



POPULAR DATA VISUALIZATION – INTUITIVE AND UNINTUITIVE

Common Practices and Best Practices

QlikView Technical Brief

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Abstract

The use of charts, graphs, maps and pictures or Data Visualization as we call it today dates back to the 1600s. During the early days when the first visuals were developed to show qualitative and quantitative information in the form of visuals, the creators did absolute justice to solve the very purpose for which these data visualizations were developed. Right from the first geological map of Great Britain, developed in 1815 by William Smith to the circular area chart drawn by Florence Nightingale to show the death of soldiers during the Crimean War, or Minard's famous visualization to show Napoleon's March during the Russian campaign, every form of these early visualizations were neatly sketched to convey information in the simplest, most intuitive form that the human brain could process quickly. Today, we still refer to these early examples as few of the best forms of data visualizations developed.

We have come a long way since then. The digital age has given rise to an inconsumable amount of data which keeps growing every millisecond. The Technology has developed in parallel to make the data consumption "quick and simple". But are we really making the data consumption "quick and simple"? With all its advantages, technology has also given us the ability to add glamour, fluff and eye candy to our charts and graphs. Sometimes, we find ourselves using data visualization techniques that not only can be hard to decode but are unintuitive and can be misinterpreted.

By citing and analyzing some popular data objects used today, this paper intends to analyze whether we use these data objects in the right way to solve the problem of conveying information, how intuitive they are from a user's perspective and in the process of doing so whether we are justifying the real purpose of showing information in a way that our brains can process easily.

Introduction

Research tells us that information, when presented in the form of pictures is better crunched by the human brain than text. Furthermore, data, qualitative and quantitative can be deciphered quicker when shown in the form of visualizations than numbers or text. This is true in most situations but there are instances when text can be a better form of conveying information than a picture or a visual. For instance, when showing the population of a city, the quantitative number is the most appropriate form of representing the information. Simply put that there is no common approach of doing things when it comes to data visualization and that the representation of information has to be contextual.

Data Visualization has become a common practice today in newspaper, journals, marketing and more importantly in the business world where numbers have to be crunched at lightning speed in order to make decisions and take the next step. This is where the need for using popular data objects like pie charts and bar graphs arises. The wide use of data visualization objects sometimes forces the creator to be competitive and misrepresent the data by adding unnecessary elements into the data objects which can be misleading to the user. The most commonly used bar graph and line charts if not used correctly can be misinterpreted for something which was not the intention in the first place. However, if used rightly the same bars and lines can be life savors. As stated in the O'Reilly Strata article 'Making Data Work', "The best data visualizations are ones that *expose something new* about the underlying patterns and relationships contained within the data. Understanding those relationships — and being able to observe them — is key to good decision making." Even a slight misrepresentation can add to complexity and can lead to the whole business to be at stake.

In the context of a Business Dashboard, it is very important to know whether the data objects, used for a particular purpose, are conveying the information in the most intuitive way or are leading the user to confusion. On this basis, 2 arguments can be made. The first Argument is, whether the Charts that we use frequently to convey certain information are appropriate in the first place and intuitive at all; and the second argument being whether the chart types which we consider to be intuitive (simple and effective) are presented in the right way to make the information decoding easy for the user.

Argument 1

HOW INTUITIVE ARE THE CHARTS THAT WE USE FREQUENTLY?

Some chart types that are used today in the business world, specifically in the sales and the pre-sales industries, have become very popular as they display data in a way that resembles a real life object or pattern like the Gauge chart, Traffic Light chart and so on. People look for metaphors for designing their charts and are appealed by their look and feel and the attractiveness of it. However, when analyzed carefully in terms of general intuitiveness and accessibility, it is noticed that these charts don't work as simply as they are meant to work. In turn, it is realized that they may lead to confusing the user or hampering the ability of the user to quickly identify the information presented.

Below are some typical examples of popular chart types that can fall into the category of being deceptive to the user.

SPEEDOMETER GAUGE CHART

Use Case:

The gauge chart has been in the business intelligence dashboard industry for a long time and is a very popular chart type. A gauge chart was first used to determine the approximate volume of liquid inside a tank. Their general use case is to determine the range of a given value. These gauges, more commonly the speedometer gauge of the cars, were then taken and pushed directly to show data in the business dashboard world.

They work very well in a factory setting where the circular dial shows the range of a certain value and the user can very quickly identify whether it is doing well or bad. However, in a Business Dashboard setting it only works effectively in attracting the user's attention and doesn't work so well in putting the point across.

Top reasons why Gauge charts become unintuitive for Business Dashboard users:

- The gauge chart does not reveal a lot of information. It just reveals a hint that something is wrong or something is very right. In most scenarios, a dashboard in the business world should convey much more than just "we are in danger". It should ideally show not only the current values but the underlying trends as well. So a gauge is probably not the best way of showing the KPIs and also the supportive information that comes along with it.
- Only a single data point can be used in a gauge to show information, thus making the use case of this chart type very rare
- Like the pie charts, the round speedometer gauges take up a lot of screen real estate and on the contrary convey very little information
- They are visually deceptive since most of the times they are designed with bright red, green and yellow colors and a thick outline with the sheen on it. This already screaming design makes it very unlikely for the user to see the information without being distracted
- For a color blind user, the red, green and yellow used to indicate good, fair and bad respectively have no meaning since all the 3 colors appear similar in hues and hence cannot be differentiated as for where the good part ends and the danger area begins

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
Typical use case scenario of a gauge chart	
Common Practice: As mentioned above it is a very common practice to use gauge charts in a dashboard to show the current numbers as against the target.	Best Practice: The best practice of showing numbers and target is a simple bar chart or bullet chart (as recommended by Stephen few in various articles). These can also show the current values, the targets, the trends and also can compare multiple data points in the same

The problem apart from the look and feel is that the gauge neither shows the target nor shows a trend. Moreover, it can show only 1 data point which means there needs to be multiple gauges in order to show multiple data points, which is very often the case in a dashboard. All this adds to the visual noise simply making it less tolerant for the user to identify information.

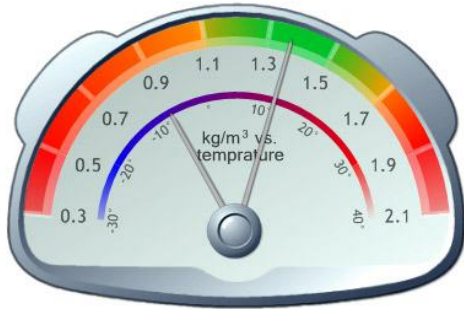
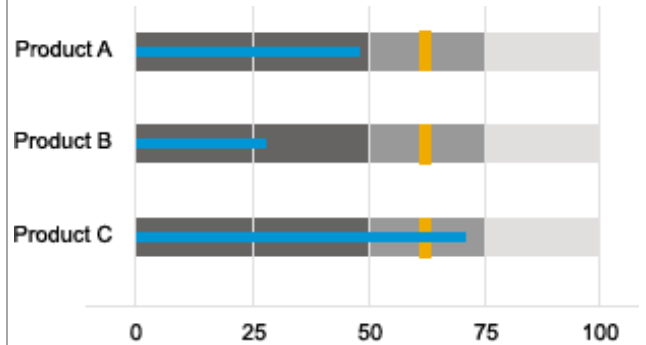


chart.

The combination of red, green and yellow can be substituted with other color blind safe colors and the graph can be made more intuitive by getting rid of the unnecessary 3D and bevels to mimic the speedometer, thus reducing the data ink ratio and the visual noise.



TRAFFIC LIGHT CHARTS

Use Case:

The Traffic Light chart is another example of a commonly used, very popular type of data object. This chart type is used to show when a certain value falls within 3 thresholds which are bad, okay and good represented by the colors Red, yellow and green respectively borrowed from the traffic light metaphor. Though this chart type gives a very good idea of the condition of a certain situation, it also brings with it a bunch of concerns that make this chart type unintuitive.

Top reasons that make the Traffic light chart unintuitive:

- This chart type relies only on the colors Red, yellow and green in deploying information. All the 3 colors are problem colors for a color blind user with red-green color deficiency. These 3 colors cannot be distinguished from one another by a color blind user which makes this chart type extremely non-compatible in terms of accessibility.

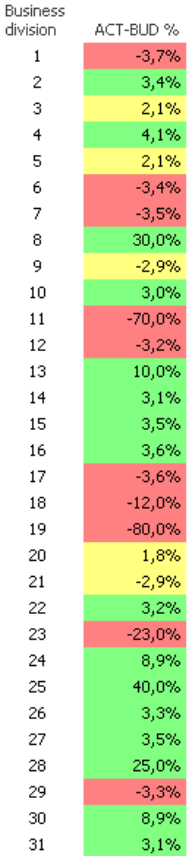
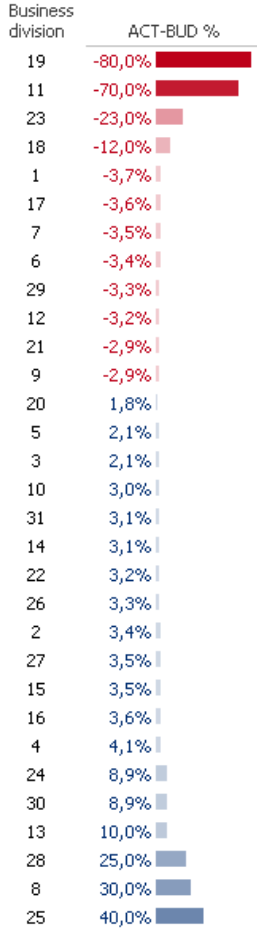



- The traffic light chart does not show a variance in values, for instance, a -3% dip in revenue and a -36% dip in the revenue both are shown by the color red as like the 3% growth in revenue and a 20% growth in revenue both are shown by the color green. In this case, even when the 20% growth is far more important for the user to know than the 3% growth, since the only color showing the positive side of the threshold is green, there is no visual cue to show the variance in these 2 values.
- If the values are ordered randomly, it is very hard to pick through the information and spot the problem areas

QlikView

- Red and green have an annotation of being bad and good respectively. That said, when a certain value is shown as Red, it means that it is “Bad” or needs attention, however, when a certain value is shown green, for example when Sales is above the threshold of being low, that doesn’t mean that Sales is doing good. In a Traffic Light chart, because of the lack of option to provide a variation, this shortcoming cannot be addressed.

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

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<p>Common Practice:</p> <p>Traffic Light charts are very commonly used in tables for numbers or information that is a part of the KPI. In this setting all the problems mentioned above exist. The table below shows a typical use case scenario.</p>  <table border="1" data-bbox="159 1031 344 1881"> <thead> <tr> <th>Business division</th> <th>ACT-BUD %</th> </tr> </thead> <tbody> <tr><td>1</td><td>-3,7%</td></tr> <tr><td>2</td><td>3,4%</td></tr> <tr><td>3</td><td>2,1%</td></tr> <tr><td>4</td><td>4,1%</td></tr> <tr><td>5</td><td>2,1%</td></tr> <tr><td>6</td><td>-3,4%</td></tr> <tr><td>7</td><td>-3,5%</td></tr> <tr><td>8</td><td>30,0%</td></tr> <tr><td>9</td><td>-2,9%</td></tr> <tr><td>10</td><td>3,0%</td></tr> <tr><td>11</td><td>-70,0%</td></tr> <tr><td>12</td><td>-3,2%</td></tr> <tr><td>13</td><td>10,0%</td></tr> <tr><td>14</td><td>3,1%</td></tr> <tr><td>15</td><td>3,5%</td></tr> <tr><td>16</td><td>3,6%</td></tr> <tr><td>17</td><td>-3,6%</td></tr> <tr><td>18</td><td>-12,0%</td></tr> <tr><td>19</td><td>-80,0%</td></tr> <tr><td>20</td><td>1,8%</td></tr> <tr><td>21</td><td>-2,9%</td></tr> <tr><td>22</td><td>3,2%</td></tr> <tr><td>23</td><td>-23,0%</td></tr> <tr><td>24</td><td>8,9%</td></tr> <tr><td>25</td><td>40,0%</td></tr> <tr><td>26</td><td>3,3%</td></tr> <tr><td>27</td><td>3,5%</td></tr> <tr><td>28</td><td>25,0%</td></tr> <tr><td>29</td><td>-3,3%</td></tr> <tr><td>30</td><td>8,9%</td></tr> <tr><td>31</td><td>3,1%</td></tr> </tbody> </table>	Business division	ACT-BUD %	1	-3,7%	2	3,4%	3	2,1%	4	4,1%	5	2,1%	6	-3,4%	7	-3,5%	8	30,0%	9	-2,9%	10	3,0%	11	-70,0%	12	-3,2%	13	10,0%	14	3,1%	15	3,5%	16	3,6%	17	-3,6%	18	-12,0%	19	-80,0%	20	1,8%	21	-2,9%	22	3,2%	23	-23,0%	24	8,9%	25	40,0%	26	3,3%	27	3,5%	28	25,0%	29	-3,3%	30	8,9%	31	3,1%	<p>Best Practice:</p> <p>The best practice of showing information that conforms to or falls below a certain threshold and all possible variations, is shown in the example below</p>  <table border="1" data-bbox="889 936 1144 1860"> <thead> <tr> <th>Business division</th> <th>ACT-BUD %</th> </tr> </thead> <tbody> <tr><td>19</td><td>-80,0%</td></tr> <tr><td>11</td><td>-70,0%</td></tr> <tr><td>23</td><td>-23,0%</td></tr> <tr><td>18</td><td>-12,0%</td></tr> <tr><td>1</td><td>-3,7%</td></tr> <tr><td>17</td><td>-3,6%</td></tr> <tr><td>7</td><td>-3,5%</td></tr> <tr><td>6</td><td>-3,4%</td></tr> <tr><td>29</td><td>-3,3%</td></tr> <tr><td>12</td><td>-3,2%</td></tr> <tr><td>21</td><td>-2,9%</td></tr> <tr><td>9</td><td>-2,9%</td></tr> <tr><td>20</td><td>1,8%</td></tr> <tr><td>5</td><td>2,1%</td></tr> <tr><td>3</td><td>2,1%</td></tr> <tr><td>10</td><td>3,0%</td></tr> <tr><td>31</td><td>3,1%</td></tr> <tr><td>14</td><td>3,1%</td></tr> <tr><td>22</td><td>3,2%</td></tr> <tr><td>26</td><td>3,3%</td></tr> <tr><td>2</td><td>3,4%</td></tr> <tr><td>27</td><td>3,5%</td></tr> <tr><td>15</td><td>3,5%</td></tr> <tr><td>16</td><td>3,6%</td></tr> <tr><td>4</td><td>4,1%</td></tr> <tr><td>24</td><td>8,9%</td></tr> <tr><td>30</td><td>8,9%</td></tr> <tr><td>13</td><td>10,0%</td></tr> <tr><td>28</td><td>25,0%</td></tr> <tr><td>8</td><td>30,0%</td></tr> <tr><td>25</td><td>40,0%</td></tr> </tbody> </table> <p>The colors red and blue are color blind safe. Also, color is not the only indicator of the attribute but the size of the bar and the gradient to the color give a lot more information that just comparing between the “black and white” worlds of red and green.</p> <p>In other situations where traffic light charts are used, it can be very helpful to add icons or various shapes to identify between the different colors for accessibility purpose as well as quick identification.</p>  <p>Also, ordering the numbers in a way that can form a pattern can give the user a quick visual cue and the pattern can help in putting the puzzle pieces together to get the whole story.</p>	Business division	ACT-BUD %	19	-80,0%	11	-70,0%	23	-23,0%	18	-12,0%	1	-3,7%	17	-3,6%	7	-3,5%	6	-3,4%	29	-3,3%	12	-3,2%	21	-2,9%	9	-2,9%	20	1,8%	5	2,1%	3	2,1%	10	3,0%	31	3,1%	14	3,1%	22	3,2%	26	3,3%	2	3,4%	27	3,5%	15	3,5%	16	3,6%	4	4,1%	24	8,9%	30	8,9%	13	10,0%	28	25,0%	8	30,0%	25	40,0%
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LED FONT CHART

Use Case:

This chart type doesn't have a typical use case like other chart types but it is more often used as a method of presenting information especially big numbers generally used as KPIs or a scorecard in a Business Dashboard, as seen in the example below.

Usability Problems:

- This font type was developed primary for information which had to be broadcasted to a large audience from a great distance. Also because the information had to be legible after sunset or when it was relatively dark, the letters had to be constructed out of LED lights which gave rise to this font type. Since the primary use case was to broadcast information from a distance, information could be read easily even though the characters are broken. However, for a normal dashboard or a chart which is viewed on the computer screen only about a feet away from the eyes, it becomes very difficult to read information with broken characters
- Also, since the characters are large and broken the time taken to focus on the information and understand what is written is far more than time taken when presented with a traditional font such as Arial. Thus the primary purpose of "quick and easy" consumption of data is compromised

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive						
Typical use case of LED font chart							
<p>Common Practice:</p> <p>The LED font chart is used in a number of cases when showing big numbers in the KPIs of the dashboard which need to be compared. However, the font itself is not very user friendly and can pose some concerns in terms of legibility.</p> <div data-bbox="152 1625 800 1787"> <table border="1"> <tr> <td>TOTAL OPEN ORDERS 31557</td> <td>TOTAL COMPLETED ORDERS 54</td> <td>HIGH PRIORITY ORDERS 282</td> </tr> </table> </div>	TOTAL OPEN ORDERS 31557	TOTAL COMPLETED ORDERS 54	HIGH PRIORITY ORDERS 282	<p>Best Practice:</p> <p>The best practice of showing information that conforms to or falls below a certain threshold and all possible variations, is shown in the example below.</p> <div data-bbox="857 1625 1511 1787"> <table border="1"> <tr> <td>TOTAL OPEN ORDERS 31557</td> <td>TOTAL COMPLETED ORDERS 54</td> <td>HIGH PRIORITY ORDERS 282</td> </tr> </table> </div>	TOTAL OPEN ORDERS 31557	TOTAL COMPLETED ORDERS 54	HIGH PRIORITY ORDERS 282
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MARIMEKKO CHART

Use Case:

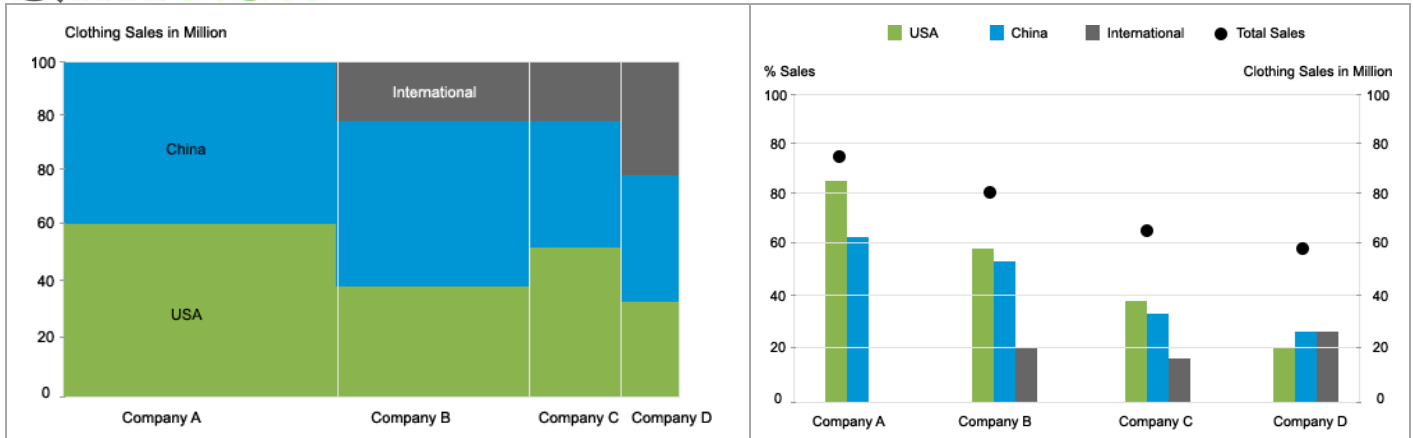
The Mekko chart is one of the many popular data objects which is used to compare 3 data points which are determined by the x-axis, y-axis and area of the data point. They are a great way to compare different segments of information all at the same time in a single graph. However, it is seen that sometimes the comparison becomes hazy and undeterminable due to the inability to spot the difference between areas of different segments which do not share a common baseline, hence rendering this chart type to be less intuitive for the user.

Top reasons that makes Mekko chart unintuitive:

- Since the segments vary in height and width and don't share a common baselines, it is difficult to compare which segment is bigger and which is smaller
- Area is an important constraint in determining the value encoded in the segment of a Mekko chart. Since the human eye is not very good in spotting the difference between the areas of 2 rectangles, one which is taller and less wide and the other is shorter but wider, it becomes difficult to draw conclusions unless the real values are specified.
- As the amount of data increases, it becomes more and more difficult to differentiate between the segments, especially the ones which look similar in height or width.

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
Typical use case of a Mekko Chart	
<p>Common Practice:</p> <p>Mekko charts are commonly used to show 2 dimensions, one is the height and the other is the width of the bar. When showing different categorical data, the bars are stacked on top of each other. Since the baselines of these bars are not the same and also they vary in their height and width, it becomes difficult to see the comparison thus defying the main purpose of the chart.</p>	<p>Best Practice:</p> <p>An Alternative to the Mekko chart can be a combination chart of bar graph and symbol. It also can be a series of bar charts proposed by Stephen Few in his article "A Design Problem" on the perceptualedge.com website</p>



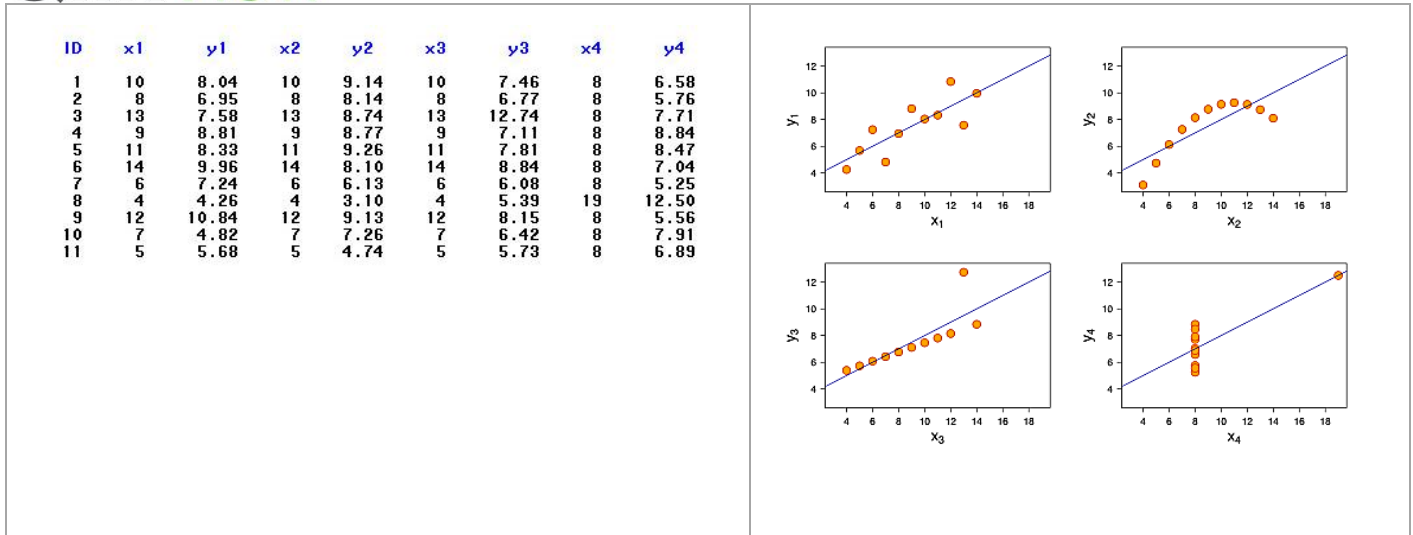
TABLES IN DASHBOARDS

Use Case:

Tables are a great way to give a detailed correlation between several items in a list. Tables help the user to neatly scan through a set of values in sequence and understand their correlation and comparison with each other. However, when tables are used to compare quantitative values in a Dashboard setting, the dashboard loses its main intent to convey information to the user in a quick and easy way. Since users takes longer time to go through each row and column of a table to compare values than going through a chart where they can quickly identify a pattern and understand the underlying trends, tables are not very appropriate to compare values when shown in a Dashboard. Whenever possible, tables should be replaced with appropriate data visualization object in a Dashboard to facilitate quick and easy consumption of data and get ideas about the trends. A great place where tables fit perfectly is reports.

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
Use of Tables for a business Dashboard application	
<p>Common Practice:</p> <p>As tables are an excellent way to show information in the most detail manner, they are quite often used in dashboards. This hampers the user's ability to quickly understand the trends, the highs and lows since the data needs to be scanned through every row and column of the table to understand the information. The example below illustrates this scenario with the help of the Anscombe's Quadrant.</p>	<p>Best Practice:</p> <p>Whenever possible it is best to illustrate the tabular data in the form of data visualization to quickly identify patterns and make sending of the data more quickly and easily.</p>



Argument 2

COMMON PRESENTATION PRACTICES THAT MAKE INTUITIVE CHARTS UNINTUITIVE:

Very commonly used data objects like the bar graphs and pie charts, we know, are the simplest forms of data visualization objects which display information very clearly and are very easy to decode. While we can term these data visualization objects as “Intuitive”, their representation sometimes pushes to an extent to be termed as unclear and unintuitive. These data objects have been designed to show specific information in a specific format, but if they are not used rightly then they fail to convey the information by becoming non-user friendly and hard to decode.

Presentation in this case plays a very important role in the conveyance of information. Adding elements to the charts which do not add value to the data presented makes the entire chart nebulous and confusing. And in some cases, diverts the focus of the user to unnecessary elements in the chart instead of the data. All this adds to the time that it takes for the user to understand the information presented thus contradicting the concept of “quick and easy” data consumption.

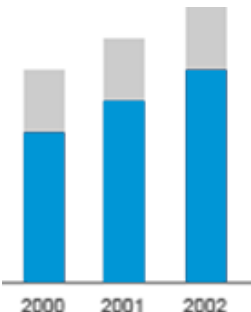
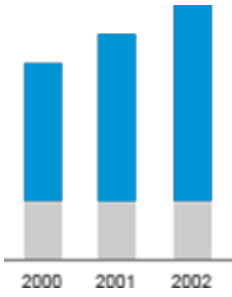
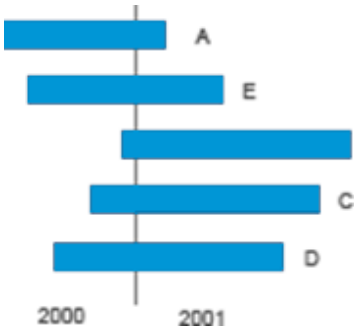
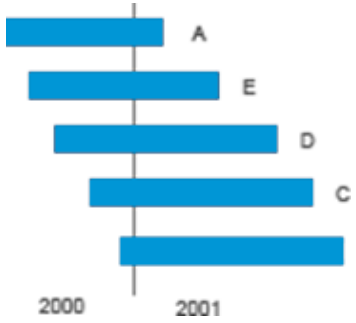
Below are some popular data visualization objects, their common use cases and presentation practices and what makes them unintuitive.

BAR GRAPHS

Use Case:

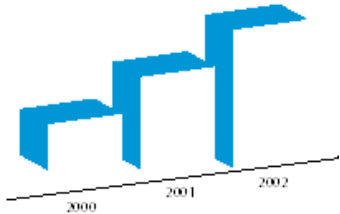
Bar graphs are one of the most popular and commonly used data visualization objects. Their typical use case is to show quantitative information which is independent of qualitative data. Bar graphs are also one of the simplest data visualization objects to decode information with the length of the bars conveying the quantitative information discretely.

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
<p>Comparing constants</p>	
<p>Common Practice:</p> <p>When comparing certain constants in a stacked bar chart, it is a common scenario to neglect the format of the portions of the bars as shown in the chart below.</p> 	<p>Best Practice:</p> <p>The relationship between the quantities can be best understood when the constant variable is put at the bottom rather than the top of the bars.</p> 
<p>Order of bars</p>	
<p>Common Practice:</p> <p>The human eye is very good at recognizing patterns, but it becomes difficult to spot change or understand data when there is no pattern that can be associated to the data objects.</p> <p>Below is a chat which shows the different quantitative information in the form of a horizontal bar chart which have not been consciously ordered.</p> 	<p>Best Practice:</p> <p>Whenever possible, if the bars have been ordered in either an ascending or descending manner, it is much easy for the eye to recognize the pattern and understand the data quickly.</p> 
<p>Using 3 dimensional bars</p>	

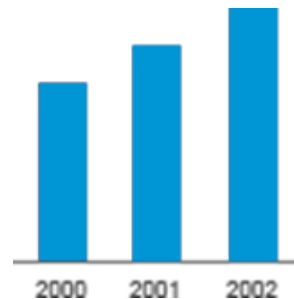
Common Practice:

3 Dimensional bars in a bar chart is seen as a common practice, however, the 3 dimension of the bar can mislead the reader into thinking that there could be a 3rd dimension within the chart when that is certainly not the intent of the graph. It also tends to increase the data ink ratio which is not recommended.



Best Practice:

3 dimensional bars within the bar chart are extremely unintuitive and confusing and should be avoided at all times.



Background within the chart

Common Practice:

Backgrounds within the chart are also another common practice which can be very disrupting for the user to read the chart.



Best Practice:

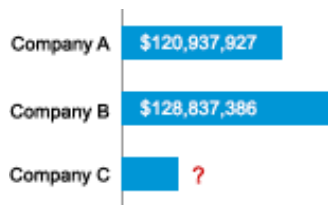
It is unnecessary to display backgrounds within the chart for the sake of clear reading of the chart. However, giving guiding axes within the chart (x-axis or y-axis depending on the type of chart) is a good practice to guide the eye of the user for a better understanding of the quantitative value of the chart.



Showing quantities within the bars

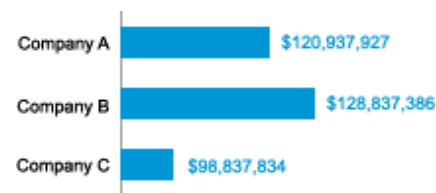
Common Practice:

One of the many common practices of using a horizontal bar chart is to put the quantity associated to the bar within the bar itself. Though this is a neat approach of showing the numbers, it can come across a scalability issue when the length of the bar can no longer support the text inside.



Best Practice:

Keeping in mind that the bars will scale as the quantity changes, it is most recommended that the text should be written outside the bars.



Information duplication

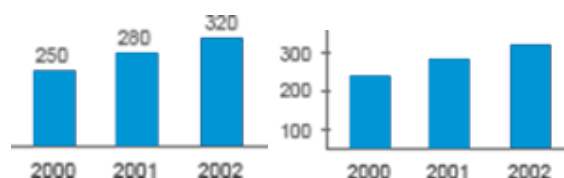
Common Practice:

Being explicit about showing information is a good practice but sometimes not necessary or one might run the risk of repeating the information. Sometimes it is seen that when drawing a bar graph the quantity associated with the bar shown on top of the bar along with the numbers on the axes. This is unnecessary since it is just a repetition of information.



Best Practice:

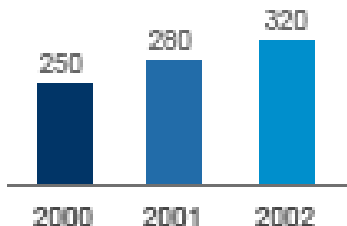
When displaying quantitative information in the bar graph, it is recommended either showing information on top of the bars or showing the axes.



Use of colors

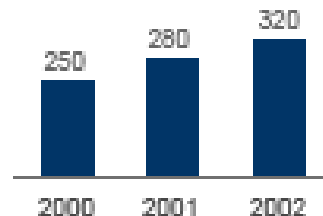
Common Practice:

It is a very common practice to show the bars within a bar chart bearing different colors even though the same attribute of the different bars is compared. This can lead to a misinterpretation that the bars are compared for different attributes. Also adding different colors is distracting to the reader.



Best Practice:

It is recommended that the colors of the bars be the same when comparing them against the same attribute. This will give a clear picture of the information that is being compared in the graph.



Accessibility tip:

Accessibility is an important factor to consider when it comes to displaying information on the computer screen. Apart from poor vision, color blindness forms a major factor to consider while designing data objects.

- For legend and text for the axis, it is recommended to use font size not less than 8 pts.
- For use of colors within the chart, it is recommended to use monotones of the same color which is easier to differentiate by a color blind user
- Shades and tints of Red, green and yellow cannot be differentiated by a color blind user, hence it is recommended not to use these colors for comparing attributes or objects

PIE CHARTS


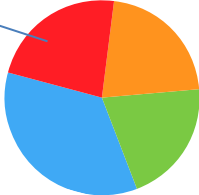
USE CASE:

Pie charts are one of the most popular data types used by every industry and sector. The typical use case of a pie chart is to show the proportions of a whole in the form of percentage. Though the use of pie charts is rampant, they are one of the most controversial chart types and are accused of obscuring information rather than conveying it clearly. But people still keep passionately using them. If pie charts are used in a way that conveys information clearly, they can be a great tool to understand proportional differences very quickly.

Top reasons why pie charts are criticized:

- Research shows that the human eye is not good at differentiating between angles and comparing sector areas
- One cannot use many data points in a pie chart. Comparing more than 7 data points overcrowds the pie chart and makes it even more difficult to differentiate between the different angles and colors
- Because of the round shape of the chart, it consumes and a lot of screen real estate than a bar chart of any other rectangular chart type. This is highly relevant in the case of designing dashboard since there is a space constraint.
- One cannot compare a series with 2 or more pie charts since it is nearly impossible to comprehend the difference between the proportions

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
Comparing more than 7 categories	
<p>Common Practice:</p> <p>Since pie charts are used very frequently, more often than not there is a need to show a lot of data categories within the pie chart. Apart from being difficult for the user to distinguish between the angles, it also becomes hard to apply colors that are far apart in hue from each other to clearly differentiate between the pie slices.</p> 	<p>Best Practice:</p> <p>The best use case scenario of displaying information in the form of a pie chart is when the categories to be compared are less than 7. If showing more than 7 categories becomes inevitable then the data can be better shown as a bar chart. Or, the categories with the smaller pie slices should be combined into one category named "Others".</p> <p>Others </p>

Using 3 dimensional visual to show pie chart

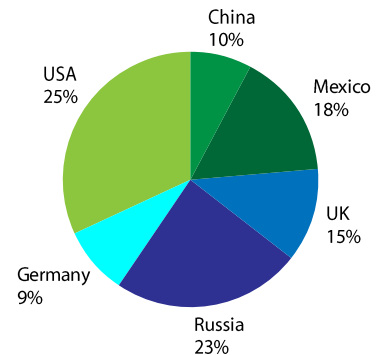
Common Practice:

Using a 3D visual to show a pie chart is surprisingly a very common phenomenon. Moreover, along with showing a 3D effect the chart is also exploded. The 3D effect to the chart makes the already difficult effort of comparing angles more difficult with the extra dimension added which really is irrelevant.



Best Practice:

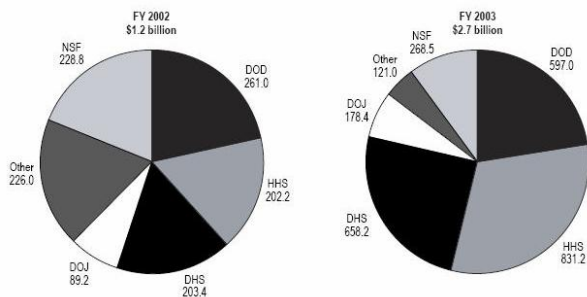
In any scenario, it is best not to apply the 3D effect to any of the charts, especially the pie chart. The extra dimension causes confusion and is not intuitive for the user.



Comparing series

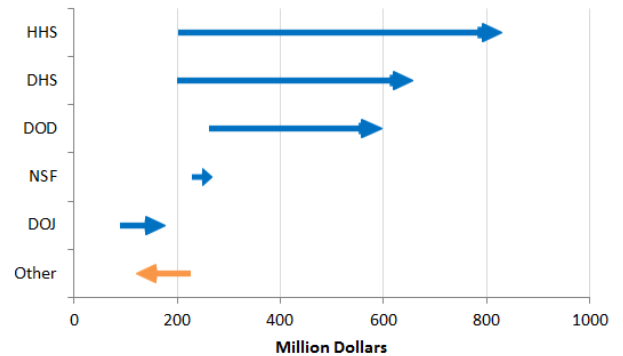
Common Practice:

When comparing a series of data, sometimes users tend to use a more than 1 pie charts. The human eye is poor in comparing angles and when one needs to compare between 2 or more sets of angles and also between angles within each pie chart, it becomes nearly impossible to understand the comparison.



Best Practice:

When there is a need to compare a series of data, it is best not to use multiple pie charts for doing so but using some other appropriate data objects like stacked bar graph or a line chart or an arrow chart.

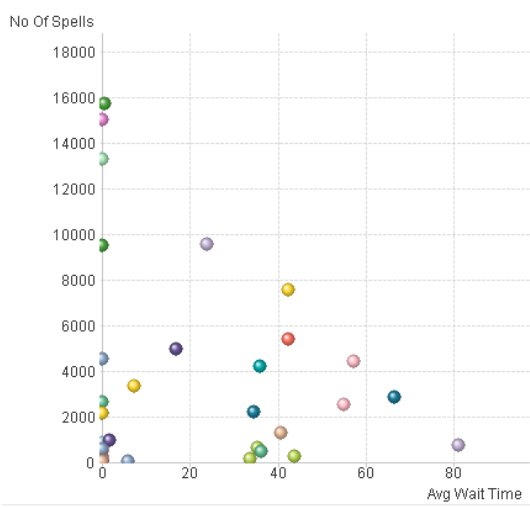
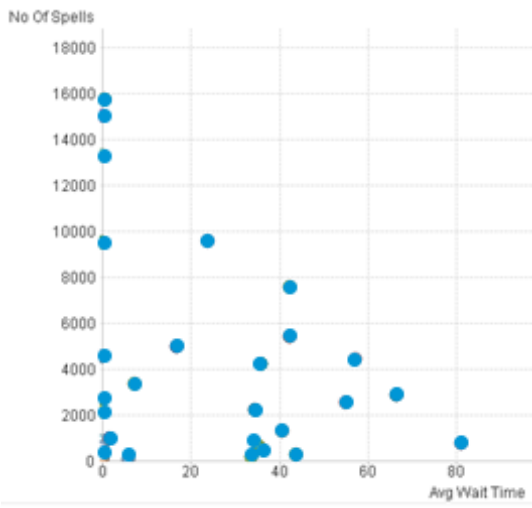


SCATTER CHARTS

Use Case:

Scatter charts are very popular and are an extremely efficient way of showing correlation between data points and to show outliers. However, since the common rule goes that the design should follow the data, sometimes scatter charts are overly designed with unnecessary glamour which can be avoided to make the data inside more important than the look of the chart.

COMMON PRACTICES SEEM: (INTUITIVE OR NON-INTUITIVE?)

Non- Intuitive	Intuitive
Presentation of a scatter chart	
<p>Common Practice:</p> <p>With scatter charts, since users have an ability to apply presentation techniques to the chart type, a lot of times, the dot of a scatter chart are made 3 dimensional. This is not only unnecessary but also hard to read when 2 dots are very close to one another and it increases the data ink ratio which is not a recommended best practice.</p> 	<p>Best Practice:</p> <p>It is highly recommended while showing data in the form of charts to avoid the practice of showing the data objects as 3 dimensional objects unless there is a 3rd dimension involved. This is for easy reading of the data without causing confusion due to the extra dimension.</p> 

Summary

In the business world, everyone is looking for quick answers to resolve problems and take the next steps. The Data visualization in that case becomes the crux of the solutions. Data visualization must put forth the information in the cleanest most transparent way so that the users can dive deep into the sea of data and fish only that which is critical for the business. Thus, the charts and graphs that we create should be analyzed carefully in terms of whether they are really solving the purpose or just adding to the complexity of the problem. Being competitive by adding extra elements to enhance the look and feel is good but only if it is not coming in the way of conveying information smoothly and precisely.

The most popular chart types which we term as unintuitive can be replaced by simple data objects that make the decoding of information “quick and easy”. Appearance is as important factor to consider as is appropriateness. Today, due to an over increasing competition in the BI industry, the makers tend to focus on the aesthetic appeal of the data objects more than the information it conveys. However, even though it is the most important to woo the user/client, it is also important to show the power of data visualization and the undermining problems that it tries to solve. Thus, in the attempt of solving the problems of the business industry, appropriate presentation skills and the right use of data visualization objects should be the primary and most important consideration to avoid facing the situation where the user fails to understand the problem itself.

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