

Analysis on Data Visualization Tools

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Abstract:

With the advent of development of online platforms, and ease of access, the businesses are shifting to online mode for delivering products/services. The statistics of service consumption are being analysed to generate insights. These insights are used to generate the investments on products and services. These influence product design, cost and the associated services around the prominent features. The data analysis is essential to assess the products/services. Smart visualization tools are being used by the organizations for carrying appropriate measures to expand the scope of services. In the paper, popular Business Intelligence Data Visualization Tools are reviewed and the different use case scenarios of application are identified.

Keywords —Data Visualisation, Business Intelligence, ACID, cloud, dashboard

I. INTRODUCTION

Data visualization helps businesses to draw useful insights from tons of data and can be vital in driving the business to next level. There are some really interesting data visualization tools out there in the market which can help to generate fine insights by analysis. These tools enable fetching data from the source platform and create different visuals which facilitate drawing insights. The data analysis can be performed on these visuals. Insights may help businesses to make key decisions and expand the business scope and services. The data make business communications interactive and easy to explain to decision makers by justification of visual facts from the tool. These tools are used to generate reports and collections of visuals making dashboards. Many tools offer collaboration for collective preparation of high quality visual maps, charts, graphs etc. Data visualization integrates the art with math and statistics and may relate to background knowledge of the interpreter to draw results. The creative way of data representation enables easy comprehension and incorporation of

people with different understanding and perspectives into the subject and finer analysis of data consumed. The insights can be used for identification of bogus business elements, making certain task more efficient, increment/decrement of investment, user feedback analysis etc. in the market. Some BI tools employ application programming interfaces to fetch data from the source and transmit for visualization.

The tools integrate with data source to import data and generate the data graphs, charts, maps etc. Users can operate and test the tools in the free trial period and upgrade to paid versions. Interactive data visualization enables user to perform manipulation on the parameters of the graph and change the data visuals. The Tableau tool has the functionality to design custom Web Data Connector to fetch data from the data source. The reviewed visualization tools provide many visualization types for users to generate output from the data for analysis.

II. DATA VISUALIZATION TOOLS

Data visualisation tools provide the platform for interpretation of data to facilitate decision making and identify inaccuracies. Following are the widely used data visualisation tools for analyses and business intelligence.

A. TABLEAU

It is an information visualization and business knowledge device utilized for detailing and breaking down tremendous volumes of data. It assists clients with making various outlines, charts, guides, dashboards, and stories for envisioning and examining information, to help in making business decisions. It is mostly centred on the motivation behind Business Intelligence applications. Intuitive dashboards can be made by clients according to the requirements. Various types of information sources can be designed to this apparatus and can be associated.

The various kinds of necessities and prerequisites of the associations can be satisfied by Tableau by getting its information dissected in very profundity. Information can be perceived and examined well genuinely. The information from various information sources can undoubtedly be investigated and report can be produced which can be effectively perceived right away. The information is examined in various ways by removing, stacking and changing. There are various techniques, steps, and cycles where the information can be handled and examined. It gives more noteworthy visual dashboards without any problem. Upholds numerous Data Sources as there are various types of information sources, for example, various kinds of information like Structured, Unstructured and Semi-Structured Data. The various information sources can be from different kinds of data sets like Oracle, MySQL, IBM DB2, MS SQL, MongoDB, Cassandra, Virtual data sets and so on. Utilizations of Tableau upholds numerous kinds of data set highlights, for example, RDBMS, No SQL Databases, Object-situated Databases, and so on, where the information in Relational Database Management System has organized information and No SQL and object-

arranged data sets are having semi-organized and unstructured information, for example, JSON, text or archive records, and so on. No programming or coding is required for Tableau features except in few cases like designing custom Web Data Connector to fetch data from a source. Tableau facilitates data manipulation requiring simple drag and drops or device highlights which is simpler to work and that likewise includes less expectation to learn and adapt. It has an extraordinary experts with enormous information having energetic to learn and figure out together in supporting the perplexing problems with instance of taking care of and overseeing information. Data Pulling and Analysis of information from various sources into the Tableau is performed to begin visualization and examination. And the report age cycle can be accomplished in a way by controlling the information portrayal according to the client or client prerequisite that makes the existence of the client simpler and useful in directing their business applications.

It upholds strong information revelation and investigation that empowers clients to address significant inquiries right away. It can associate with a few information sources that other BI devices don't uphold. It empowers clients to make reports by joining and mixing different datasets. Their Server upholds a concentrated area to deal with all distributed information sources inside an association. The visual outputs can be in the form of Charts, Tables, Graphs, Maps, Infographics, Dashboards, Area Chart, Bar Chart, Box-and-whisker Plots, Bubble Cloud, Bullet Graph, Cartogram, Circle View, Dot Distribution Map, Gantt Chart, Heat Map, Highlight Table, Histogram, Matrix, Network, Polar Area, Radial Tree, Scatter Plot (2D or 3D), Streamgraph, Text Tables, Timeline, Tree map, Wedge Stack Graph, Word Cloud, or combination of graphs on dashboard.

B. MICROSOFT POWER BI

Microsoft Power BI is a business insight stage that gives nontechnical business clients instruments for conglomerating, examining, picturing and sharing information. Power BI's UI is genuinely instinctive

for clients acquainted with Excel and its profound joining with other Microsoft items makes it an extremely flexible self-administration device that requires minimal forthright preparation. A free rendition of Power BI is expected for little to fair size entrepreneurs. There is likewise Power BI Report Server for organizations that should keep up with their information and reports on premises. That variant of Power BI requires an extraordinary rendition of the work area application suitably called Power BI Desktop for Power BI Report Server.

It is utilized to track down experiences inside an association's information and can assist with interfacing unique informational collections, change and clean the information into an information model and make outlines or charts to give visuals of the information. The information models made from Power BI can be utilized in more ways than one for associations, including recounting stories through outlines and information representations and analyzing situations inside the information. Power BI reports can likewise address inquiries continuously and assist with determining to ensure offices meet business measurements and can give leader dashboards to executives or administrators, giving administration more understanding into how offices are doing.

Its key features are AI, Hybrid Support, and Common Information model support, demonstrating view, self-administration information prep, integrating API, customization, fast insights, and integration of Cortana.

C. DOMO

Domo is a famous Cloud-based Business Intelligence stage that can interface with a plenty of information sources, combine and pre-process information to make dynamic Domo Data Visualizations alongside cooperative devices that can be utilized to determine important experiences.

Domo is a solitary stage with many prebuilt connectors that can satisfy all Business Intelligence prerequisites of a business. Information in the last objective can be coordinated as wanted. With only a couple of snaps, clients can interface with a wide

assortment of information sources, applications, and, surprisingly, On-premise information sources. Getting ready information for making Domo Data Visualization is a straightforward cycle and clients can use the intuitive usefulness to set it up. This usefulness can be utilized with information sources to be pre-handled by just relocating the comparing symbol and playing out the necessary activities. All representations in Domo are made on Domo Cards. A Card is like a Canvas or a Dashboard, where clients can make representations and offer them according to prerequisites. Cards are made utilizing the Domo Card Builder, which allows clients to add information sources utilizing its straightforward intuitive usefulness, add complex arrangements of information effectively, and imagine information with only a couple of snaps.

Clients can set cautions and notices for various occasions like a spike or a dunk in the worth of a specific measurement. Clients can likewise zero in on a subset of information and a segment of reports pertinent to their work, to expand efficiency and group viability. For instance, local chiefs can have a particular perspective on the Stories, though the top administration can direct and oversee through a 10,000 foot perspective of everything significant. The outputs can be obtained as: Pie Charts, Line Charts, Bar Charts, Map Charts, Scatter Plot Charts, Gantt Charts, Forecasting Charts, Radar Charts, Bubble Charts, or Period-over-Period Charts.

D. ORACLE ANALYTICS CLOUD

The versatile and secure Oracle Cloud administration gives a full arrangement of capacities to investigate and perform cooperative examination for you, your workgroup, and your undertaking. With Oracle Analytics Cloud you additionally get adaptable help the board abilities, including quick arrangement, simple scaling and fixing, and computerized lifecycle the executives.

Its features which make this tool aesthetic as bring together your information sources utilizing an extensive variety of out-of-the-crate information associations. Information readiness as it ingest, profile, and purge your information utilizing various calculations. Information stream as it transform and total your information, and afterward

run AI models at scale. Information demonstrating as it develop trusted and represented semantic models to guarantee a predictable perspective on business-basic information. Information representation as it visualize and investigate your information, on any gadget, on-premises, and in the cloud. See the signs in your information and make complex thoughts drawing in, significant, and straightforward. Information revelation subject matter specialists can undoubtedly work together with other business clients, mixing clever examination at scale and AI experiences. Information coordinated effort, the large associations and little groups can share information all the more essentially, without the need to oversee or combine numerous variants of calculation sheets, and immediately perform impromptu investigation of their bookkeeping sheet information. Stay associated with mechanized conveyance of examination and screen continuous business execution from anyplace whenever. Application designers can use interfaces that empower them to expand, redo, and implant rich logical encounters in the application stream. The visualization types on the desktop version are: Bar Graphs, Filter and other visualization types, Geospatial Graphs, Grid Graphs, Line Graphs, Network Graphs, Pie and Tree map Graphs, and Scatter Graphs.

E. QLIKSENSE

Qlik Sense is a cutting edge venture examination stage from the trailblazer in client driven business knowledge - Qlik. It upholds the broadest scope of examination use cases — from self-administration information representation and information investigation to intuitive dashboards, to inserted investigation, portable investigation, and revealing including KPI detailing and distributing — all inside an administered, multi-cloud engineering. It alludes to the portrayal of information or data in outlines, charts, maps or other visual arrangements. This makes it more straightforward so that partners might be able to see patterns, perceive connections and uncover exceptions in their information. With the ascent of huge information, powerful perception changes enormous datasets into an unmistakable,

convincing story and noteworthy bits of knowledge that can expand productivity, income and benefits. It can benefit the business as quicker navigation by review and controlling enormous informational collections in visual configurations, you can comprehend the story your information tells you at a speedy look, as opposed to poring over heaps of numbers and tables for hours or week. The best information representation apparatuses permit clients to communicate with every one of their information, straightforwardly on the outline to find stowed away examples, see information connections and uncover significant bits of knowledge — all without IT support. Dashboards assist people with effectively following the presentation of business drives by permitting them to rapidly perceive what ordinary activities mean for key execution pointers (KPIs). Because visuals make it more clear information, everybody in an association — including business clients — can investigate information and find experiences that further develop organization development and adequacy. The visualization output can be generated as: Bar Chart, Box Plot, Bullet Chart, Combo Chart, Distribution plot, Gauge, Histogram, Line Chart, Map, Pie Chart, Scatter Plot, Tree map, Waterfall Chart, Visualization bundle, Filter Pane, KPI, or Pivot Table.

F. IBM COGNOS ANALYTICS

It is a business knowledge instrument for online revealing and examination. This venture programming gives different highlights to perform information accumulation and make easy to understand definite reports. Cognos likewise offers a choice to send out reports in XML or PDF configuration and view the reports in XML design. It is an online interface that permits clients to get to Cognos 10 and studios. In light of your relegated job, you can utilize this part to recover, view, distribute, make due, and arrange organizations' reports, scoreboards, and specialists. It offers some features as it offers In-memory streaming examination, gives Real-time occasions, alarms, and notices, instinctive, engaging Web 2.0 connection point and moderate collaboration, freestyle get together, and search-helped composing.

Wizard-driven outside information, programmed admittance to SAP BW inquiries, permits highlights like situation displaying, ongoing observing, and prescient investigation, clients can alter existing information, drill-Through Capability, potential Image Documentation Integration. It is stage autonomous, adaptable, and dependable and offers secure information as it is watched by a firewall. The visualization outputs can be generated as Area, Box Plot, Bubble, Bullet, Clustered Bar, Bullet, Clustered Bar, Clustered Column, Floating Bar, Floating Column, Heat Map, Hierarchy bubble, Line, Map, Marieke, Network, Packed bubble, Pie, Point, Radar, Radial, River, Stacked Bar, Stacked Column, Step line and area, Target Column, Target Bar, Tree map, Waterfall, or Word cloud.

G. SISENSE

Sisense is a main business insight (BI) programming that offers a large group of advantages to its clients. You can utilize it to gather data from every one of your sources and bring together them into a solitary store. The application's strong visual reports can be utilized to create brilliant examination. Furthermore, it empowers you to impart your bits of knowledge to your colleagues and clients without any problem. It additionally has a simple to-utilize interface which even non-geeks can rapidly adjust to. The product uses online dashboards that empower clients to cooperate utilizing similar bits of knowledge. There is compelling reason need to download documents which implies different duplicates can be kept away from. This limits the possibilities changing information. Additionally, it utilizes Crowd Accelerated BI innovation which can all the while handle many questions. In this manner, the framework gives an exact and constant workplace for clients, which guarantees they come by exact results.

It permits to make limitless dashboards which can be imparted to different clients by email (on a planned premise or every information update). Its engineering productively uses the RAM, CPU, and circle space, permitting clients to run Big Data examination on reasonable equipment. It permits

you to trade information to PDF, CSV, Excel, pictures, and so on. And, utilizes the Single-Sign-On verification, which decreases secret key exhaustion and expands the client's efficiency. It allows involving channels in the dashboard gadgets to question complex information from your information source without composing SQL questions. The channels applied are converted into SQL inquiries your information source comprehends. This way to deal with questioning information opens the inquiries to just the information source, which gives convenience to clients. It empowers clients to join information from different sources and play out the fundamental investigations. It associates with both SQL and NoSQL information bases.

III. DATA VISUALIZATION TOOLS FEATURES

The new users of the system get acquainted with the features and functions of the tools in the free trial period and upgrade to the paid versions for continuing the use. The reviewed data visualization tools provide the free trial period of minimum 14 days. The data visualization tools are tested. These tools provide interactive visualization types and the output forms are mentioned in the above section for each of the tool.

TABLE I
COMPARISON OF FRAMEWORKS

TOOLS	FREE TRIAL	INTERACTIVE VISUALIZATION	COLLABORATION
TABLEAU	✓	✓	✓
MICROSOFT POWER BI	✓	✓	PAID
DOMO	✓	✓	✓
ORACLE CLOUD ANALYTICS	✓	✓	✓
QLIKSENS	✓	✓	✓

IBM COGNOS ANALYTIC S	✓	✓	✓
SISENSE	✓	✓	✓

IV. RESULTS & CONCLUSIONS

The pictorial representation of information is easier to comprehend than the written numeric, texts. The data visualization tools are generating the basic visualization type of output and advanced creative and interactive outputs from the imported information. The advanced features of data visualization tools include applying artificial intelligence and also create machine learning models from the data output. Visualization tools are vital for the performance as it significantly impacts understanding of the relevant statistics. The data visualization is important for organizations in terms of time and cost effectiveness. Data visualization supports decision making and lower the inefficiencies. To maximize the gains, data needs to be viewed from different standpoints and trends and patterns need to be identified; data visualization tools help with these and reduce the errors and inaccuracies as well. The insights drawn from the data are used to create new strategies for in different sectors like businesses, researches, healthcare etc. These increase the operations effectiveness and productivity. The tool generated reports can be stored and old data can be easily analyzed in future needs.

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