INTERACTIVE DASHBOARD DESIGN FOR MANAGER, DATA ANALYST AND DATA SCIENTIST PERSPECTIVE

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ABSTRACT

With large amounts of unstructured data being produced every day, organizations are trying to extract as much relevant information as possible. This massive quantity of data is collected from a variety of sources, and data analysts and data scientists use it to create a dashboard that provides a complete picture of the organization's performance. Dashboards are business intelligence (BI) reporting tools that collect and show key metrics and key performance indicators (KPIs) on a single screen, enabling users to monitor and analyse business performance at a glance. An objective assessment of the company's overall performance, as well as of each department, is provided. If each department has access to the dashboard, it may serve as a springboard for future discussion and good decision-making. The goal of this article is to explain in detail the implementation of Dashboard and how it works, which will serve as a blueprint for building an effective dashboard with respect to best practices for dashboard design.

KEYWORDS

ETL, Data, Dashboard, Data Analyst, data Science.

1. INTRODUCTION

Definition - What does dashboard mean?

A Dashboard is said to be a simple to read, frequently single page, real-time user interface, demonstrating a graphical introduction of the present status (snapshot) and historical trends of an organizations or computer appliances key performance indicators to enable immediate and informed choices to be made briefly. There are a lot of ideas about what a dashboard is, which this article will clearly define.

There are typically four types of presentation media: dashboards, visual analysis tools, scorecards, and reports but our focus will be on dashboard designing. These are all visual representations of data that help people identify correlations, trends, outliers (anomalies), patterns, and business conditions. Similarly, they all have their own unique attributes. A dashboard in a simple word can provides us with a Summary of the status of a Performance of a project, Sales report, Customer details Updates, Employees report etc. A dashboard gives the real-time changes happening that can be analyse further. There are three most used dashboards among many other.

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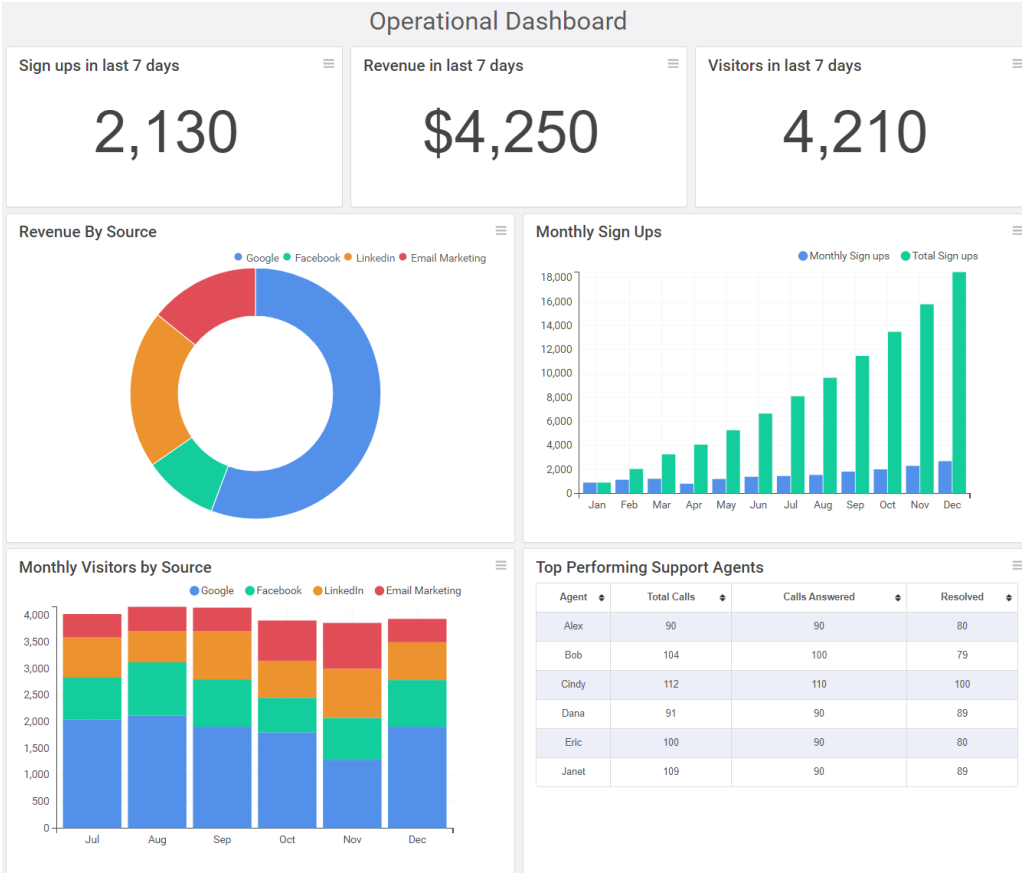
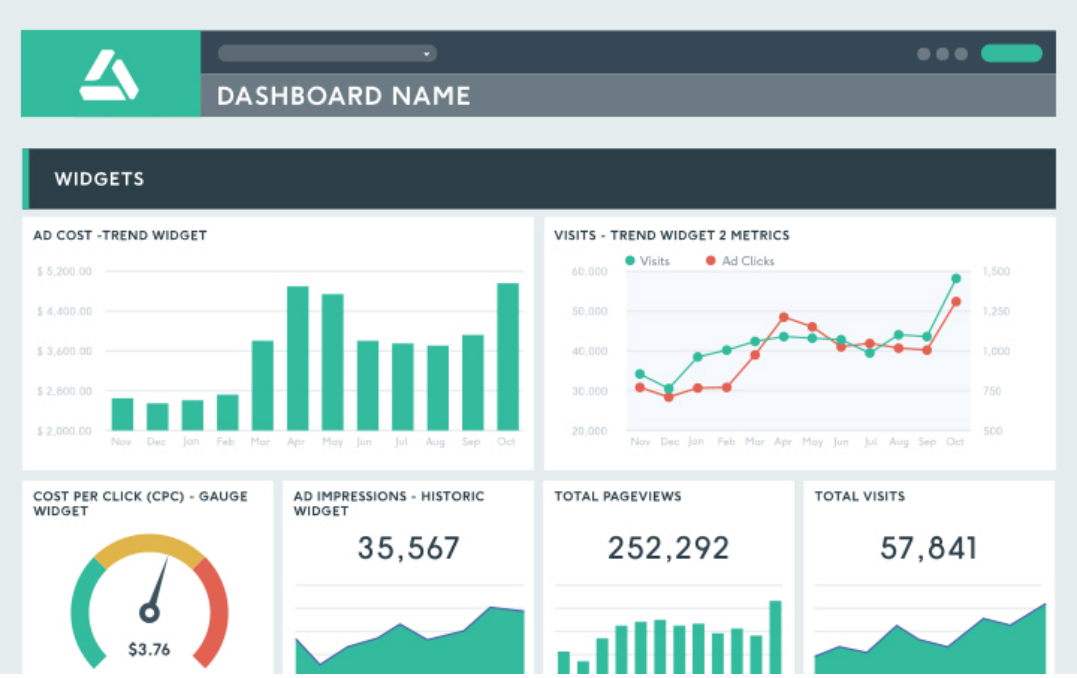
The operational dashboard: This is said to be the simplest and most popular kind of dashboard that shows real-time changes in data for various operations. This is a visualization tool that helps to track business operations and provides us with an updated performance report. These dashboards are good at summarizing large amounts of data and are designed in a way such that they can be viewed multiple times a day, say to check their progress towards a target set. It is mostly used by managers to monitor the performance of their employees. These simple dashboards can collect data from a single or multiple sources and present it in a simple and readable at-a-glance format.



Source from: https://ubiq.co/analytics-blog/create-operational-dashboard-business/

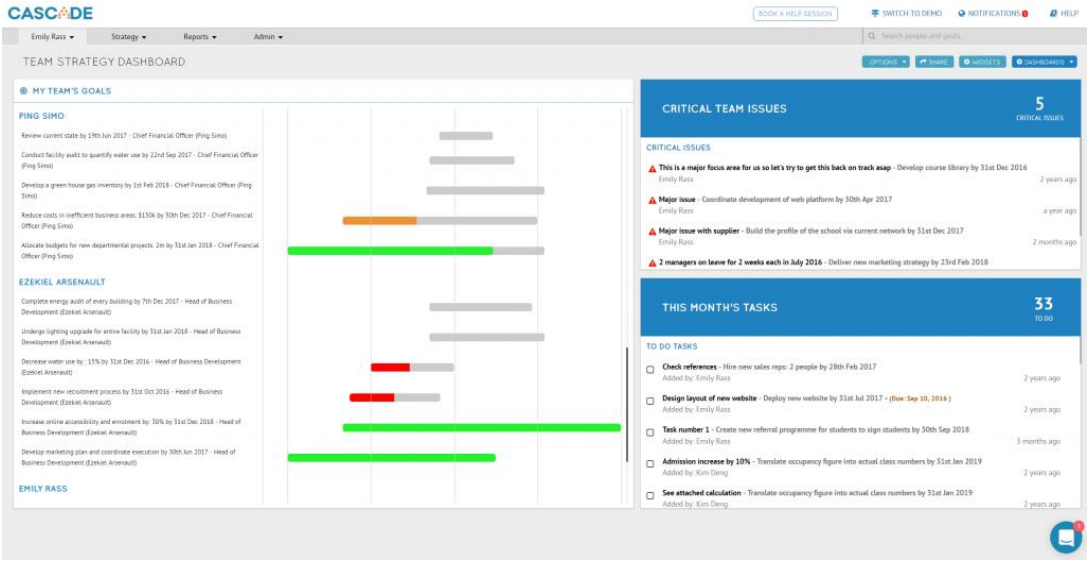
Analytical Dashboards: This is the types of dashboards that used data from previous reports to make further decisions. This is used to track changes, predict the result and conclusion as well. Drill through, Pivot Tables are some features that is available in this dashboard. This Dashboards is commonly used by Data Analyst who perform slicing of Data to compare and Investigate Occurring Outcomes.



Source from https://dashthis.com/analytical-dashboard/

Strategic Dashboards: These dashboards help the managers and stakeholders to determine the current state of the organization. With this dashboard, the area of Improvement can be detected and ways to avoid

business disruption can be established.



Source from: https://www.cascade.app/blog/examples-to-create-strategy-dashboards

Advantages of A Dashboards: A dashboard makes it easier to grasp data from different sources and view them at a single glance. It gives a clear picture of the company's progress and improves decision making. Dashboards are very important in today's industry. It allows the stakeholders as

well as the user to select certain key performance indicators to display and would provide real-time updates whenever needed. These indicators can be based on anything such as output, input, time, and activity. A good dashboard will provide key benefits such as total business visibility, significant time savings, reduced stress, increased productivity, and increased profits. The most important part of a good dashboard is the part that gets the least amount of attention, which usually shows the underlying data. There are several types of ways to set up dashboards, but they are all categorized into three, which will be explained further in the paper.

2. IMPLEMENTATION OF A DASHBOARD DESIGN

At a high level, it may seem relatively easy to build a dashboard. Companies that feel they have a good handle on which performance indicators are of strategic importance to the organization may think collecting, summarizing, and consolidating the supporting data shouldn't be that difficult. However, such oversimplification can lead to a failed project before it ever gets off the ground. A dashboard may appear to be a simple task at first glance. Organizations that believe they have a strong hold on which performance indicators are critical to their business operations may believe that gathering, summarizing, and aggregating the supporting data shouldn't be too tough. However, oversimplification can lead to a failed project. Successfully implementing a dashboard requires a step-by-step process and a methodology that considers all aspects of the project life cycle. This series of tasks includes planning, design, building, and deploying. This will be similar, regardless of the technology or vendor chosen. It is important to include all these steps above correctly to design and implement a dashboard that will have the potential to bring an immediate and considerable return on investment (ROI) to your organization.

2.1. Characteristics of a good dashboard design

A dashboard is an information management tool that visually tracks, explains, or break down and shows key performance indicators (KPI), metrics and key data points to monitor the wellbeing of a business, department, or explicit process. They are customizable to meet the specific needs of a department and organization.

- All the visualizations fit on a single PC screen — It should fit on one screen, but there may be scroll bars for tables with a lot of rows or charts with too many Data points.
- It demonstrates the most important performance indicators / performance measures to be checked.

- It should be able to discover correlations, trends, exceptions (irregularities), and business conditions in Data.
- Interactivity for example filtering and drill-down can be used in a Dashboard; however, those kinds of activities ought not be required to see which performance indicators are failing to meet expectations.
- It is not designed exclusively for decision makers but instead ought to be utilized by the general workforce as effective dashboards are straightforward and use.
- The displayed Data automatically refreshed with no help from the client. frequency of the update will differ by organization and by purpose. The most effective dashboards have Data updated on a minimum daily.

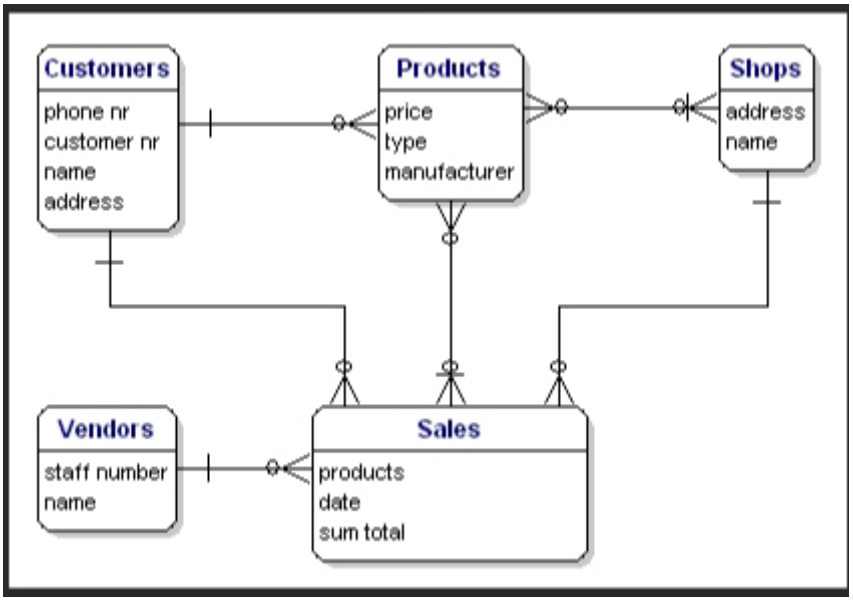
2.2. Database Vs Dashboard

A Database is a management framework for your data. Databases come in about as many various forms as the data comes in. A dashboard is a visual display of the most important of the most imperative data expected to accomplish at least one goals; combined and organized on a single screen so the information can be monitored briefly. We can say both has to do with information or data of your company.

Types of Databases

- Relational database.
- Flat-file database.
- Hierarchical & Network database.
- Object-oriented database.
- Object-relational database.

Relationships between Database and Dashboard



THE ABOVE DIAGRAM EXPLAIN HOW A DATABASE LOOK LIKE

THE ABOVE DIAGRAM EXPLAIN HOW A DASHBOARD LOOK LIKE

2.3. Identify the necessary internal and likely external databases that would be needed to support the Dashboard

After external database servers are defined, the databases on them can be defined. Altus Director can utilize databases that as of now exist on those servers, or it can create them while bootstrapping new Cloudera Manager examples or CDH clusters.

After outer database servers are characterized, the databases on them can be characterized. Altus. The following parts of an existing database must be defined which are additionally expected to support a dashboard:

- Type - The type of database, “MYSQL” or “POSTGRESQL.”
- Hostname – Server host name.
- Port – Server listening port.
- Name – The server database name.
- Username – User account name that has full access to the database.
- Password – User account password.

The parts of an external database template are:

- Name - A unique name for the template within the deployment or cluster template.
- Database Server Name - The name of the external database server where the new database is to reside.
- Database Name Prefix - The string prefix for the name of the new database server.
- Username Prefix - The string prefix for the name of the new user account that will have full access to the database.

The database server name in a database server template must refer to an external database server that is already defined.

At the point when Altus Director makes the new database, it names the database by beginning with the prefix in the template and after which appends a random string.

2.4. Internal database

Every organization has an internal network that sends and gets data from different sources inside and outside the organization. That network additionally stores all the internal information identified with organization like sales data, consumer feedback which are part of the data expected to help a database etc. Any such collection of data with respect information on market and consumer behaviour in electronic form will be called as internal database.

I. CRITICAL ENTITY RELATIONSHIPS (ER) ACROSS DATABASES TO ENSURE HIGH LEVEL OF INFORMATION ACCURACY

ER diagrams help ensure that the relationships among the data entities in a database are rightly organized so that any application programs developed are consistent with business operations and user needs. In addition, ER diagrams can also help as reference documents after a database is in use. To the database if changes are made, ER diagrams help design them.

A good example is an ER that is designed for an order database. In this database design, A salesperson will serve many customers. This is an example of a one-to-many relationship, as shown by planned data redundancy is a method of structuring data in which the logical database design is altered so that data entities are joined together, sum totals are taken in the data records instead of calculating from elemental data, and some data attributes are repeated in more than one data entity to for database performance improvement. data model - A diagram of data entities and their relationships. Enterprise data modelling is the Data modelling done at the level of all the enterprise. entity-relationship (ER)diagrams- Data models that use basic graphical symbols to show the organization relationships between data.

II. DESCRIBE THE DBMS/ERP RELATIONSHIPS IN HIGH-LEVEL TERMS THAT SUPPORT THE EXTRACT, TRANSFORM, AND LOAD (ETL) FUNCTIONS NECESSARY TO DELIVER INFORMATION AND FORMATS (E.G., CHARTS, ETC.) TO THE DASHBOARD

In computing, extract, transform, load (ETL) is a procedure in database utilization to prepare data for analysis, particularly in data warehousing which ended up well known during the 1970s.Data extraction clarifies extracting data from homogeneous or heterogeneous sources, while data transformation processes data by changing them into a legitimate storage design/structure for the questioning and analysis purposes.

Lastly, data loading explains the insertion of data into the final target database example is an operational data store, a data mart, or a data warehouse. An appropriately designed ETL system extracts data from the source systems, enforces data quality and consistency standards, conforms data so that different sources can be utilized together, and finally delivers data in a presentation-ready format so that application developers can design applications and end users can make decide.

2.5. Dashboard perspectives

I. KEY PRINCIPLES TO DESIGN A DASHBOARD

Building an effective dashboard with respect to best practices for dashboard design is the summit of a complete BI process would more often include gathering requirements, defining KPIs and creating a data model.

II. BUSINESS VALUE OBTAINED

There are five key benefits of Business Value that can be obtained from a Dashboards.

BVDs bridge the information gap.

BVDs channel various data points from within the business into a centralized location – which means geographical, organizational, production, IT and other data can be combined to gain a more contextual understanding of the information at your disposal which offers clear, colorful graphical user interfaces (GUI) that help users easily understand and evaluate complex datasets. Example: a car's dashboard.

A. Business value give business meaning to IT data.

It simplifies IT data into a format that is understandable to C-level staff members.

B. Visibility

BVD provides the organization with unparalleled visibility and insight and puts all the information at their fingertips.

C. With BVD you can gauge performance against your plan
D. They afford time savings for executives.

3. CRITICAL SUCCESS FACTORS

a. Your dashboard should provide the relevant information in about 5 seconds.

The excess of a dashboard designed should be able to answer most often asked business questions briefly.

b. Logical Layout: The Inverted Pyramid

Display the most significant insights on the top part of the dashboard, trends in the middle, and granular details in the bottom.

c. Minimalism: Less is More

Each dashboard should contain no more than 5-9 visualizations.

d. Choosing the right data visualization

Select the appropriate type of data visualization according to its purpose.

Before choosing a visualization, consider which type of information you are trying to relay:

- Relationship
- Comparison
- Composition
- Distribution

4. COMMON PITFALLS

Common pitfalls in dashboard design: -

I. A very common mistake is starting off with too much complexity. I ascribe to the KISS principle – Keep It very Simple and uncomplicated.

II. Taking it further, too much complexity can also lead to the data being separated into multiple screens or into different instances of a single screen.

III. Another common dashboard design blunder is to use gadgets or widgets like speedometers and gauges that may not lend any context to the data in terms of letting you see if your KPIs are on track, better than in the past or worse than projected.

IV. You can avoid using the same type of visual representation of a KPI multiple times for the sake of offering up more “visual variety” to viewers. At the bottom line, they should be able to assess different KPIs using a visual display that’s both intuitive and interactive for them.

I. Another common faux pas in designing visual representations of KPIs is not displaying data from the "zero" level, which can create a distorted view of the data and a significant discrepancy between the KPI's real and perceived values.

5. CONCLUSIONS

Choosing the correct visualization is key to making sure your end users understand what they are looking at, yet that is not all you ought to consider. When contemplating about how to design a dashboard you need to put in consideration who will be the end user of the dashboard in any case. For instance, when designing a dashboard for an end user focused on ad platform optimization, you might need to focus on metrics that will increase conversion rates. Because your end user will be in the loop of what goes on with every ad on a day-to-day level, considering the nitty-gritty measures such as CPM (cost per Mille) would make more sense and choosing an ERP system is a very difficult thing to experience. It required the knowledge and understanding of a variety of business units. On the other side, choosing DBMS is as good as the experience you go through with ERP system chosen. But an organization should not choose an ERP without considering possible underlying DBMS's. DBMS vendors always guaranteed to be the best around and they all can also give out a list of notes of their satisfied customers. Implementing ERP is a key decision, which involves human as well as monetary resources and requires legitimate assessment and business process re-designing. If you are unable to track your progress at work whenever your organization needs Improvement, and you are also unable to determine in which area, if your Data are stored in multiple places and you are finding it difficult to compare or analyze them, then you should consider dashboard Creation which will make your Data Analysis and Management a lot easier and your life better.

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