

Reports That Make Decisions: SAS® Visual Analytics

Arun Sugumar, Vimal Raj,
Kavi Associates LLC, Barrington, IL

ABSTRACT

SAS® Visual Analytics provides numerous capabilities to analyze data quickly and efficiently which makes it easier for making key business decisions that are critical for day-to-day operations. Depending on your organization, for example, Human Resources, Sales, or Finance, the data can be easily mined by decision makers, providing information that empowers the user to make key business decisions. The right data preparation during report development is the key to success. SAS Visual Analytics provides the ability to explore the data and to make forecasts using automatic charting capabilities with a simple click-and-choose interface. The ability to load all the historical data into memory enables you to make decisions by analyzing the data patterns. The decision is within reach when the report designer uses SAS® Visual Analytics Designer functionality like alerts, display rules, ranks, comments, and others. Planning your data preparation task is critical for the success of the report. Identify the category and measure values in the source data, and convert them appropriately, based on your planned usage. Alerts notifications are sent to the right decision makers by e-mail when the report objects contain data that meets certain criteria. Display rules help in highlighting the right metrics to leadership, which helps focus the decision makers on the right metric in the data maze. For example, color coding the metrics quickly tells the report user which business problems require action. Ranking the metrics, such as top 10 or bottom 10, can help the decision makers focus on a success or on problem areas. They can drill into more details about why they stand out or fall behind. Report Comments which gives power to the business users to improve the data quality.

INTRODUCTION

“Gut Feeling” has been always a key aspect in decision making process among the business leaders. Taking informed business decisions has been a highly valued wish and CXO's invest in data related tools and technologies with this thought in mind. SAS Visual Analytics has an intuitive web interface that provides a drag and drop functionality to make the decision making process simple. Alerts, display rules and other functionalities of SAS Visual Analytics provide the right building blocks for technological automation and to help in the decision management. Through this paper we have used few of them from SAS Visual Analytics 6.4 and associated them with business use cases.

DATA PREPARATION IS SIGNIFICANT FOR INSIGHT

Gathering the report requirements or planning the report purpose is the very key to the report. Mixing the data and using the processing power will create the insight. These insights can help you to take the necessary actions which can deliver the right value to the data. SAS Visual Analytics gives the processing power because of the in-memory processing capabilities and the advanced visualizing capabilities deliver the insights. We have simulated the Freight Rail industry data to base all the SAS Visual Analytics reports which can lead to the right decisions.

CREATE BUSINESS IMPACT WITH ALERTS

Alerting the business person based on the insight from data on his NEXT ACTION creates the business impact. For example, in the Transportation industry, a Maintenance manager can get alerts provided to them based on predicted rim thickness if it meets specified failure criteria and initiate actions to prevent wheel failures. This helps the maintenance manager to schedule a maintenance plan considering the fleet's condition. Adding an alert to a report gives the notification capabilities through Email or notifications can viewed in the home screen of SAS Visual Analytics after the user's successful login. The system monitors the data, and the report developer can specify how frequently system checks are made and notifications are sent.

SETTING UP ALERTS

Figure 1 explains the “Add Alert” option for a report object. An expression which needs to be evaluated is provided in the alert context. The options for “how often to query the system” is provided. If the system default has been chosen the value for “how often to query” will be set as 10 minutes. The report developer has the options to provide custom values based on the needs but the maximum limit is limited to 100 hours. When setting up the Email notification frequency there are multiple custom options based on Minute, Hour and Day selection as shown in Figure 1. When the report developer modifies the notification frequency then the notification history is reset. In SAS Visual Analytics 6.4, there is no option to set a specific time for sending an alert notification.

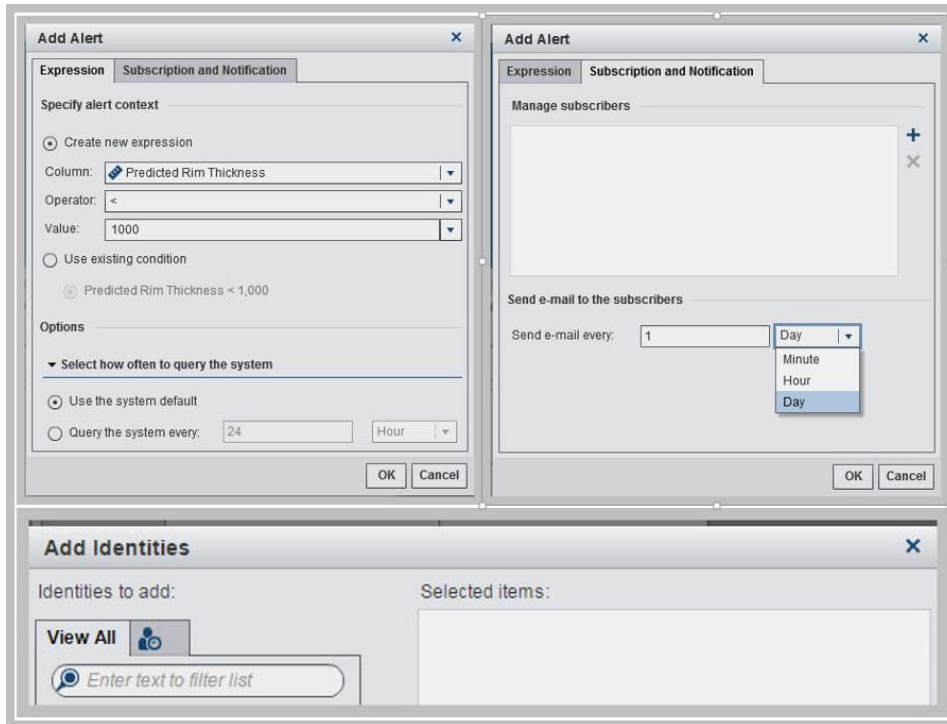


Figure 1 Adding Alert for a Report Object

ALERTS IN ACTION

After expanding the right pane in the report viewer screen the business users can look at these options like properties, comments and alerts. If a new business user is interested in tracking the metric then the business user can subscribe or unsubscribe to that alert.

BE ALERT IN SETTING UP ALERTS

The user's metadata identity must be associated with the appropriate email address. This can be verified in the "user manager" section of SAS Management Console. For alerts to work the SAS Trusted User, which is a privileged internal user, will need to have ReadMetadata access to the LASR table, report and the libraries.

If there are any issues in adding the alerts then a report user can work with a SAS Administrator to analyze the log file (SASVisualAnalyticsHyperlink6.4.log) which is located in "/config/Lev1/Web/Logs/SASServer_n" (Depends on the SAS installation platform.). Figure 2 gives a print screen of an error log when there is an issue in locating the LASR table. The log file can grow quickly if you want to query the system frequently and a SAS administrator can follow the best practices to manage the file size for better performance of the environment.

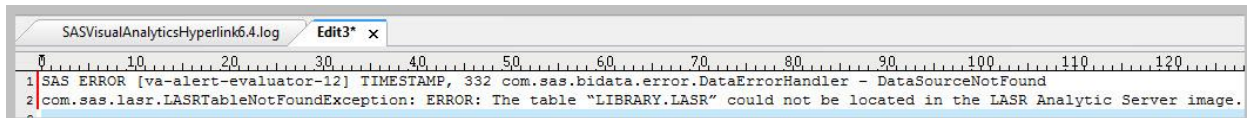


Figure 2 Troubleshooting Alert Errors in SAS Visual Analytics

Early alerts make it easier to prevent costly failures. SAS Visual Analytics helps to achieve this purpose by sending a notification to specific users when report objects contain data that meets certain criteria. The alerts can be sent to a user or group of users so that failure is avoided at all cost and preventive actions are initiated at the right time.

DISPLAY RULES DECIDE THE NEXT ACTIONS

Alerts help in ensuring the key business metrics are monitored closely and failures are avoided. Display rules help the report developer to visually spot where the failures can happen and highlight the problem visually to the business user who initiates the action to prevent the failures. The display rules conditionally highlights to the report user based on the expression results.

In this example, locomotives have a planned maintenance schedule, which can be at 60 or 90 day intervals. At each planned maintenance period, wheels are inspected and the rim thickness is measured. During each maintenance period, data is collected and fed to the prediction models. Once the Maintenance manager enters the locomotive ID, the SAS Visual Analytics report will show the predicted rim thickness of the wheel after 30/60/90 day period.

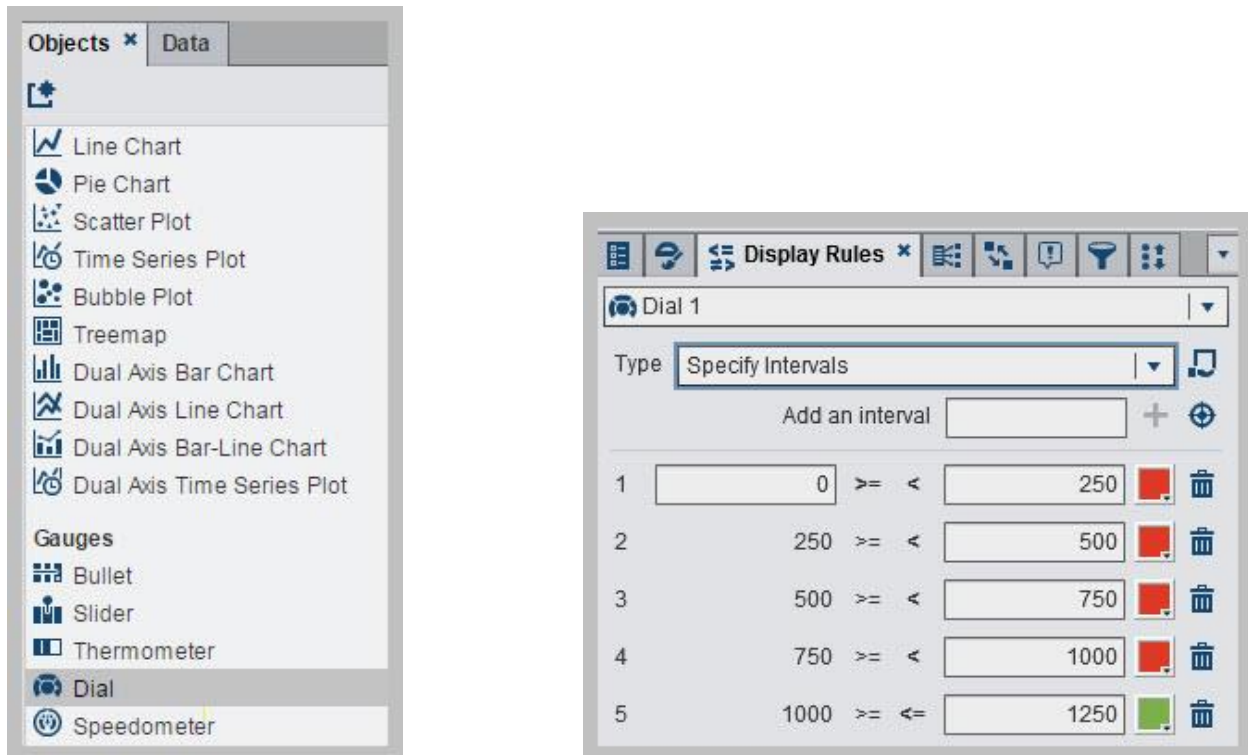


Figure 3 Dial Gauge and setting up Intervals using Display Rules for Dial Gauge

Rim thickness intervals are set using the display rules and if the predicted rim thickness falls below 1 inch thickness then it is considered to be wheel failure. Figure 3 shows steps to select a dial gauge and also the options to set up the intervals in the display rules tab which involves the following steps

1. Select the gauge type from objects.
2. In the right pane, click the Display Rules tab. Figure 3 explains how to specify the display rules for the gauge. Populate the intervals, edit the display rule, and specify the Type.
3. To automatically populate the intervals, click the auto populate button to enter a number of intervals, lower bound and upper bound and click OK.
4. To edit the display rule for a gauge, click the edit display rule button which allows selecting a Type, add intervals and select the color

In our use case below which is shown in figure 4, the faulty wheel is shown visually in Red color. The Maintenance manager can quickly identify the wheel failure which can happen in the next 30 days based on its current rim thickness. The predicted values of twelve coupled driving wheels are depicted using 12 gauges. Figure 4 below shows Pred_L1 which is the predicted value for the left first wheel and the ones with underscore R1 gives the right wheel rim thickness. Top row has the predicted rim thickness of the right wheels and bottom row depicts the left wheel rim thickness.

The red colored dial in figure 4 indicates the wheel which can fail with the next 30 days based on the prediction model and will need a replacement before the next maintenance cycle.



Figure 4 Gauge Display of a Locomotive’s Predicted Rim thickness using “Display Rules”

GEOMAP AND TOP 10 RANKS

Geo Region Maps are visually plotted in a map and can take inputs like country, state, state abbreviations and zip code information. SAS Visual Analytics also has capabilities to overlay the data as bubbles and also a scatter plot through Geo Bubble maps and Geo Coordinate maps. In the use case below we have plotted the Trip Origins and destinations information in a Geo Region Map.

A geography data item which is based on the State abbreviations is used to plot the data in a Map. Top 10 origins and destinations of the freight based on the trip information can help the scheduling manager to plan for the parked empty railcar fleet at specific location based on the railcar types and their demand in the states. Geographical information can help the lease contract negotiations with prospective customers.

Setting up the Geo Region Map involves the following steps

1. Select “Geo Region Map” from other objects section in the left panel and drop into the report section
2. Add the origin or destination which is based on state abbreviation and the trip count information
3. In the data colors choose the gradient which indicates the trip concentration

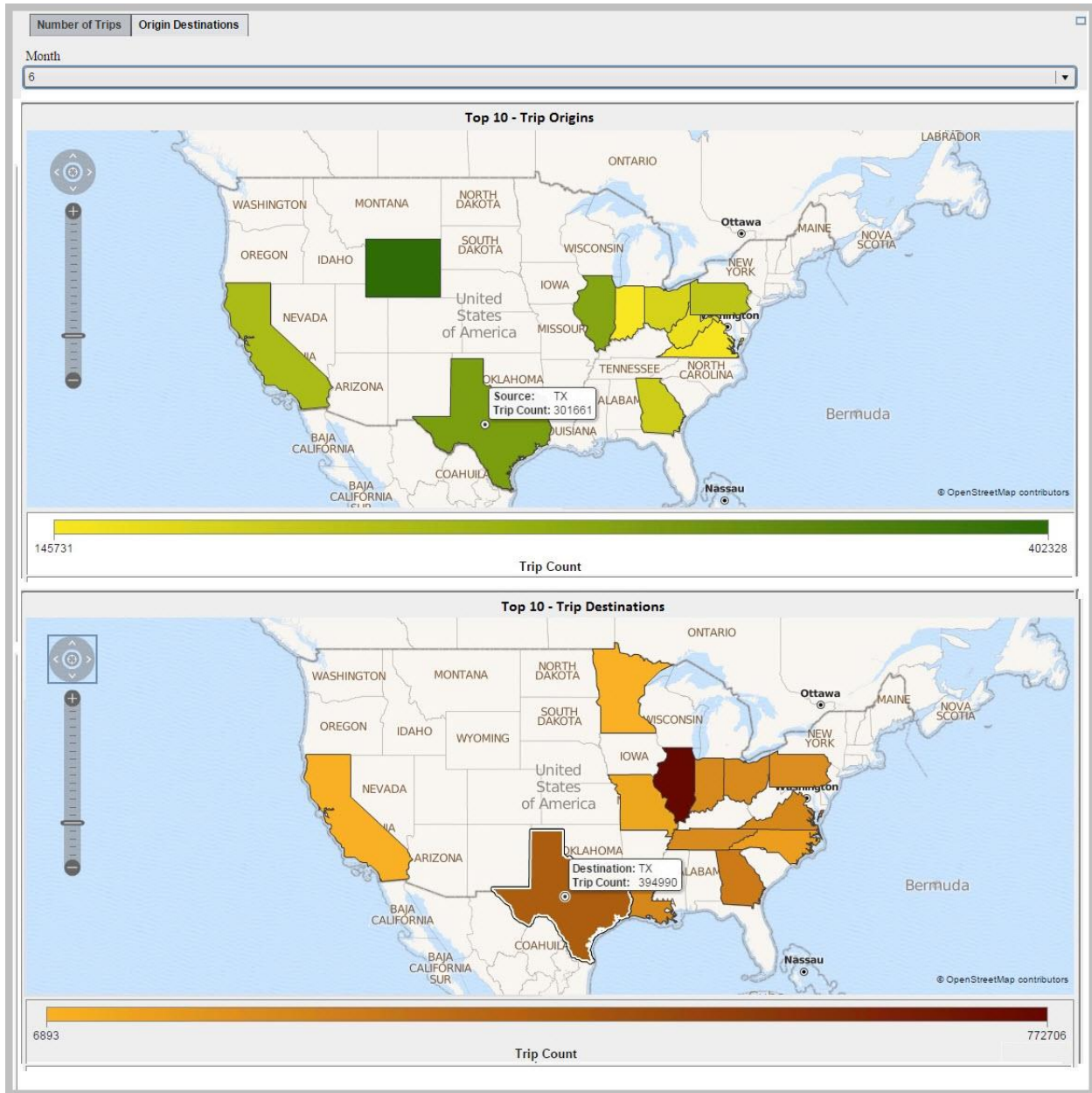


Figure 5 Geo Region Map of Top 10 trip Origins and Destination states for a Month

In the map show in figure 5 which is based on the period (month) selection the top 10 states are plotted for their origin and destination trip counts. More seasonality related patterns can be identified by choosing the various periods and gradients that will help to identify the trip concentration in a particular region.

COMMENTING THE METRICS IN A REPORT

Adding explanatory information to a specific metric in a particular report can be done using the comments feature. Comments can help monitor the data quality which help to create a responsive and reliable reporting environment. For example if the user finds a data quality issue then it can be highlighted and a print screen can be attached highlighting the data quality issue. The comments also can take attachments and if attachments can be a security concern to organizations then we can restrict the file types which may be a cause of concern like EXE/BAT.

The administrator can edit the “/config/lev1/web/webappserver/SASServer1_1/sas_webapps/sas.svcs.scs.war/WEB-INF/config.xml file” depending on the SAS installation of your environment. In the XML file, there is an option to include the “disallowedMimeTypes” which can restrict certain file types.

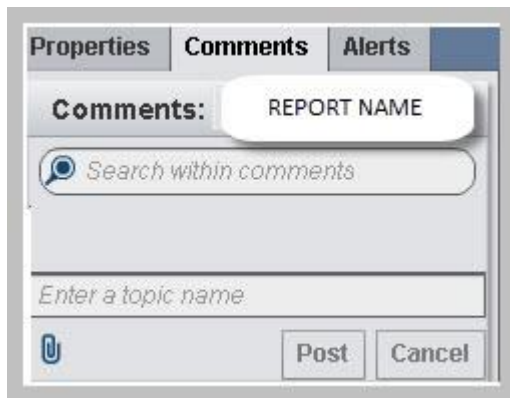


Figure 6 Comments in SAS Visual Analytics

CONCLUSION

SAS Visual Analytics helps in gaining quick insights with the in-memory data. A report should provide answers for all the most difficult questions. SAS Visual Analytics provides advanced data visualization capabilities to make decisions clear and forthright and deliver to the end business users so that actions emerge from the data. Alerts, display rules, geo region maps and comments are few of them highlighted in this paper that helps in the decision making process. There is lot more of functionality inside the visual exploration which will help making the right decision with the available data.

REFERENCES

- SAS Visual Analytics User Guide - <http://support.sas.com/documentation/onlinedoc/va/>

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RECOMMENDED READING

- SAS Visual Analytics User Guide - <http://support.sas.com/documentation/onlinedoc/va/>

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Arun Sugumar
Kavi Associates LLC
(847) 387 6760
arun.sugumar@kaviglobal.com
<http://www.kaviglobal.com>

Vimal Raj
Kavi Associates LLC
(847) 387 6760
vimal.raj@kaviglobal.com
<http://www.kaviglobal.com>

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