**2.9 My Visualizations Project - Temporal Visualizations  
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Week2**

**Fire Incidents (1992-2020)  
A graph showing the growth of a company

Description automatically generated  
  
Heatmap showing Fire Size by State  
A screenshot of a computer screen

Description automatically generated**

**Stakeholder Temporal Needs**

1. Firefighters and First Responders:
   * Require real-time hourly and daily patterns to deploy resources effectively during fire outbreaks.
   * Seasonal trends help prepare for peak wildfire months (e.g., summer and fall).
2. Policy Makers and Environmental Agencies:
   * Require yearly trends to assess the effectiveness of fire management policies and funding allocation.
   * Seasonal insights aid in understanding climate impacts and developing long-term mitigation strategies.

**Interaction with Temporal Data**

1. Firefighters and Responders:
   * Compare periods with historical data to forecast resource demands and identify anomalies in fire patterns.
2. Policy Makers and Agencies:
   * Analyze long-term trends, evaluate anomalies, and create forecasts to prevent wildfires.

**Relevant Time Scales**

1. Hourly/Daily:
   * Critical for responders managing active wildfires.
2. Seasonal/Yearly:
   * Relevant for policy makers and environmental researchers to analyze broader patterns and evaluate policy impacts.

**Data Assessment**

1. Time Representation in Available Data:
   * Time series measurements: Yearly fire incidents and burned areas provide a long-term trend analysis.
   * Cumulative values: Total annual fire sizes offer insights into the scale of fire activity over time.
   * Point-in-time snapshots: Exact timestamps of fire incidents allow granular analysis of daily patterns.
   * Cyclical patterns: Seasonal fire activity reflects recurring trends during specific months.
2. Temporal Granularity:
   * Data is granular at yearly and monthly levels, suitable for long-term and seasonal analysis.
3. Completeness of Temporal Coverage:
   * The dataset spans multiple decades, ensuring comprehensive temporal coverage for trends but may lack granularity for earlier years or specific fire events.
4. Additional Context Needed:
   * Environmental data such as rainfall, temperature, and wind speed could enhance the understanding of fire activity patterns.
   * Population growth or human activity data can contextualize increasing or decreasing fire incidents.

**Initial Design Exploration**

1. Visualization 1: Line Chart of Annual Fire Incidents
   * Design: A line chart displaying the number of fire incidents by year.
     + X-axis: Year (1992–2020).
     + Y-axis: Total fire incidents.
     + Annotations for significant anomalies (e.g., drought years).
   * Purpose: Show long-term trends in fire incidents and identify years with peak activity or sharp declines.
   * Stakeholder Benefit: Helps policymakers evaluate the effectiveness of fire management policies and focus on high-risk years.
2. Visualization 2: Heatmap of Fire Size by State
   * Design: A heatmap showing the size of fires (in acres) by state and month.
     + X-axis: Months (January–December).
     + Y-axis: States.
     + Color Scale: Fire size (e.g., lighter shades for smaller fires, darker shades for larger ones).
   * Purpose: Reveal seasonal and regional patterns of fire activity.
   * Stakeholder Benefit: Enables first responders and environmental agencies to allocate resources effectively during peak months and high-risk regions.

Part2: AI-Assisted Design Process

AI tools, specifically ChatGPT (OpenAI v4.0), were used to brainstorm visualization ideas, identify key variables for temporal analysis, and align designs with stakeholder needs. Prompts such as “Suggest visualization designs for temporal analysis of wildfire incidents” and “Explain how line charts and heatmaps can show yearly and seasonal trends” helped refine the approach. While AI provided creative suggestions like combining seasonal and yearly trends into complementary visuals and annotating anomalies in line charts, it lacked details on technical feasibility and handling overlapping data in heatmaps. To address these limitations, manual adjustments were made, such as refining the color scales and simplifying AI-proposed animations into static heatmaps. Overall, AI accelerated the design process, but human intervention was crucial to implement practical and effective solutions.