

An in-depth look into advanced visualisation

By Frans Vermaak, issued by Praesignis ¹³ Sep 2016

"To affect through the eyes what we fail to convey to the public, through their word-proof ears." ~ *Florence Nightingale* ~



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What do we mean when we talk about data visualisation? Essentially it depends on what your background and data is. Looking at data from a scientific or research point of view, many people wouldn't realise that they are analysing or visualis data, but at the end of the day, that is exactly what they do.

Be it the utilisation of sound or sonar frequency to map and analyse data, or using biological molecules, and then using computers to select what kind of molecules to use in combination or simulation of them. These are all data points. So visualising data has so many different formats.

In a recent study, researchers from Miami USA and the UK worked together to create a 3D and 2D image of what a Dolph would see underwater, using its Sonar. They measured the sonar with a diver down below and recorded the reflection and then visualised it the way a Dolphin would see it. That is one example from a scientific way, of looking at data. One would I really perceive this to be data visualisation, but that is exactly what it is.



Data visualisation is very powerful in storytelling. An outstanding example is what Florence Nightingale did for the British army. The problem they were experiencing was a high death toll within their army, and they could not identify what the ma causes of death were. It was assumed and perceived that they were dying from their injuries as a result of the war. Floren Nightingale graphed the deaths, including specific diseases, and of course the war itself, and it turned out, that the majorit of deaths, by far were as a result of disease. Florence Nightingale knew that words alone would not convince the British army of the facts. Instead, she decided to put the information on a graph, very clearly, for a specific period, 1854 – 1856 indicate the causes of death, diseases or injuries from the war. The words she used are so true. When we talk about Data Visualisation, people really need to understand that a picture tells a thousand words. Florence Nightingale said, "**To affect through the eyes what we fail to convey to the public, through their word-proof ears.**"

People don't hear the words you say, they make assumptions while you talk. When you show statistics on a graph, with th right visualisation, the audience cannot deny what you are trying to convey. They cannot deny the truth.

Another great example is of Napoleon's invasion of Russia during the war of 1812. When Napoleon started with his war, ye can see on the graph below, how his troops shrank on the way to Russia, and again on the way back.



click to enlarge

A couple of things happened here. First the temperature changed completely. The army was not ready for the temperature change and that was the major factor. As they progressed there were a couple of small battles happening on the way to Moscow, but by the time they got to Moscow, they had completely lost their appetite to fight the Russians, and decided to retreat. But, that didn't stop the decrease in their army. On the way back, the weather got even colder, and they lost more people. They had started off with a major amount of people in their army, and ended up with hardly any. It's not just about the facts on their own, but about how you can tell the story more effectively using visualisation.

It is very interesting to note when these visualisations were done. This was in the 1800s, long before the age of computers Today, there's still huge power in using visualisation to tell an accurate story with facts.

Understanding the story and understanding what methods to use is really important. Let us take a look at some of the more well-known data visualisation products and tools.

IBM Cognos

A very powerful reporting tool. It does reporting and Dashboarding and has the ability to read data on OLAP and relational sources. Built on a service orientated architecture (SOA), it integrates well with tools like TM1 and SPSS, also in the IBM stack, very powerful predictive analytics tools and forecasting capabilities. With its powerful modelling capabilities, structure environment and very effective visualisation, Cognos is in my opinion, a very good enterprise scale BI reporting and analytics tool.

Microstrategy

Focused on Business Intelligence. Their visualisations are very impactful and very clear. Microstrategy's stronghold is the ROLAP engine. Forrester notes that many Forrester clients who use the ROLAP engine, site lower long term costs of BI ownership, because it allows them to build fewer cubes and reports. However, leveraging the ROLAP engine can be very complex and time-consuming. This platform has a steep learning curve, which should be considered.

QlikView

Another very hot tool in the last couple of years has been QlikView from QlikTech, as well as a more user-friendly License product, which is focused on the Dashboarding capabilities. QlikView is very powerful in memory consumption and speed analysis. Many customers rate it as easy to use when you compare it directly with other BI products, because it does allow

for external data sources to be included as well. For end users, it is not the easiest tool to use, it requires some IT scripting especially when you start getting into complex reports with various data sources, but it is easier than some of the BI tools of there.

SAS

AS's value is far greater than just the standard BI type use of visualisation. It has very powerful algorithmic capabilities, for statistical analysis, predictive analytics, and such, it is extremely powerful. SAS has the graphing capabilities to render whatever you find through your analysis. Gartner notes that clients consider SAS product the most difficult to use for business users, compared with offerings from other vendors. Truth be told, SAS is not the easiest tool to use, but once yo get it down, and have a decent SAS Developers, the capabilities are vast.

R

R is more a platform than a tool. With powerful algorithmic capabilities as well as Machine Learning capabilities, it is a statistical package used to parse large datasets. "R" is a very complex tool and one that takes a while to understand, but it has a very strong community and library. At the end of the day, the power is in the community that you have online. R is mostly open source, so you can have the platform at no cost, but the truth is there is a huge community out there that you can tap for support and training.

Weka

This is a very interesting tool currently being used by many Universities. It is not the most advanced tool, and probably not enterprise scale, but very useful and very capable, particularly for Data Scientists. Weka is not the most complex tool to learn. Its capabilities vary from its visualisation capabilities to strong data mining capability. Weka is a good tool for classifying and clustering data based on various attributes, both powerful ways to explore data, and it also has the ability to generate simple plots.

Processing

A product that I do not know very well, but it has become the Poster Child for interactive visualisations. Great on visualising and it enables you to write much simpler code, which is compiled into Java. It includes a <u>Processing.js</u> project, which mak it easier for websites to use Processing without Java applets, plus a port to Object-C, that can be used on iOS if you choo Processing is a desktop application, but can be run on all platforms. There are plenty of examples and code from the community available because it has been around for many years.

Google Charts

Google Charts is a great charting solutions for much of the web. Google Charts is highly flexible and has an excellent set c developer tools behind it. It is especially useful tool for specialist visualisations like geocharts on maps and gauges. It also includes built-in animation and user interactive controls.

Better World Flux

I like the explanation of what this tool is. It says that it takes boring data and makes it interesting. A simple tool, that doesn' necessarily take on the enterprise scale charting or visualisation, but it takes boring information and makes it a bit prettier. Something to consider is that Better World Flux is orientated towards making positive change to the world by using impressive visualisation. This tool doesn't allow you to upload your own data, but does offer a rich interactive output.

Tableau

Tableau, at this point in time, is leading the visualisation and visual analytics. It has some unique capabilities, one of which the patented VizQL language. Tableau is very powerful and very easy to use. Gartner says its clients give Tableau top or near top marks for ease of use, functionality, product quality, product performance, support, customer relationship, succe

achievement of business benefits and view of its future, as it achieved 94 percent revenue growth in 2011. A top notch company background, very good development of product, and easy to use.

RapAnalyst

This is another very unique product. It is a fairly old product, yet really powerful on machine learning. RapAnalyst is not a very big or complex application, but it is very powerful at what it does, creating visual maps of data and finding anomalies and groupings. Very useful, specifically on data mining.

The next tools are very unique and brand new in South Africa. <u>Praesignis</u> will be launching these tools on 13 September 2016.



Our **Voice Analytics** tool does voice to text, allowing you to record, video, sound, real-time voice to text. It does the analys highlights and indexes specific key words and when you select those keywords to do analysis. As soon as you click on the text, it takes you to five seconds prior and starts playing so that you can listen to the context and read it while you listen to sound. The indexed words allow you to analyse the words across your dataset. You can then investigate the word in conte with all related metadata like the time and the person. You can immediately click on those recordings and listen to the recordings in context. This makes it a very powerful tool for investigations and for mining text, because it takes the voice to text. With the visualisation capabilities of this tool, you can see what the relationships between the words or the people or t recordings etc. is. There are endless analytical possibilities for this kind of technology.



Another brand new tool that we are launching is more a content / social media analytics tool. It is extremely powerful and very unique. This is cutting edge technology, using a range of visualisations with bubble charts, line charts, maps, scatter charts, and a range of other visualisations that can be used to visualise the content or social media. When you need to kn what people are saying about a subject matter like your brand or a marketing campaign, and who those people are, the ro players and influencers. Determining whether the sentiment is positive or negative, and seeing the relationships between th people. You might want to know what the keywords are that the person is using, where they are located and even what devices they are using, there age and gender groups. Whether it is a brand or a company, whether it is a marketing campaign being launched, whether it is a hashtag movement against a government, perhaps something like an election in country. It is extremely powerful from a social media point of view, but it doesn't stop there. The big thing with this, is really analysing external information from the internet with your internal structured and unstructured information. Analysing socia media information with your internal email communication or call centres to text, and then analysing that in combination w social media. The next step is to go from reactive to proactive. Now you can pick up on trends or issues early enough so t you can push back the right information to influence externally and internally with proactive programs. You can then monit the success of those programs.

Another brand new, cutting edge tool that Praesignis is bringing into South Africa, is one that is extremely powerful for regulatory or forensic financial intelligence or analytics. It is very powerful in detecting fraud in process, checking that processes happen in the right way, reducing the false positives when you go through your anti money laundering process etc., or compliance type testing. It has the ability to take your current compliance or anti money laundering processes and testing it in a look back analysis. We look at your data and visualise how successful your current processes are in detecti

fraud. The next step is to go ahead and make sure that we identify and adjust those rules so that we get the right level of security and compliance for the customer. It also reduces the false positives and therefore costs.

We have the skills and the associations with the right partners, to be able to deliver this capability to any organisations.

What data visualisation means to you depends on your background and the data you are looking at. The crux is to understand that visualisation is there to really explain the data in a clear and concise manner so that people or systems ca make the correct decisions. It should highlight those anomalies, changes, trends, segmentations, groupings etc.

It is the way you look at the data that really gives you the value of it. Visualisation is important. It needs inventive thinking. needs you to understand the data and what the potential outcome or the potential value of your data could be. By using the right visualisation you might even discover things that you never knew. In my opinion, data visualisation is really the way forward. Visualisations is a very old concept, but yet it is a huge challenge for organisations to do the right visualisation or the data. Praesignis is all about Data. We have the expertise to make sense of data. We challenge everyone to look at the data in a different way, and present it in a new and different way.

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