CoachX LIVE

HealthCare Analysis

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Objectives for Healthcare Dataset Analysis

The provided healthcare dataset includes comprehensive data on funding for various research and disease areas from 2008 to 2024, as well as mortality and prevalence data for 2019.The objective of this project is to create an extensive Tableau dashboard based on the provided dataset. The dashboard will include various types of visualizations, analytical techniques, and features. This will demonstrate different functionalities in Tableau, such as joins, custom SQL, filters, and advanced calculations..

Data Information

The dataset provided contains information about various research and disease areas, with funding amounts over multiple years from 2008 to 2024. The dataset includes columns for:

1. **Research/Disease Areas**
2. **Funding amounts from 2008 to 2024** (with specific columns for ARRA and estimated future funding)
3. **2019 US Mortality**
4. **2019 US Prevalence**

Scope

1. **Visualizations**:
    - Line graphs (single and dual)
    - Bar charts (horizontal, vertical, side-by-side, stacked)
    - Pie charts
    - Gantt charts
    - Maps (symbol, filled)
    - Tree maps and heat maps
    - Advanced charts (waterfall, doughnut, funnel, whisker, scatter plot)
2. **Analytical Techniques**:
    - Filters
    - Grouping fields
    - Calculated fields (INDEX(), RANK(), LAST(), FIRST())
    - Running totals (RUNNING_SUM, WINDOW_SUM)
    - String, boolean, and date calculations
    - Trend analysis (logarithmic, exponential, linear, polynomial models)

Methodology

1. **Data Preparation**:
    - Clean and preprocess the dataset.
    - Understand the structure and relationships within the data.
2. **Visualization Creation**:
    - Use Tableau to create various types of charts and graphs.
    - Implement different types of filters and calculated fields.
    - Create advanced charts to gain deeper insights from the data.
3. **Dashboard Assembly**:
    - Combine all visualizations into a cohesive dashboard.
    - Ensure the dashboard is interactive and user-friendly.

Step-by-Step Outline for Tableau Dashboard Creation

1. Data Preparation

- Clean and preprocess the dataset for analysis.
- Import the dataset into Tableau.

2. Visualizations and Questions

Joins and Custom SQL

- **Question**: How to perform different types of joins using custom SQL in Tableau?
    - Create tables or use existing datasets.
    - Demonstrate inner, left, right, and full outer joins using Tableau's Custom SQL feature.

Line Graphs

- **Single Line Graph**:
    - **Question**: What are the funding trends over the years for a specific research area?
        - Create a line graph showing funding amounts from 2008 to 2024 for one research area.
- **Dual Line Graph**:
    - **Question**: How do the funding trends of two different research areas compare over the years?
        - Create a dual-line graph with two lines representing different research areas.

Blended Axis vs. Dual Axis

- **Question**: What is the difference between blended axis and dual axis in Tableau?
- :
    - **Blended Axis**: Show two measures on a single axis.

- **Dual Axis**: Show two measures with two independent axes.

Bar Charts

- **Horizontal Bar Chart**:
  - **Question**: Which research area received the most funding in a specific year?
    - Create a horizontal bar chart for a selected year.
- **Vertical Bar Chart**:
  - **Question**: How does the funding amount for a research area vary across different years?
    - Create a vertical bar chart for one research area over the years.
- **Side-by-Side Bar Chart**:
  - **Question**: How do funding amounts compare between two research areas across multiple years?
    - Create a side-by-side bar chart for two research areas.
- **Stacked Bar Chart**:
  - **Question**: What is the combined funding for multiple research areas over the years?
    - Create a stacked bar chart for selected research areas.

Pie Charts

- **Question**: What is the funding distribution among various research areas in a specific year?
  - Create a pie chart showing the funding distribution for a selected year.

Gantt Charts

- **Question**: How is the funding timeline distributed across research areas?
  - Create a Gantt chart to show funding timelines.

Maps

- **Symbol Map**:
  - **Question**: What are the funding amounts in different geographic regions?
    - Create a symbol map showing funding by location.
- **Filled Map**:
  - **Question**: How is the funding distributed across different regions?
    - Create a filled map to visualize funding distribution.

Tree Maps and Heat Maps

- **Tree Map**:
  - **Question**: How can we visualize the hierarchical distribution of funding?
    - Create a tree map showing funding distribution.
- **Heat Map**:
  - **Question**: Which research areas received the highest funding?
    - Create a heat map to highlight funding intensity.

Advanced Charts

- **Waterfall Chart**:
  - **Question**: How did the funding change from year to year for a research area?
    - Create a waterfall chart to show incremental changes.
- **Doughnut Chart**:
  - **Question**: What is the funding distribution among research areas?
    - Create a doughnut chart for a selected year.
- **Funnel Chart**:
  - **Question**: How does the funding amount narrow down from one stage to another?
    - Create a funnel chart for specific funding stages.
- **Whisker Chart**:
  - **Question**: What are the funding distributions with minimum and maximum values?
    - Create a whisker chart showing funding ranges.
- **Scatter Plot**:
  - **Question**: Is there a correlation between funding amounts and mortality rates?
    - Create a scatter plot to visualize the correlation.

Calculations and Trend Analysis

- **Index, Rank, Last, First Functions**:
  - **Question**: How to use INDEX(), RANK(), LAST(), and FIRST() functions in Tableau?
    - Implement these functions to create calculated fields.
- **Running Sum and Window Sum Calculations**:
  - **Question**: How to calculate running totals and window sums?
    - Use RUNNING_SUM and WINDOW_SUM calculations in visualizations.
- **String, Boolean, and Date Calculations**:
  - **Question**: How to perform string, boolean, and date calculations?
    - Create calculated fields for each type of calculation.
- **Trend Analysis**:
  - **Question**: What are the trends in funding over the years?
    - Perform trend analysis using logarithmic, exponential, linear, and polynomial models.

3. Dashboard Assembly

- Combine all visualizations into a cohesive and interactive dashboard.
- Ensure the dashboard is user-friendly and provides actionable insights.

The dataset allows for in-depth analysis and visualization, leading to several key objectives:

Objective 1: Trend Analysis

- **Insight**: Identify trends in funding over time for different research and disease areas.
- **Visualization**: Line graphs (single and dual) to show funding changes from 2008 to 2024.

Objective 2: Comparative Analysis

- **Insight**: Compare funding amounts across different research areas and understand funding distribution.
- **Visualization**: Bar charts (horizontal, vertical, side-by-side, stacked), pie charts.

Objective 3: Funding Allocation

- **Insight**: Determine how funding is allocated across different years and research areas.
- **Visualization**: Gantt charts to show funding timelines, stacked bar charts.

Objective 4: Geographic Analysis

- **Insight**: Visualize funding distribution across different geographic regions.
- **Visualization**: Symbol maps, filled maps.

Objective 5: Hierarchical Data Representation

- **Insight**: Understand the hierarchical distribution of funding among various research areas.
- **Visualization**: Tree maps, heat maps.

Objective 6: Advanced Analytical Techniques

- **Insight**: Apply advanced analytical techniques to identify patterns and correlations.
- **Visualization**: Scatter plots for correlation analysis, advanced charts like waterfall, doughnut, funnel, and whisker charts for detailed insights.

Objective 7: Statistical Calculations

- **Insight**: Use statistical calculations to derive additional insights from the data.
- **Techniques**: Calculated fields (INDEX(), RANK(), LAST(), FIRST()), running totals (RUNNING_SUM, WINDOW_SUM), string, boolean, and date calculations.

Objective 8: Trend Prediction

- **Insight**: Predict future trends in funding using various models.
- **Visualization**: Trend analysis with logarithmic, exponential, linear, and polynomial models.

Specific Tasks to Address

Question 1: Which research areas have received the most consistent funding over the years?

Reason:

Understanding which research areas have received consistent funding helps identify areas of sustained interest and support. This can inform future funding decisions and policy-making.

Example:

If we see that cancer research has received steady funding from 2008 to 2024, it indicates a continuous priority for this area, suggesting stability in research opportunities and potential for long-term projects.

Chart:

Line Graphs: These charts are perfect for displaying trends over time. A single line graph can show the funding trend for a specific research area, while a dual line graph can compare trends between two areas.

Visualization:

- **Single Line Graph**: Displays funding amounts from 2008 to 2024 for one research area.
- **Dual Line Graph**: Compares funding trends of two different research areas.

Question 2: How do the funding amounts for different research areas compare on a year-by-year basis?

Reason:

Comparing funding amounts annually helps identify which areas receive more attention and resources each year. This can highlight shifts in funding priorities.

Example:

If mental health research shows a significant increase in funding in 2015, it might correlate with policy changes or increased awareness about mental health issues.

Chart:

Bar Charts: Useful for comparing different categories.

- **Horizontal Bar Chart**: Shows the research area receiving the most funding in a specific year.

- **Vertical Bar Chart**: Illustrates the variation of funding for a research area across different years.
- **Side-by-Side Bar Chart**: Compares funding amounts between two research areas across multiple years.
- **Stacked Bar Chart**: Displays combined funding for multiple research areas over the years.

Visualization:

- **Horizontal Bar Chart**: For a selected year, visualize which research area received the highest funding.
- **Vertical Bar Chart**: Show funding amounts for a research area over the years.
- **Side-by-Side Bar Chart**: Compare two research areas' funding across multiple years.
- **Stacked Bar Chart**: Display funding for multiple research areas combined over the years.

Question 3: What is the relationship between funding amounts and 2019 US mortality and prevalence rates?

Reason:

Analyzing the relationship between funding and health outcomes like mortality and prevalence rates can reveal the effectiveness of investments in different research areas.

Example:

If cardiovascular research has high funding and low mortality rates in 2019, it might suggest that the funding has positively impacted health outcomes.

Chart:

Scatter Plots: Ideal for showing correlations between two variables.

- **Scatter Plot**: Displays the correlation between funding amounts and mortality/prevalence rates.

Visualization:

- **Scatter Plot**: Plot funding amounts against mortality rates and prevalence rates to visualize correlations.

Question 4: How has the introduction of ARRA funding impacted the overall funding for specific research areas?

Reason:

The American Recovery and Reinvestment Act (ARRA) funding can significantly influence research funding. Understanding its impact helps assess additional support from such initiatives.

Example:

If diabetes research shows a spike in funding during the ARRA years, it highlights the impact of ARRA on boosting resources for this area.

Chart:

Gantt Charts: Useful for showing timelines and the duration of funding.

- **Gantt Chart**: Visualize the timeline of funding across different research areas.

Visualization:

- **Gantt Chart**: Show funding timelines for research areas, highlighting periods of ARRA funding.

Question 5: Which research areas are projected to receive increased funding in the coming years?

Reason:

Predicting future funding helps stakeholders plan and allocate resources efficiently. It also guides researchers on potential opportunities for funding.

Example:

If projections show increased funding for genetic research, it indicates a growing interest and potential for advancements in that area.

Chart:

Trend Analysis: Logarithmic, exponential, linear, and polynomial models help predict future trends.

- **Trend Analysis Charts**: Predict funding trends using different models.

Visualization:

- **Trend Analysis**: Use models to predict future funding trends.

Question 6: What geographic regions receive the most funding, and how is this distributed?

Reason:

Geographic analysis of funding helps identify regional disparities and focus areas. This can inform policy decisions to address funding gaps.

Example:

If the Northeast region consistently receives the most funding, it might indicate a concentration of research institutions or priorities in that area.

Chart:

Maps: Effective for geographic analysis.

- **Symbol Map**: Show funding amounts in different regions.
- **Filled Map**: Visualize funding distribution across regions.

Visualization:

- **Symbol Map**: Display funding amounts by location.
- **Filled Map**: Show funding distribution across different regions.

Question 7: What are the hierarchical distributions of funding, and which areas are prioritized?

Reason:

Understanding the hierarchy in funding allocation helps identify primary and secondary priorities. This insight is crucial for strategic planning and resource allocation.

Example:

If cardiovascular research is at the top of the funding hierarchy, followed by neurological research, it shows prioritization in these areas.

Chart:

Tree Maps and Heat Maps: Excellent for hierarchical and intensity visualizations.

- **Tree Map**: Visualize the hierarchical distribution of funding.
- **Heat Map**: Highlight funding intensity.

Visualization:

- **Tree Map**: Show hierarchical distribution of funding.
- **Heat Map**: Highlight research areas with the highest funding.

Question 8: How can advanced visualizations provide deeper insights into funding patterns and trends?

Reason:

Advanced visualizations uncover complex patterns and trends that simple charts might miss. They provide a comprehensive view of data relationships.

Example:

A waterfall chart can show incremental changes in funding year by year, providing a clear view of how funding evolves.

Chart:

Advanced Charts: Waterfall, doughnut, funnel, whisker, and scatter plots for detailed insights.

- **Waterfall Chart**: Show funding changes year by year.
- **Doughnut Chart**: Display funding distribution among research areas.
- **Funnel Chart**: Show funding narrowing from one stage to another.
- **Whisker Chart**: Show funding distributions with minimum and maximum values.
- **Scatter Plot**: Visualize correlation between funding and health outcomes.

Visualization:

- **Waterfall Chart**: Show incremental changes in funding.
- **Doughnut Chart**: Display funding distribution for a selected year.
- **Funnel Chart**: Show funding stages.
- **Whisker Chart**: Display funding ranges.
- **Scatter Plot**: Show correlations between funding and outcomes

Next Steps

1. **Import the dataset into Tableau**.
2. **Start with creating basic visualizations like line graphs and bar charts**.
3. **Gradually implement advanced visualizations and analytical techniques**.
4. **Assemble the final dashboard incorporating all visualizations and insights**.

Submission Guidelines

Format: PowerPoint or PDF
Length: 1-20 slides.
Sections: Introduction, Key Findings, Actionable, Methodologies , Approaches, Insights, Conclusions

Tools and Technologies :

POWER BI O/R **TABLEAU**

Deadline:

Submit your report and presentation within 21 Days from the day you will start.