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Scatterplots are used to understand the relationship or association between two variables. Questions like "When the temperature increases, do gas prices also increase?" or "How are changes in the price of gas related to the number of miles people drive each month?" can be answered by studying the pattern in a scatterplot. [adsenseWide] Basic Structure Given a scatterplot, the variable on the horizontal axis is the predictor (or independent variable) and the variable on the vertical axis is the response responds to changes in the predictor. Each point represents the value of the response for a given value of the predictor. These are called observed values. Patterns In general, you can categorize the pattern in a scatterplot as either linear or nonlinear. Scatterplots with a linear pattern have points that seem to generally fall along a line while nonlinear patterns seem to follow along some curve. Whatever the pattern is, we use this to describe the association between the variables. If there is no clear pattern, then it means there is no clear association or relationship between the variables that we are studying. As you can see above, linear patterns, as the value of the predictor increases, so does the value of the response. This shows up in the scatterplot as a linear pattern that rises from left to right. In a negative pattern, as the predictor increases, the value of the relationship or association between two variables is shown by how close the points are to each other. This is true whether the pattern is linear, nonlinear, positive, or negative. It can be somewhat subjective to compare the strength of one association to another. For scatterplots with linear patterns, the correlation coefficient can be used to better understand this strength. Example Caitlyn has started a business selling textbooks and novels online. In order to better predict her costs, she has been collecting data on the number of books in each shipment she has sent and the weight of the shipment she has sent and the response? (b) Describe the association between the two variables. Is it weak, strong, or neither? (c) What was the heaviest shipment Caitlyn made? (d) One of the shipment? Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions — You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. last modified January 10, 2023 Google charts tutorial is an introductory tutorial to Google charts library. It shows how to create a scatter chart, a line chart, and a pie charts library. In our examples, we create a scatter charts in JavaScript with Google charts library. from user-supplied information. The user supplies data and formatting in JavaScript embedded in a web page; in response the service sends an image of the chart. The library provides a large number of ready-to-use chart types. events that let us connect them to create complex structures. Charts are rendered using HTML5/SVG technology to provide cross-browser and cross-platform compatibility (including iPhones, iPads, and Android). DataTable The charts are populated with the DataTable class. It is a two-dimensional, mutable table of values. It has methods for sorting, modifying, and filtering data. It can be populated directly from a web page, a database, or any data provider supporting the Chart Tools Datasource protocol. Scatter chart is a type of plot or mathematical diagram using Cartesian coordinates to display values for typically two variables for a set of data. A scatter chart is created with google.visualization.ScatterChart. scatter.html We load the chart API. google.charts.load('current', {'packages':['corechart']}); In the first step we load the Visualization API and the corechart package. google.charts.setOnLoadCallback(drawChart); We set a callback to run when the Google Visualization API is loaded. function drawChart() { In the drawChart function we create and populate the data table, generate a chart and draw it. var data = new google.visualization.DataTable(); We create the data table. data.addColumn('string', 'Date'); data.addColumn('number', 'Price'); Columns are added with the addColumn method. The parameters are the data type and label. data.addRows([ ['Mar 14', 43], ['Nov 14', 39], ['Jan 15', 42], ['Mar 15', 37], ['Dec 15', 34], ['Feb 16', 40] ]); The data is added to the data table with the addRows method. var options = { title: "USD/kg'}, legend: { position: "none" } }; Here we set the chart options. We give a title to the chart, sets its dimensions, vertical axis label, and disable the legend. var chart = new google.visualization.ScatterChart(document.getElementById('mychart')); We generate the chart options to the draw method. Chart.draw(data, options); The chart is drawn with the draw method. We pass the chart options to the draw method. This is the tag that will hold the chart. Figure: Scatter chart Line chart A line chart is a basic type of chart which displays information as a series of data points connected by straight line segments. A line chart is created with google.visualization.LineChart. linechart.html google.charts.load('current', {'packages':['corechart']}); google.charts.setOnLoadCallback(drawChart); function drawChart() { var data = new google.visualization.DataTable(); data.addColumn('string', 'Fruit'); data. 'height':400 }; var chart = new google.visualization.PieChart(document.getElementById('mychart')); chart.draw(data, options); } The example creates a pie chart. var data = new google.visualization.DataTable(); data.addColumn('string', 'Fruit'); data.addColumn('string', 'Fruit'); data.addColumn('number', 'Quantity'); data.addRows([ ['Oranges', 38], ['Pears', 45], ['Plums', 24], ['Blueberries', 10] ]); In the chart we show the proportions of available fruits. var options = { 'title': 'Fruits', 'titleTextStyle': { 'fontSize': '22', }, 'width': 500, 'height': 400 }; In the chart options, we set the chart title, change the default title font size, and set the size of the chart. var chart = new google.visualization.PieChart (document.getElementById('chart div')); The pie chart is created with google.visualization.PieChart. Figure: Pie charts library. A scatterplot is used to visualize a relationship between datasets, enabling you to interpret whether there is a trend in your data or not. A scatterplot is also known as a scatter diagram. Each observation in a scatterplot has 2 coordinates: the independent variables displayed on the y-axis. Depending on the pattern that shows up in the plot, you might be able to determine whether a relationship or correlation exists between the two variables. If the data points make a straight line when plotted, then the relationship between the variable are strong. Consider the graph by looking at the trends from left to right. On the left diagram, we can say that the plot has a perfect positive correlation because the value of dependent variable y goes up as the value of independent variable x increases. On the other hand, the right diagram has a perfect negative correlation because the value increases. But these examples rarely happen with real datasets. You might find a strong or weak correlation, but never perfect as shown below:When the data doesn't resemble any pattern at all, then there's no correlation between the variables in the dataset. They are particularly useful for identifying patterns and trends in the dataset. The visual insights allow you to easily see outliers, clusters, and the data distribution. I hope this tutorials! How do you spot trends when your data is all over the place? For businesses in industries like banking, telco, and HR, understanding the relationships between key metrics - like customer churn and subscription costs or training budgets and performance - can feel overwhelming. To simplify the process, you need the right tools. Scatter plots offer a straightforward way to visualize and uncover patterns in complex data, turning chaos into clarity. Ready to see how they work?What are scatter plots?A scatter plots?A scatter plots offer a straightforward way to visualize and uncover patterns in complex data, turning chaos into clarity. variable on the x-axis and another on the y-axis. Each point represents a pair of values, making it easy to visualize relationships between two variables. For stakeholders like CIOs and Product Owners, scatter plots highlight trends and correlations at a glance, helping with strategic decisions. For technical teams like engineers and AI teams, they provide a foundation for deeper analysis, debugging, and model optimization. Think of scatter plots as the meeting point between questions and answers in your data. They connect the dots - literally - helping businesses across industries like banking, telco, and HR find correlations between different things that are happening in their businesses. Whether it's understanding how customer churn ties to subscription costs or how training investments improve performance, scatter plots bring clarity to complex data. They show more than just numbers - they tell a story that leads to smarter decisions. Let's explore how they work and why they matter. How to read scatter plots bring clarity to complex data. effectively, follow these steps. Understand the axes. Identify the horizontal axis (x-axis) and the vertical axis (y-axis). The independent variable is on the y-axis. Look for patterns. Observe how the scatter chart displays data points. A line of best fit or trend line may help reveal a positive correlation (both variables increase together), a negative correlation (one variable increases as the other decreases), or a null correlation (no clear relationship). Examine specific points. Each single dot represents a pair of numeric values from the data set, showing how the two variables interact. For example, a scatter plot might show how ice cream sales relate to daily temperature. Use a scatter plots of comparison. When working with multiple variables, a scatter plots of examine correlations across different variables in a matrix format. Common mistakes when reading scatter plots. Not all scatter plots show relationships. A scatter diagram with all the points randomly scattered may indicate no linear correlation. Forgetting the line of best fit. A line drawn incorrectly or overlooked entirely can misrepresent the data's linear correlation or categorical data, where other chart types, like line charts, might work better. When and how to use scatter plots Ever feel like your data is whispering secrets you can't quite hear? Scatter plots for their specific needs. Let's see how they bring clarity to the chaos!#1 Product OwnersWhat's driving your customers to stay - or leave? Scatter plots clearly uncover patterns in feature adoption, user behavior, and retention trends, helping you make informed product decisions. Use cases:Feature adoption vs. retention trends, helping your customers to stay - or leave? churnPurpose: Identify price points that impact retention. Customer satisfaction vs. feature usagePurpose: Pinpoint which features delight your users the most. Example: A telco company tracks how introducing a self-service feature affects customer retention. Using a scatter plot, they compare feature adoption rates (x-axis) with retention rates (yaxis). The data shows clusters of high adoption and low churn, revealing the feature's success and highlighting its value to the business.#2 BI ManagersTracking performance across multiple metrics can feel like juggling too many balls at once. Scatter plots simplify this by visually connecting the dots, helping BI managers uncover actionable insights from complex datasets. Use cases: Marketing spend vs. lead qualityPurpose: Optimize budget allocation for higher ROI. Sales growth vs. customer acquisition costsPurpose: Measure the effectiveness of training programs on productivity. Example: An HR analytics team uses a scatter plot to analyze training investments (x-axis) against employee productivity scores (y-axis). A positive correlation highlights which training programs deliver the highest returns, allowing BI managers to focus resources on initiatives that boost performance. #3 Engineers How can you debug faster and optimize system performance? Scatter plots help engineers visualize relationships in complex data, making it easier to identify patterns, correlations, and outliers that impact system reliability and code quality. Use cases: Error rates vs. code changes Purpose: Identify risky deployment patterns and improve code quality. Server response time vs. API call volumePurpose: Pinpoint performance bottlenecks and optimize scalability.Example: A SaaS development team uses a scatter plot to track weekly code pushes (x-axis) against error reports (y-axis). The line of best fit reveals a trend: error rates spike during large deployments. Engineers can adjust their deployment processes - reducing system downtime and improving reliability.#4 CIOs/CTOsMaximizing efficiency while scaling operations is no easy task. Scatter plots provide a straightforward way to visualize relationships between critical system metrics, helping CIOs and CTOs make informed decisions that align with business goals. Use cases: Infrastructure costs vs. system uptimePurpose: Balance cost efficiency. IT resource allocation vs. team productivityPurpose: Optimize resource distribution for maximum output. Example: A banking institution uses a scatter plot to compare monthly server costs (x-axis) against system uptime, enabling the CIO to identify inefficiencies and adjust the infrastructure budget accordingly.#5 DesignersTurning complex data into intuitive visualizations is key to great design. Scatter plots allow designers to create clean, insightful scatter plots for dashboard designsPurpose: Create visually engaging ways to represent relationships between both the variables. Aligning numerical data with user-friendly layoutsPurpose: Make insights accessible without overwhelming users. Highlighting trends with a straight line or vertical linePurpose: Help users quickly grasp the significance of key data points. Example: A SaaS company's design team uses a scatter graph to plot two dimensions: feature usage (x-axis) and customer satisfaction (y-axis). A straight line highlights the trend, showing a perfect negative correlation for one feature's usability and make necessary adjustments to improve user experience. Extracting meaningful insights from complex datasets is at the heart of AI work Scatter plots help AI teams visualize relationships between features, identify trends, and refine models based on the given data. Use cases: Feature importance vs. model accuracyPurpose: Evaluate the effect of dataset size on model performance. Input variability vs. prediction reliabilityPurpose: Spot inconsistencies that could skew AI outputs. Example: An AI team creates a scatter plot to analyze two dimensions: feature importance (x-axis) and model accuracy (y-axis). The plot shows clusters of data variables with a perfect negative correlation for one feature, indicating it may be introducing noise. This insight enables the team to adjust the dataset and improve model performance.#7 Telco companiesEver wonder why customer churn seems unpredictable? For telco businesses, scatter plots can illuminate the unseen connections between data variables. churn ratePurpose: Reveal price sensitivities affecting retention. Service outages vs. customer complaintsPurpose: Uncover patterns that drive dissatisfaction. Marketing campaign reach vs. new sign-upsPurpose: Uncover patterns that drive dissatisfaction. Marketing campaign success and optimize strategies. Example: A telco company plots subscription cost on the horizontal axis and churn rate on the vertical line. The scatter plot shows a positive correlation, with higher churn rates tied to increased pricing tiers. This insight guides the pricing team to rethink strategies for premium offerings, ensuring better retention and revenue stability.#8 HR departmentsHow do you know if your employee initiatives are delivering results? Scatter plots give HR teams a clear view of the relationships between investments in people and the outcomes that matter most. Use cases: Training budget vs. employee satisfaction vs. retention ratesPurpose: Identify what keeps employees engaged and loyal. Workload vs. absenteeismPurpose: Uncover workload thresholds that impact employee well-being. Example: An HR department plots training budget on the horizontal axis and employee performance scores linked to increased training investment. This insight helps HR leaders allocate budgets to programs with the highest impact, boosting both morale and productivity. How Luzmo makes scatter plots better Luzmo re interactive, scatter plots better like Luzmo IQ, scatter plots become more interactive, insightful, and tailored to your business needs.Luzmo Flex: Customization and scalability for engineers and developersLuzmo Flex is a code-first SDK designed for developersLuzmo Flex is a code-first SDK designed for developersLuzmo Flex is a code-first SDK designed for developers to build fully customizable data visualizations, including scatter plots with tailored features, such as dynamic filters, custom labels, and interactive data points. Scalable integration > Flex ensures your scatter plots handle large datasets and complex requirements - suitable for enterprise-level use cases. Developer-first design > With Flex, developers have complete control over the visualization's behavior and styling so it aligns perfectly with your product's needs.Luzmo IQ is an AI-powered assistant that simplifies data analysis by enabling natural language interaction with your visualizations. It's designed to turn raw datainto actionable insights for both analysis by enabling natural language interaction with your visualizations. It's designed to turn raw datainto actionable insights for both analysis by enabling natural language interaction with your visualizations. It's designed to turn raw datainto actionable insights for both analysis by enabling natural language interaction with your visualizations. those insights with interactive visualizations, like scatter plots. Natural language queries > With IQ, users can ask questions like "What's the relationship between feature adoption and churn?" and receive immediate, visual answers via scatter plots. AI-powered analysis > IQ enhances scatter plots by identifying correlations, outliers, and trends automatically, making it easier to draw insights from complex datasets. Interactive visualizations > users can refine results, explore AI-generated summaries, and interact directly with scatter plots to better understand their data. Luzmo simply ensures that analytics work harder for your business. ConclusionData can be overwhelming when it's scattered across endless rows and columns. Finding meaningful patterns, understanding relationships, and making informed decisions can feel like an uphill battle. That's where scatter plots step in - they get rid of raw data and present clear, actionable insights. You can go beyond traditional visualizations with tools like Luzmo Flex for building tailored scatter plots and Luzmo IQ for delivering AI-driven analysis. No matter if you're tracking customer churn, debugging systems, or refining AI models, scatter plots can empower you to connect the dots and uncover the story your data is telling. Ready to make your data is telling. Ready to make your data is telling. Ready to make your data is telling. today.FAQWhat does a scatter plot show? A scatter plot visually represents the relationship between two numeric variable, while the vertical axis (y-axis) represents the dependent variable. Examining the distribution of the points, scatter plots can reveal patterns such as positive correlation (no clear relationship between the variables). How do you interpret a scatter plot? To interpret a scatter plot? To interpret a scatter plot, start by identifying the variables on the x-axis and y-axis to understand what is being compared. Look for patterns in the distribution of data points, such as a cluster of points forming a line, which indicates a correlation where both variables rise together or a negative correlation where one decreases as the other increases. Outliers - points that deviate significantly from the trend - are also important, as they can provide insights or signal potential errors in the data. How to draw a scatter plot, begin by selecting two variables intersect on the graph. Ensure that the axes are labeled clearly to indicate what each variables. Using tools like Luzmo Flex or other software can simplify this process, especially for large datasets or when interactivity is required. What are the 5 parts of a scatter plot? A scatter plot typically includes five essential components. The title provides an overview of what the scatter plot represents, making it easy for viewers to understand its purpose. The x-axis, which shows the independent variable, and the y-axis, which represents the dependent variable, frame the graph. The data points, plotted as individual dots, show how the two variables relate to each other. Lastly, a trend line, such as a line of best fit, can be added to indicate the overall direction or correlation within the data, helping users draw clearer conclusions. Scatterplots are useful for interpreting trends in statistical data. Each observation (or point) in a scatterplot has two coordinates. The first corresponds to the first piece of data in the pair (that's the X coordinate; the amount that you go left or right). The second piece of data in the pair (that's the X-coordinate; the amount that you go left or right). coordinates. Scatterplot of outdoor temperature in relation to cricket chirps The above figure shows a scatterplot for the temperature (Fahrenheit) Number of Chirps (in 15 Seconds) 57 18 60 20 64 21 65 23 68 27 71 30 74 34 77 39 Because the data are ordered according to their X-values, the points on the scatterplot correspond from left to right to the observations given in the data as you go from left to right. If the data show an uphill pattern as you move from left to right, this indicates a positive relationship between X and Y. As the X-values increase (move right), the Y-values tend to increase (move down). If the data don't seem to resemble any kind of pattern (even a vague one), then no relationship exists between X and Y. One pattern of special interest is a linear pattern, where the data has a general look of a line going uphill or downhill. Looking at the preceding figure, you can see that a positive linear relationship does appear between the temperature and the number of cricket chirps. That is, as the temperature increases, the number of cricket chirps increases as well. Note that the scatterplot only suggests a linear relationship between X and Y exists when the pattern of Xand Y-values resembles a line, either uphill (with a positive slope) or downhill (with a negative slope). Scatterplots show possible associations or relationships between two variables. However, just because your graph or chart shows something is going on, it doesn't mean that a cause-and-effect relationship exists. For example, a doctor observes that people who take vitamin C each day seem to have fewer colds. Does this mean vitamin C prevents colds? Not necessarily. It could be that people who are more health icr, are not overweight, exercise every day, and wash their hands more often. If this doctor really wants to know if it's the vitamin C that's doing it, they need a well-designed experiment that rules out these other factors. If you are wondering what does a scatter plot has also other names such as scatter plot has also other names such as scatter plot show, the answer is more simple than you might think. The scatter plot has also other names such as scatter plot has also other names sc business, biology, social statistics, data science and etc.On this page:What is scatter plot? Definition.What is the purpose of a scatter plot? When to use it?Types of correlation in a scatter plot? Advantages. Let's define it!It is an X-Y diagram that shows a relationship between two variables. It is used to plot data points on a vertical and a horizontal axis. The purpose is to show how much one variable affects another. Example: A classic example is the relationship between monthly sales and advertising dollars in a company. The below table presents data for 7 online stores, their monthly e-commerce sales, and online advertising costs for the last year. Online StoreMonthly E-commerce Sales (in 1000 s)Online Advertising Dollars (1000 s)13681.723401.536652.273761.3Now, let's create the scatter diagram based on the data we have. The scatter diagram b you see in the plot is called "line of best fit" or a "trend line". This line is used to help us make predictions that are based on past data. Usually, when there is a relationship between 2 variables, the first one is called independent. The second variable is called dependent because its values depend on the first variable. But it is also possible to have no relationship between 2 variables at all.So, What is The Purpose of a Scatter Plot?In today world of data science, Scatter graphs have a couple of purposes. Let's list them: To show whether 2 variables are related or not. To show how much one variable affects another - the main purpose! To help you predict the behavior of one variable (dependent) based on the measure of the other variable (independent). When To Use A Scatter Plot? Scatter diagram has many applications and usages nowadays. Here are some of them: When trying to find out whether there is a relationship between 2 variables. When having paired numerical data. When working with root cause analysis tools to identify the potential for problems. When just want to visualize the correlation between 2 large datasets without regard to time. Types of Correlation. Ther are 3 types of correlation: 1. Positive Correlation: 1. Positive Correlation in a Scatter PlotIn the above text, we many times mentioned the relationship between 2 variables. This called correlation in a Scatter PlotIn the above text, we many times mentioned the relationship between 2 variables. variable) increase as the other variable (independent variable) increase, there is a positive correlation. Height and clothes size is a good example here. When the height of a child increase, there is a positive correlation between height and clothes size is a good example here. When the height and clothes size is a good example here. When the height of a child increase, there is a positive correlation looks like that: As you see in the positive correlation, the "best-fit line" goes from the origin out to high Y- and X- values.2. Negative correlationAs you might guess, we have negatively. Usually, when car age increase, the car price decrease.Let's see how the Scatter plot looks like: As you see in the negative correlation, the trend line goes from a high-value on the x-axis. 3. No correlation between the variables. For example, there is no relationship between the variables. For example, there is no relationship between the variables. correlation looks like that: The above graphs are made by www.meta-chart.com/Scatter plots aren't one of the most often used visualization type of charts, but they have an important role. They show you large quantities of data and present a correlation between variables. In addition to that, they are a valuable tool for working with linear regression models.As everything else in this world, Scatter plots have some pros and cons:Advantages of Scatter plots:Show a relationship and a trend in the data relationship and a trend in the data relationship and a trend in the data relationship. graphical correlation. Disadvantages of Scatter Plots: Flat best-fit line gives inconclusive results. Interpretation can be subjective. Correlation does not mean and not show the relation of more than two variables. It is true that Scatter plots have some limitations. However, when used correctly, they are a great tool for overviews and showing patterns and relationship between some datasets. If you need some real-life examples of how Scatter charts work, check our post simple linear regression examples. Silvia Valcheva is a digital marketer with over a decade of experience creating content for the tech industry. She has a strong passion for writing about emerging software and technologies such as big data, AI (Artificial Intelligence), IoT (Internet of Things), process automation, etc. We'll use the following sales information dataset when creating a scatter plot and describing what you can do with it. Download the Practice Workbook How to Make a Scatter Chart in Excel Select your data range. Go to the Insert tab. Click the drop-down for Insert scatter (X, Y or Bubble Chart icon under Charts in Excel There are a few types of scatter. charts available in Excel: Scatter with smooth lines and markers Scatter with straight the styles: Go to the Insert tab. Click the drop-down for Insert Scatter (X, Y or Bubble Charts group. Select More Scatter Charts. The Insert Charts group. Select More Scatter Positive Correlation: Positive correlation: Positive correlationship between the variables. So, if one of the variables increases, the other one decreases. No Correlation: The variables are just scattered through the chart area. How to Edit a Scatter Chart in Excel Case 1 -Change Axis Scale Right-click on the Axis option. On the right corner of the worksheet window, the Format Axis options, you can change the axis scale by changing the Bounds and Units values. Case 2 - Add Labels to a Scatter Chart/Plot Click on the chart area. Click the Chart Elements button on the top-right. Click the right arrow of the Data labels option and select More options, put a checkmark on the Value From Cells option in the Label Contains group. In the Data Label dialog box, assign the range of labels in the Select Data Label Range field. Click OK. This will insert labels to your data in the scatter plot. You can also replace the position of the labels, click and hold, then drag it to move it elsewhere. Case 3 - Add a Trendline to a Scatter Plot Right-click on any of the dots. Select the Add Trendline option from the menu. Excel will insert a trendline for your scattered data. How to Switch Axes in an Excel Scatter Plot Right-click on Edit under Legend Entries (Series). The Edit Series dialog box will appear. Exchange the values in the Series X values and Series Y values fields. Click OK. Excel will switch the X and Y axes in the scatter plot. Frequently Asked Questions 1. What data is suitable for visualizing numerical data sets with two variables. The variables should be continuous and measured on a scale. 2. Can I create a scatter plot with more than two variables in Excel? An Excel scatter plot typically shows the relationship between two variables. However, you can use additional visual elements like color or size to represent a third variable. This technique, known as bubble charts, allows for the inclusion of data in the scatter plot. 3. Can I analyze data using regression analysis with scatter plots in Excel provides regression analysis tools that can be applied to scatter plots. Regression analysis allows you to estimate and model the relationship between variables, including determining the equation of the best-fit line. based on the scatter plot data. Scatter Chart in Excel: Knowledge Hub