

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Look at this Graph
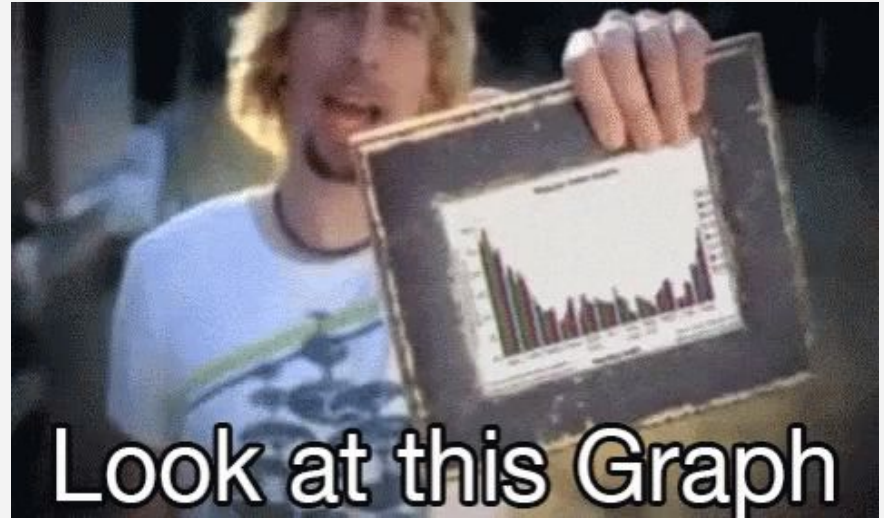
# The Problem

- Understanding Data relations can be difficult

- Solves complexity by simplifying data visually

- Converts raw data into graphical representations

- Used for reporting, operations, and tracking

- Reveals hidden patterns in raw data

- Creates engaging, fun visual graphics as well
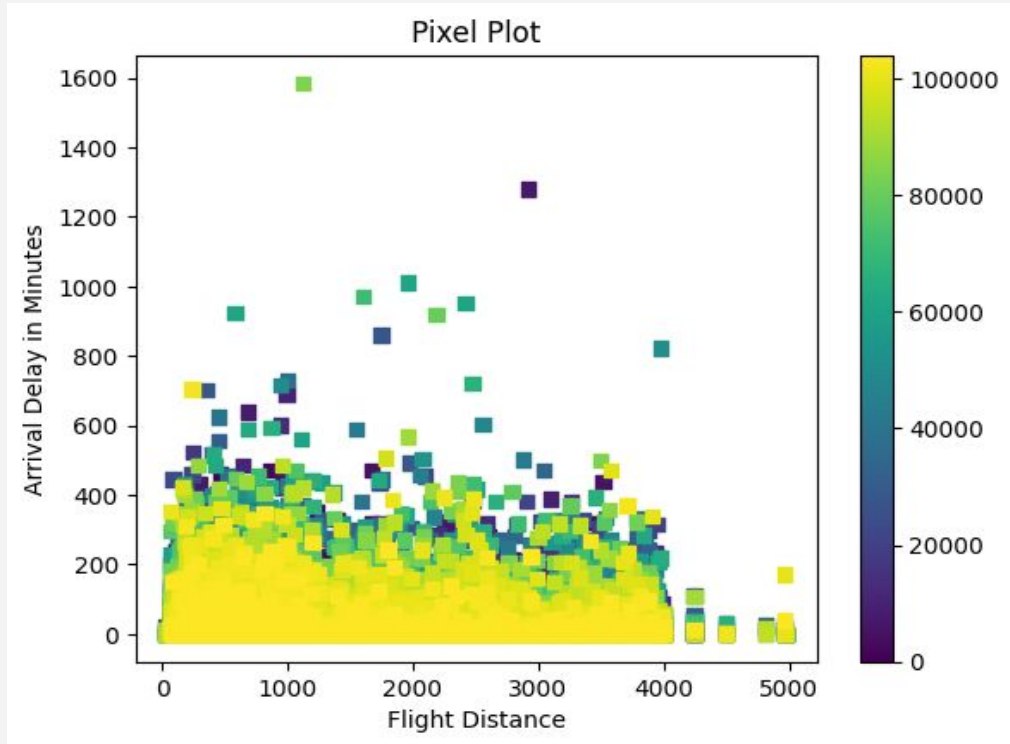
Methods to Visualise data

- Pixel Visualization

- Geometric projection

- Icon-based

- Hierarchical and graph-based

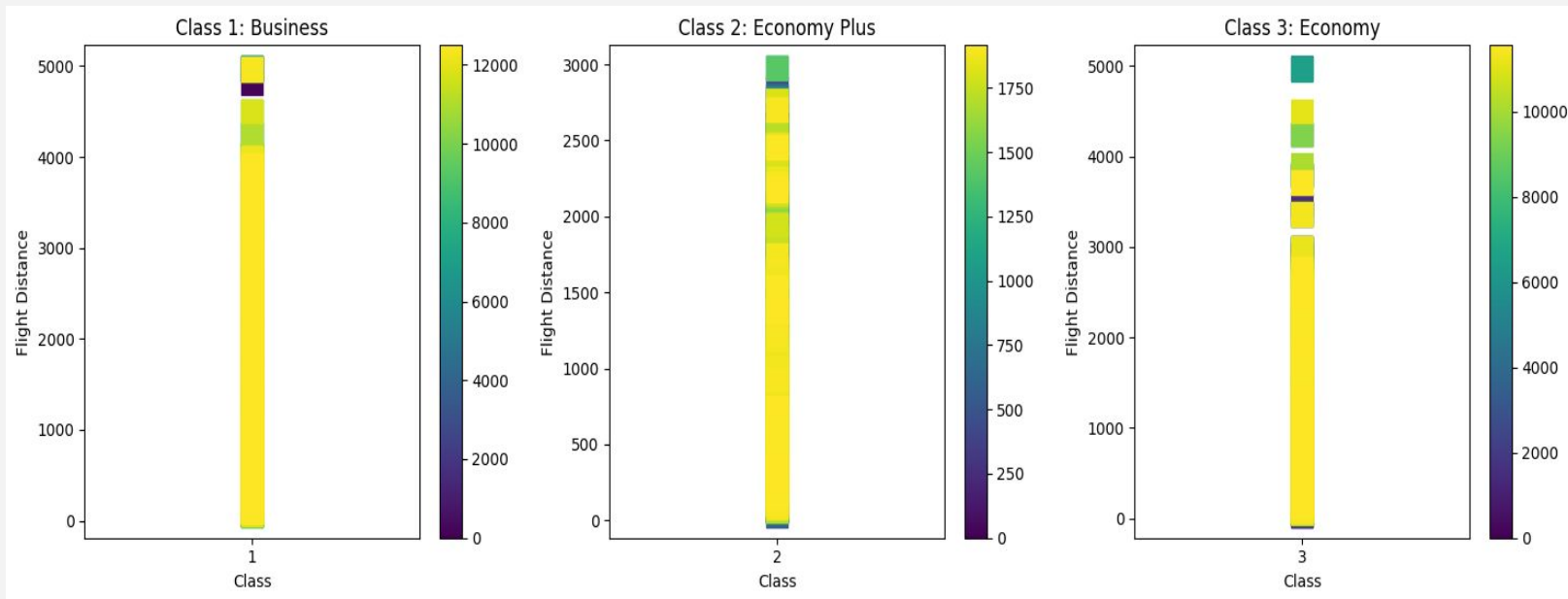- Complex data and relations

Applying to our Dataset
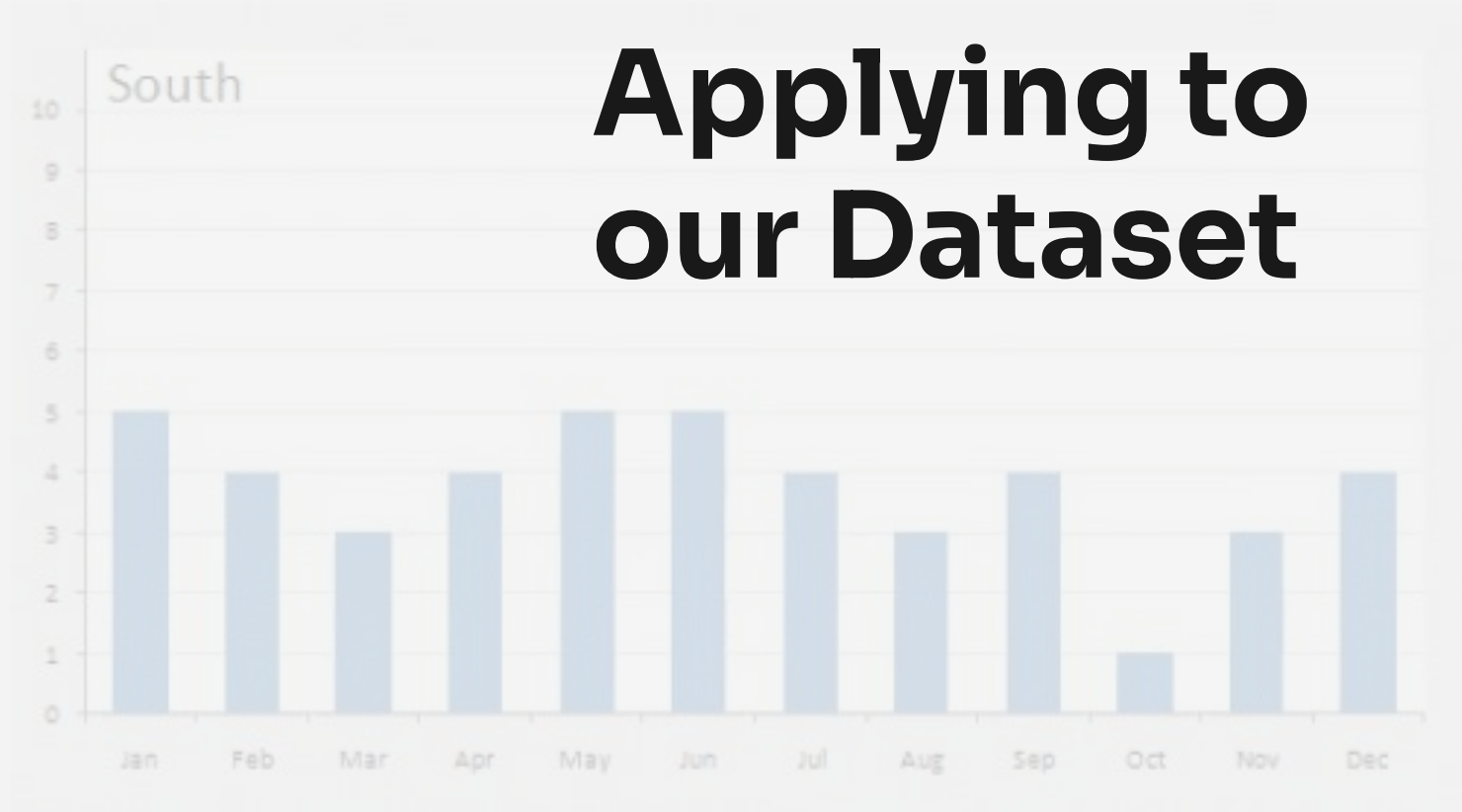
Pixel Graphs

- Cluster of Data at Bottom

- Fizzles out as y axis increases

- Shows Outlier

- Questionable Usefulness

Pixel Graphs

Geometric Projection

- Pixel techniques lack multidimensional distribution insights
- Geometric projection finds useful data projections
- Helps visualize high-dimensional data relationships
- Main challenge: displaying high-dimensional data
- Projects multidimensional space onto 2-D displays

Scatter Plots

- Display relationships between two variables
  - 3rd dimension using colour
- They help identify patterns, trends, and correlations
- A strong positive correlation
- Do we need both features?

Scatter Plot: Departure Delay vs Arrival Delay
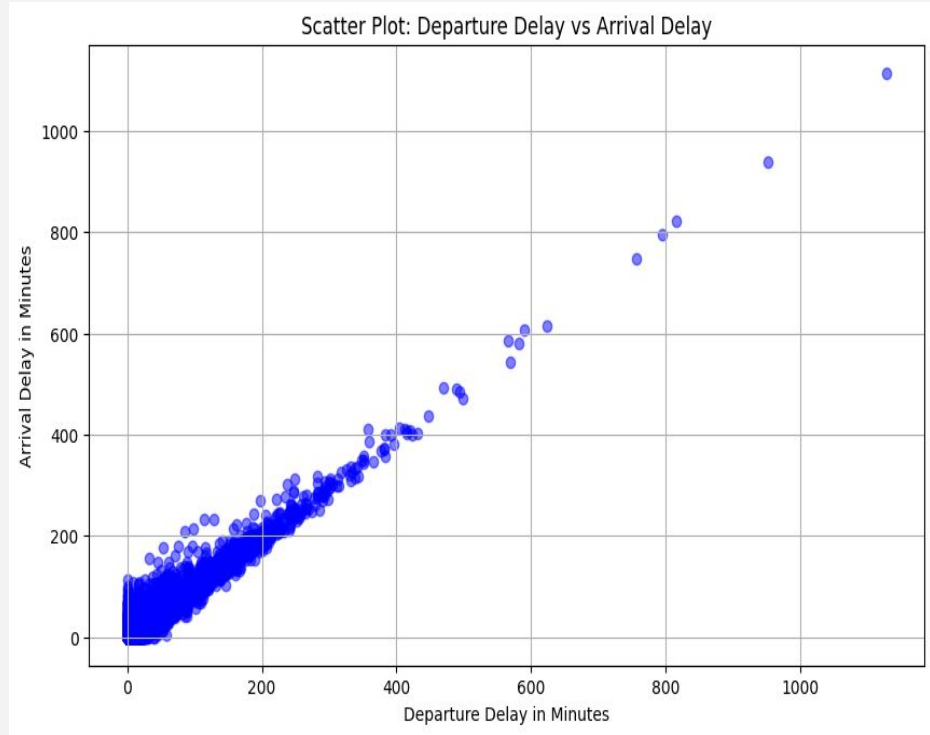
Scatter Plot Matrix

- Variables compared in an n × n grid
- Shows pairwise 2-D scatter plots for each variable
  - Colour used for satisfaction class
- Diagonal plots display individual variable distributions
- Satisfied rate Online boarding higher
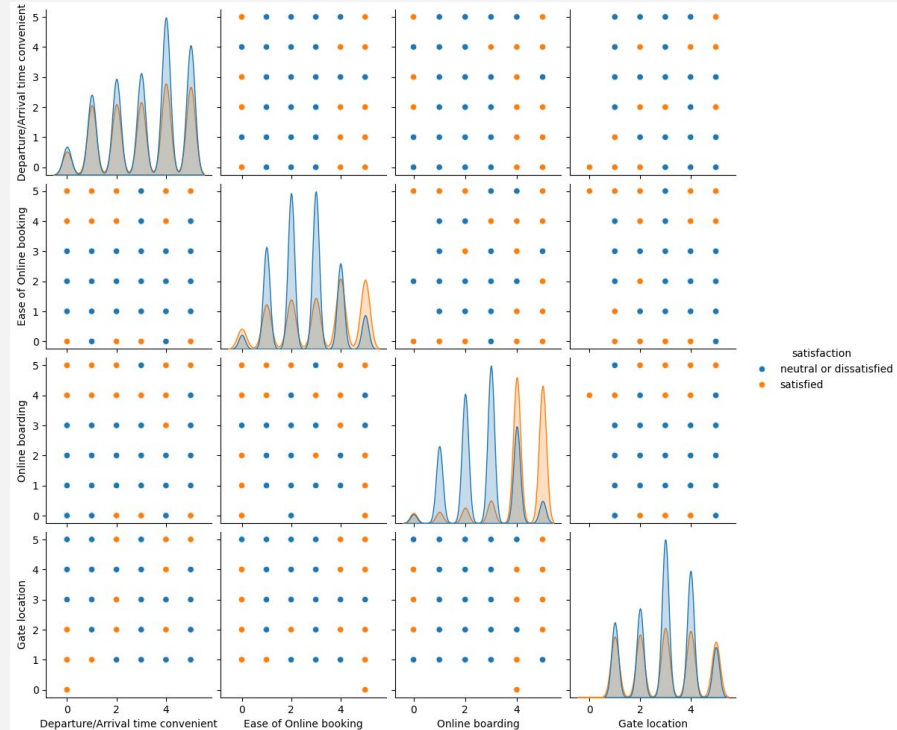
Parallel Coordinates Plot

- Visualize higher-dimensional data efficiently.
- Parallel axes for each dimension
- Each record shown as polygonal line
- Satisfied line thicker top and bottom
- Neutral are towards middle

Parallel Coordinates Plot
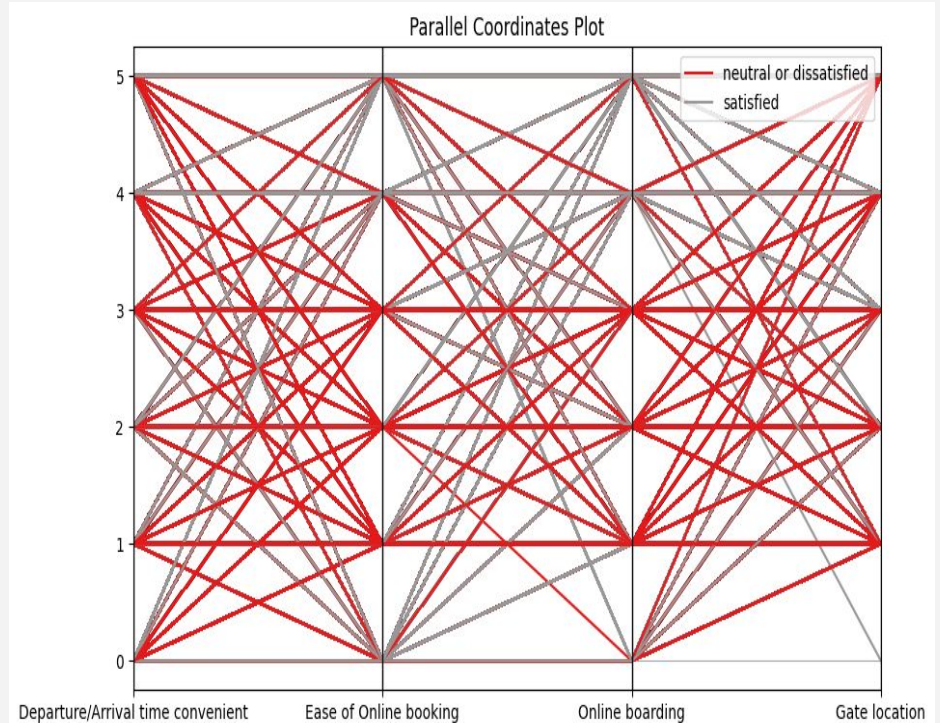
Chernoff Faces

- Good for small datasets

- Bad for ours
  - 129,000+ rows

- Limited Options
  - Only 5 columns can be chosen

- Displayed row by row
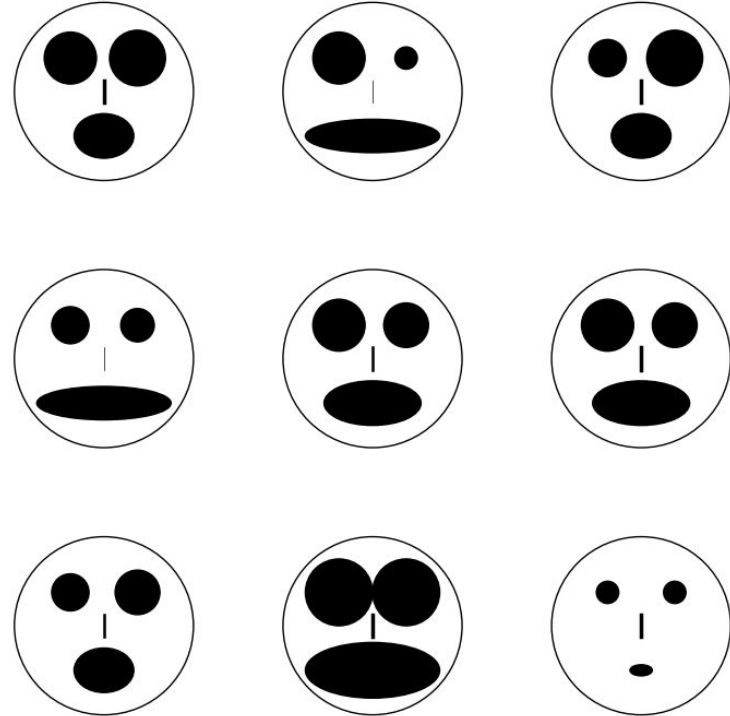
Graph 1

R.E -> On-Board Service

L.E -> Inflight Wifi Service

M.W -> Leg room Service

M.H -> Baggage Handling

N.L -> Check-in Service

Chernoff Faces Representing Customer Experience Ratings

Graph 2

1
'Inflight wifi service', **(ESL)**
'Departure/Arrival time convenient', **(ESR)**
'Ease of Online booking', **(MW)**
'Gate location', **(MH)**
'Food and drink', **(NL)**
2
'Online boarding', **(ESL)**
'Seat comfort', **(ESR)**
'Inflight entertainment', **(MW)**
'On-board service', **(MH)**
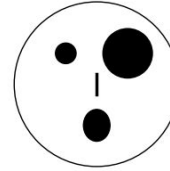'Leg room service', **(NL)**
3
'Cleanliness', **(ESL)**
'satisfaction', **(ESR)**
'Inflight service', **(MW)**
'Baggage handling', **(MH)**
'Checkin service' **(NL)**

Chernoff Face Representing Average Ratings (Cols [1-5])   **1**

Chernoff Face Representing Average Ratings (Cols [6-10])   **2**

Chernoff Face Representing Average Ratings (Cols [11-14, 17])   **3**

Hierarchical Techniques

- Manage high-dimensional data.
- They partition dimensions into manageable subsets.
- Subspaces are visualized in a hierarchy.
- Simplifies complex data visualization challenges.
- Enhances clarity for large data sets.
- Supports detailed analysis of specific dimensions.

Tree Map

- Nested rectangles represent different data categories

- Area size reflects quantitative values

- Provides a compact overview of information

- Useful for comparing parts to whole

- Enhances understanding of data relationships visually

Tree Map

Hierarchical Visualization of Satisfaction Levels
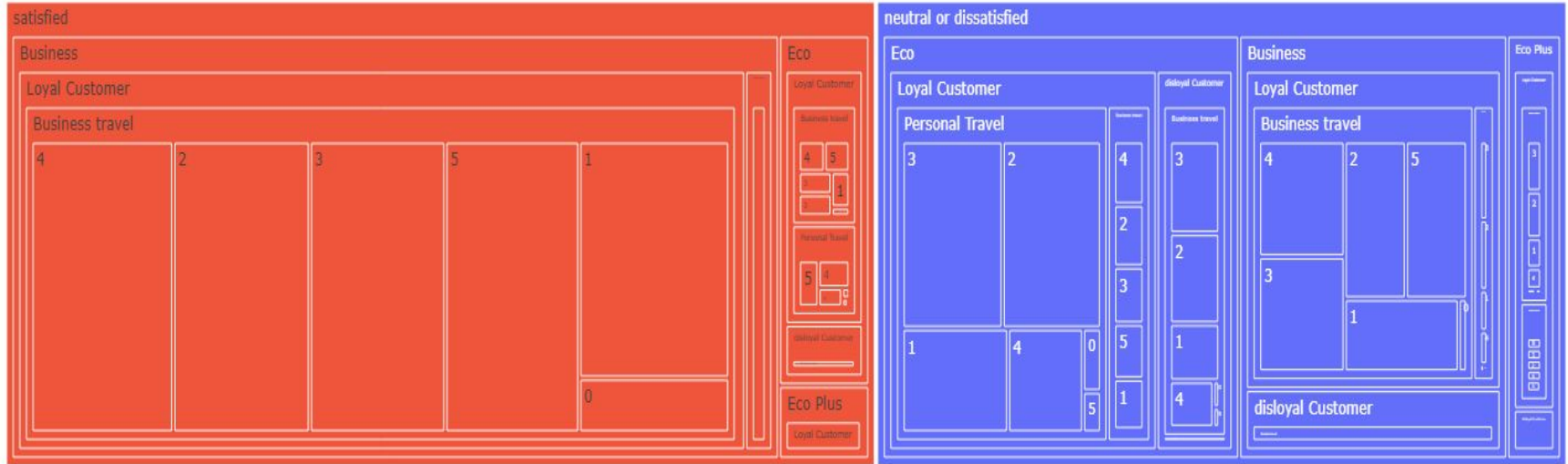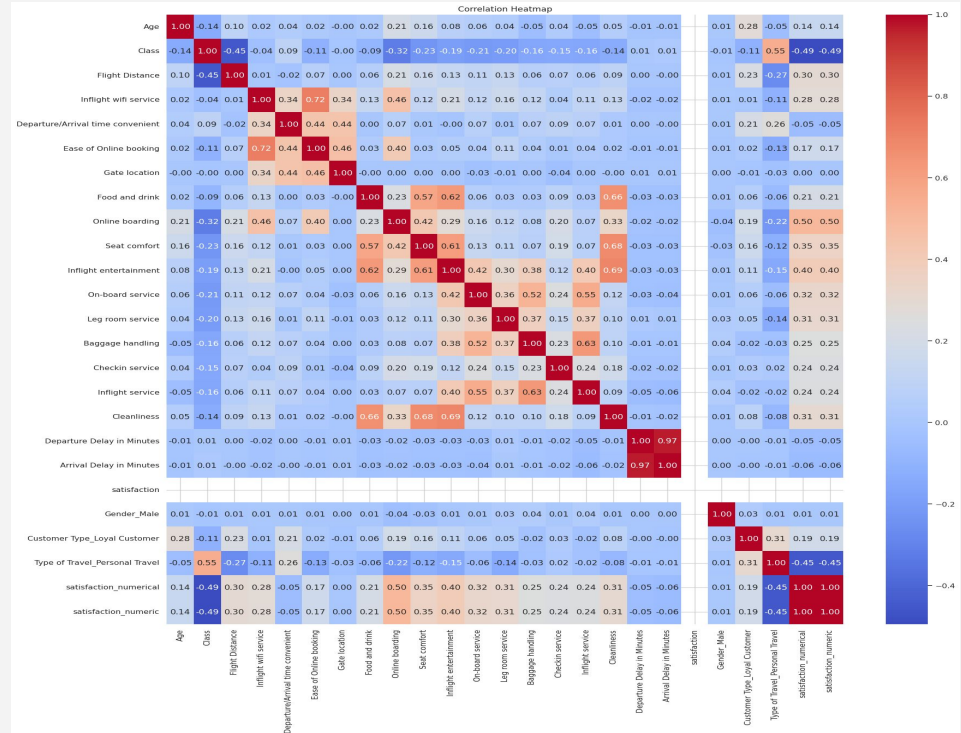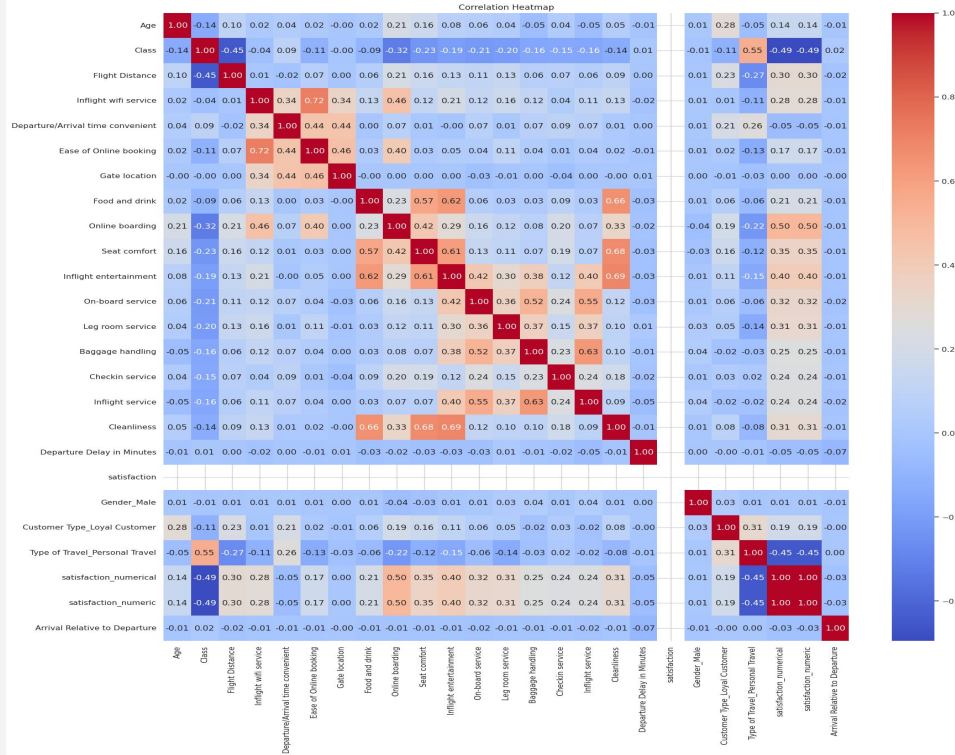
Complex Data & Relations

- Used Heat Maps

- Displays correlations between variables in dataset.

- Uses a color gradient for clarity.

- Simplifies complex relations

Complex Data and Relations

- Extremely strong correlation between Delays
- Ease of online booking and inflight wifi
- Decided to extract a new feature
- Keep Ease of online booking and inflight wifi

Correlation Heatmap

Complex Data and Relations

Correlation Heatmap

Thank You