Data Analysis and Visualization
A Comparative Study of Different Tools

Abstract

This is the age of massive amounts of Data which cumulate into Big Data and to understand all of it we need different visualization and analysis techniques, there are tons of data visualization techniques out there which helps us visuals the massive data that is being gathered. After this visualization, we can make a proper analysis of data and make the most out of our gathered data by extracting as much knowledge as possible. This paper devises a comparison between different apparent visualization techniques and tools in the market out there and analyzes the pros and cons of different tools of visualization and it also discusses the scenarios which give us information about which technique should be used in which scenario or company type according to the data analysis needs.

Keywords

Data Analysis, Data Visualization, Belladati, Klipfolio, Pentaho BA, Tableau, Microsoft BI, Spotfire,Comparison.

1. Introduction

The amount of data which we need to process and make sense of is increasing by day by day. For example, the data on big social media platforms is so huge that it takes tons of terabytes of spaces just to store it. In order to make sense, we need to analyze and visuals this data with the help of some techniques and tools which are available, or we need to develop our own according to our needs. In the paper, we have discussed different tools which are being used in the market for data visualizations such as Belladati, Pentaho, Klipfolio, Microsoft Bi, Spotfire and Tableau. We took a deep dive into these tools and analyzed them so that a comparison can be done with the help of data collected and found the best scenarios in which any of these can be used and utilized. This paper covers some of the pros and cons of different visualization techniques, it also covers some live graphs taken from the tools to give the reader a better idea about the tools of visualization.

2. Data Visualization and Analysis

Data Analysis and Visualization goes hand in hand while making sense of some huge amounts data gathered, to analyze the data, we need to visualize it first, so we can observe and understand the data and analyze and optimize it according to our needs. Many tools can be used to visualize the data in graphical forms, so we can better interpret and observe the trend lines in the data. [1]

3. Data Visualization Tools

This is the list of tools that are discussed in the paper.

Data Analysis, Data Visualization, Belladati, Klipfolio, Pentaho BA, Tableau, Microsoft BI, Spotfire.

3.1 Klipfolio

Klipfolio is a tool that makes compelling dashboards. It can transfer any information source to the dashboard, it can also automate the retrieval of the data, and utilize (and reuse) that information to fabricate representations and dashboards for our organization. Here are the pros and cons discovered while using and reading about the tools in more details. [2]

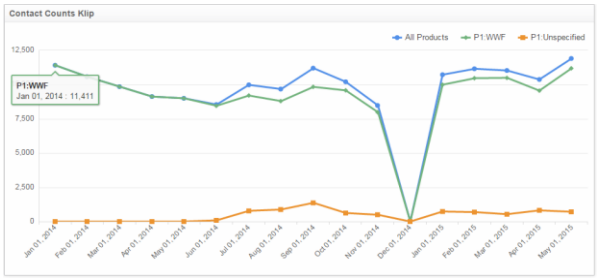

Figure 1 Data Visualization in Klipfolio

PROS	CONS
1. It can include multiple information sources that can be viewed in the single report. 2. Dynamic Data Sources by using different variables in queries. 3. Automated updating of the data source and report every minute or as per desired. 4. It can utilize different formulas in the report and can make reports in our own manner. 5. Simple to utilize and quicker. 6. Utilize SQL queries as an information source and various sort of information sources can be used.	1. Data Limitation. The most extreme information source has a limit of no more than 10mbs. 2. We need to include various series manually, it isn't so insightful to distinguish arrangement from our information source.

Table 1 Klipfolio [16] [17]

3.2 Belladati

Belladati is an online web-based tool that is utilized to make dashboards or reports generation of different kinds which can include sales, marketing etc. composing on various matrices and monitoring trends. | Belladati is used for small and medium-sized companies as it's an online agile reporting solution. [3]

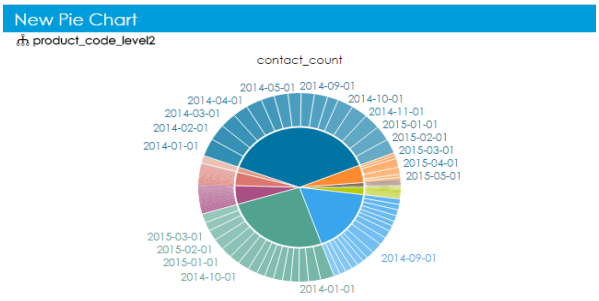

Figure 2 Data Visualization in Belladati

PROS	CONS
1. Data sources and reports can be refreshed daily and we can schedule the import as well. 2. No data restriction, we can import unlimited data from our information/data sources. 3. Simple to utilize and quicker. 4. Much Intelligent than other tools, distinguish various series from data sources and execute on reports automatically. 5. Utilize SQL inquiry as data sources.	1. Single information source for a single report. 2. The data source is not dynamic here. It first imports the data to Belladati server and then we can make reports on that server. 3.On scheduled data loading, it first removes the existing data source and then imports fresh data, based on the query. 4. On applying filters, we first have to save the report then Belladati refreshes that report on the bases of that filters.

Table 2 Belladati

3.3 Roambi

Roambi is a portable information representation and investigation system. We can make reports through web application that can be seen on cell phones. [4]

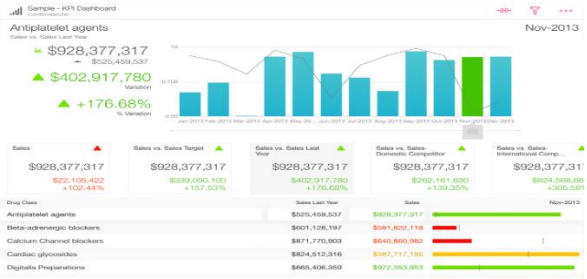

Figure 3 Data Visualization in Roambi [5]

PROS	CONS
1. Unlimited Data Source. 2. Flexible Users permissions for every user. 3. End to End Encryption for super secured data. 4. Can edit various types of business reports.	1. No SQL Data Source. 2. No dynamic Source. 3. More complex development of reports that can only be done on web application and then it generates a preview that can be viewed from the mobile application. 4. No auto-updating or refreshing of data.

Table 3 Roambi

3.4 Tableau

Tableau Desktop is data analysis tool. We can create our reports on Tableau desktop application and then we can publish these reports on tableau server. It is one of the most used visualization tool being used in the market. [6]

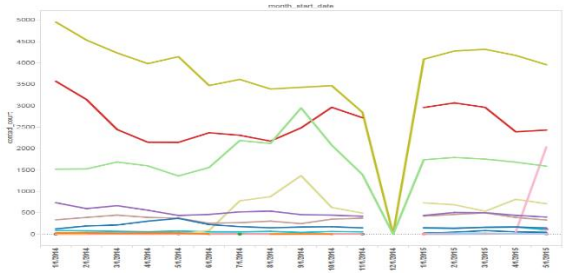

Figure 4 Data Visualization in Tableau

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PROS	CONS
1.Refreshes the report and data source constantly on the desktop application. But on the web have to manually schedule the import of our data based on the specified query. 2.It can apply parameterized queries. But it is helpful only in the development of reports. 3.No data limitation, we can import unlimited data from our data source. 4.The desktop application is much faster. 5.It can use multiple data sources for a single report based on joins. 6.Integrated with Amazon Web Services Redshift.	1.Low flexibility to make complex reports. 2.No web interface for creation of reports and data sources. But we can view or edit our reports and data sources on tableau online. 3.The data source is not dynamic on the web interface. It first imports the data to tableau online server then we can schedule data import. It first removes existing data source and then imports fresh data based on the query.

Table 4 Tableau [16] [17]

3.5 Pentaho Business Analytics

Pentaho BA is business intelligence tool, used to make reports and dashboards. We can create simple Analysis reports and interactive reports on online BA server, but for complex reports, we need to use Pentaho Report Designer. We create reports in Report designer and can publish them on online Server. [7]

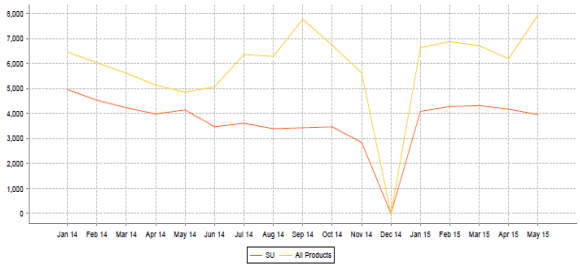

Figure 5 Data Visualization in Pentaho BA

PROS	CONS
1. Refresh the report and data source constantly on both Pentaho Server and Report Designer. 2. We can apply parameterized queries. And parameters can be used on both Pentaho server and Report Designer. 3. No data limitation. 4. The desktop application is much faster. 5. We can use multiple data sources for the single report. 6. We can make complex reports on Pentaho Report Designer. And for simple trend reports, we can use Pentaho BA Server. 7. Integrated with Amazon Web Services Redshift (Amazon Redshift is a fully managed, petabyte scalable data warehouse solution ideal for centralizing and analyzing massive data)	1. No web interface for creation of Complex reports. We can only view our reports created by Report Designer.

Table 5 Pentaho BA [15]

3.6 MS Power BI

MS Power BI is a cloud-based business intelligence. It handles three different types to visualize data like personal, team and organization. It organizes and visualizes data according to the scenario and problem. Microsoft Power BI is a king of visualization. There are a lot of visualization formats from on the office Store for free. Users can also customize the formats according to their choice. [8]

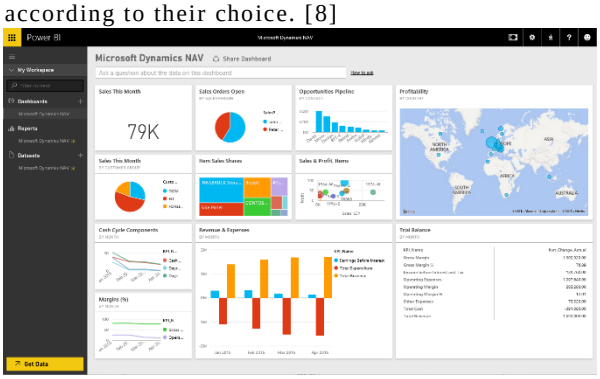

Figure 6 Data Visualization in MS Power BI [14]

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PROS	CONS
It is free to use. It supports a large collection of data. Interactive Visualization. Unlimited access to data and cloud. Drag and drop facility. Secure data. Ad hoc analysis and reporting	1.Cloud option can only be found in the windows version. 2.Unable to publish reports of all associated data.

Table 6 MS Power BI [9] [10] [12]

3.7 Spotfire

Spot fire is a business intelligence software that provides users to analyze, visualize and take push notifications on mobile devices. It is good for a small business. This platform grows according to the needs of the business. It can use existing business intelligence and reporting systems for small businesses. It is available for three different scenarios like desktop, cloud, and platform. Desktop enables users to create dashboards and evaluates, analyze and manipulate data on their PCs. Cloud allows to create, evaluate and share analyses, with the team on the cloud using cloud-based analytics. Platform version is used to create big data analytics applications for large companies. [11]

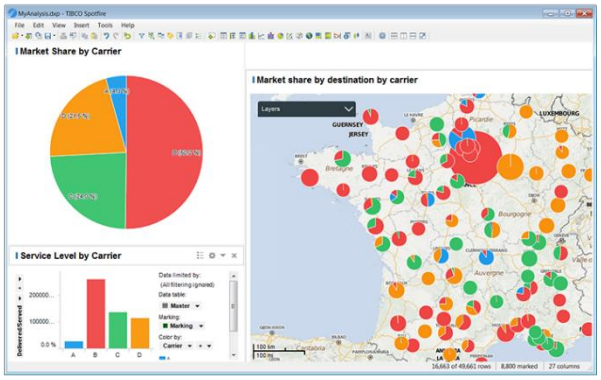

Figure 7 Data Visualization in Spotfire [18]

PROS	CONS
1.Teams collaborate with each other via mobile phone	1.Unable to report multi data 2.Lack to control embedded business intelligence

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2.It allows the user to build data one time and publish many reports. 3.Variety of visualization. 4.It is deeply rooted in other databases and third-party tools. 5.It deploys on-premise and web. 6.Push alerts and notifications on mobile phones.	

Table 7 Spotfire [13]

4. Key Features Table

Software/Features	Compatibility	Ease to Use	Pricing	Data Interaction	Scalability	Data Sources
Tableau	Desktop, Mobile, Web	No	Varies from 35$ to 70$	Very Good	Large/ Medium	Multi
Pentaho BA	Desktop only	Yes	Free	V	Enterprise	Multi
Spotfire	Mobile, Desktop	Yes	650$ annual subscription for Desktop 200$/month or 2000$/year for Cloud	Very Good	Small/Medium	Database Restricted
Klipfolio	Web, Mobile, Desktop	Yes	19$/Month		Enterprise	Multi
MS Power BI	Web, Mobile, Desktop	Yes	Free/9.99 Pro version	Third party/Very Good	Medium/ Enterprise	Multi
Roambi	Mobile	No	22$/Month		Small	Database Restricted
Belladati	Desktop,	Yes	Various		Small/Medium/ Enterprise	Multi

Figure 8 Features Comparison Table

5.Conclusion

This paper has discussed various types of data visualization and analysis tools. The main goal of this paper is to inform the reader about advantages and disadvantages of different tools and discuss various scenarios according to the size of the company in which they want to use a data representation and visualization method.

This paper will help in making the decision about which tools they should use according to their company needs. The paper has taken in account various types of factors and devised a table at the end of the paper which shows some main key features of every tool discussed in this paper and according to these features, a reader can make a well-informed decision about getting a tool for their company.

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