

SAS® REPORTS ON YOUR FINGERTIPS? – SAS BI IS THE ANSWER FOR CREATING IMMERSIVE MOBILE REPORTS

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ABSTRACT

The widespread use of smartphone and tablets has created a shift in how information is consumed. Nowadays it's very important for the users to be able to access the information which is latest, readily available wherever they are located. So is it possible in SAS to access the reports through your mobile or tab? The answer is YES! With the help of SAS BI we can now access the information at our fingertips and make decisions at any place and any time. We can even interact, navigate, filter and drill down the reports and make faster decisions. We can also easily annotate to share thoughts, ideas and questions and even add audio/video comments and share them via email.

INTRODUCTION

In pharmaceutical industry data is the backbone for everything and the unique selling proposition (USP) is to get the right drug in market at the right time. Often, the decision makers in Pharma Industry reviewing SAS reports are high-level executives who are in meetings, traveling, or otherwise away from the office. To meet the demands of these business professionals, SAS reports are now available from mobile devices.

Nowadays data is getting bigger and means to access it getting smaller. The widespread usage of tablets and smartphones has created demand for organizations to adapt and support mobile devices.

The use of iPads by Health Care professionals has transformed many aspects of clinical practice.

We can now record the data online and share it in no time but the challenge is to make it available to the decision makers quickly.

SAS Mobile BI is an important component of SAS Visual Analytics which is used to deliver the analytical results and reports to the mobile device which will help the decision maker to quickly access the information anywhere and at anytime.

To access the latest relevant information the user can use their iPads and Android tablets to get an insight which will help them to make their decision quickly and regularly.

SAS mobile BI uses the in-memory capabilities which help the user to find patterns and analytically find the relation between the data irrespective of the size of the data.

It also enables IT to provide synchronized and latest data which will be used for analysis. With the help of SAS Mobile BI the report designer can create and deliver the reports to mobile devices which will be used by the decision makers to view the data and get an insight into the data from their Apple iPad or Android tablet.

In this paper we will discuss mobile reporting and the key benefits and features of mobile BI. We will also discuss how to align the data and design the report in SAS Visual Analytics Explorer.

To use the mobile BI apps you need to license SAS Enterprise BI Server and to design the report you need SAS Visual Analytics.

You can login to SAS website and can get access to Visual Analytics to design the report with the dummy data. This paper is based on exploring different functionality of SAS Visual Analytics by giving some examples and the application of these features.

KEY BENEFITS:

- Enables the decision makers to access synchronized and up-to-date data wherever they go to make the decision as per the latest data.
- You do not have to depend on others to deliver the updated reports instead provides access to the latest data which in turn increases productivity.
- Reports can be shared with others through email by adding comments or annotations.
- You will get alerts whenever the report is updated.

- Enables IT to protect and manage the integrity and security of data which makes it safe and secure.
- Is interactive, engaging and easy to use (zoom, drill, filter, comments, audio/video etc).
- Reports can be accessed either online or offline so no need to wait to get back to office to review the report, it is right there on your iPad or smartphone.

These features and many more will help the Pharma companies to meet the expectation of the market by allowing the user to quickly access and interact with the reports by using their iPad or Android tablet and make faster decisions based on the latest data available wherever they go.

INTEGRATION WITH MOBILE

SAS mobile BI is developed in Apple iOS and Google Android platform which will help the application to take the advantage of device specific hardware or software and integrate with many operating systems. It incorporates most of the functionality of mobile applications which are supported by the user's device. For example mobile BI can use the audio and video functionality of the mobile to insert the comments in the report.

It can even interact with other applications in your mobile. The sharing feature of the mobile BI enables it to capture the image, annotate it and send it along with the editable text through any email application installed in the system. Figure 1 and Figure 2 show you the options available in iOS and Android for sending via e-mail.



Figure 1. iOS Report Sharing Option

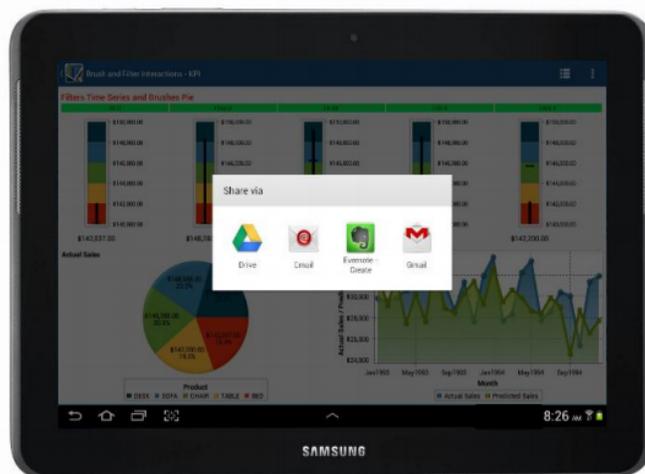


Figure 2. Android Report sharing Option

Mobile BI gives you a visually rich and dynamic experience since all the reports are interactive and use the native methods available in iPad and Android for e.g. pinching, zooming, swiping, content grouping and one touch navigation to drill down the data. Figure 3 will give you a visual experience for interacting in iPad or Android.

To view more than one report on the screen you can use the swipe container and hold multiple reports at a time. With the use of finger swipe user can scroll through all the objects. One of the most important gestures is the tap which will allow you to drill down and filter to the data of your interest. If you tap and hold it will produce the magnified view of data beneath your finger.

With the help of these interactive methods you can connect, explore and visualize data better via touch. It also allows you in navigating to the data of your interest quickly to find pattern or issues in the data which further helps improve efficiency.

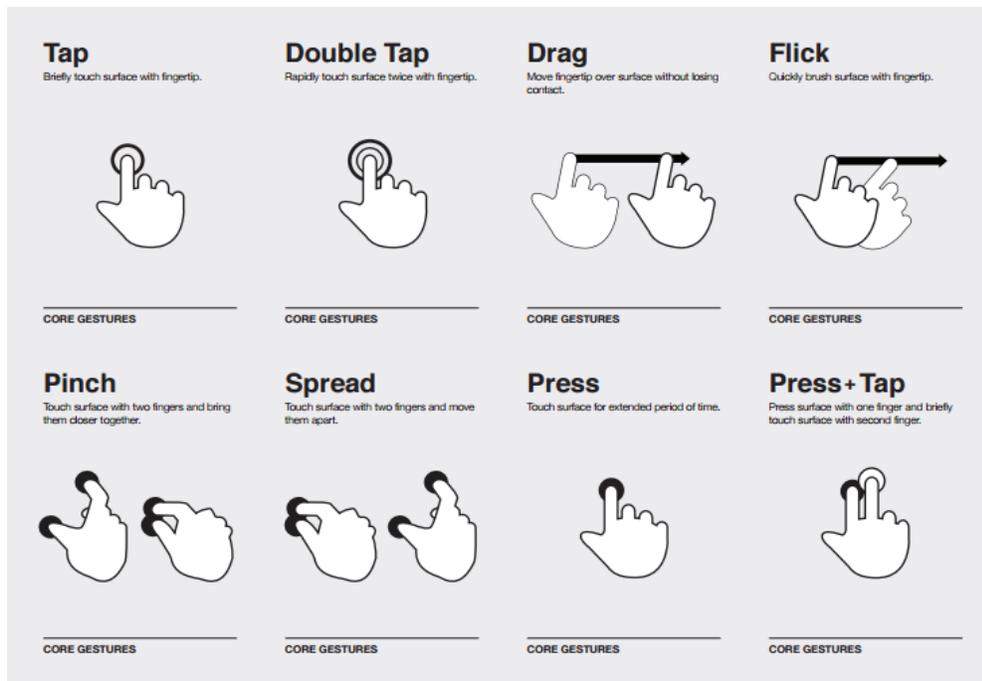


Figure 3. Interaction Method to iPad and Android

DESIGNING THE MOBILE REPORT

To design any report the most important thing is to understand the requirement correctly. The report should be effective enough to communicate the message to the user and it should be properly planned by understanding the need of the user.

During the design phase you need to follow the below steps:

1. Identify the data to be used for the report.
2. Add interactivity like filtering and brushing to help analyze the data better.
3. Add definition of interaction to support the drill down and detail level approach.
4. Last but not least make your report beautiful.

LOCATING THE DATA

For designing a report you need SAS Visual Analytics Designer. You can import the data from either local data file or from server. While importing the data from local data file you can either use a spreadsheet, or delimited text file or SAS dataset. And while importing it from server you can use other data source also like Oracle, Teradata, DB2 and even Twitter.

So you can either use the analysis dataset or can directly use the raw data from Oracle dataset or any other data source for designing the report. You also have the Autoload functionality but it requires some setup before it can be used.

BUILDING THE DATA

The next step is to use the data builder which will help the analyst to perform basic data preparation. We will not go in details of data builder but it is very useful if you want to select data from multiple tables or you want to subset it based on your requirement.

Some of the essential features of data building are:

- Joining the datasets or tables.

- Filtering the data by applying Where or Having clause.
- Creating new calculated variables.
- Sub setting the variables for output column.
- Sorting of data.

The drag and drop functionality to select the data from the server or even making the relation between tables will make it very easy to use. You can view the code and result which will be generated based on your selection. You can save your final data selection in a new table. You can also reuse the data query as sub query for creating a new data query.

EXPLORING THE DATA

You can explore your data source using the component of SAS Visual Analytics called Visual Analytics Explorer. You can use different visualization technique to explore the data. Some of them are listed below but there are lots more to explore:

- Chart (like bar chart, line chart).
- Plots (like scatter plot, bubble plot, box plot)
- Histograms.
- Forecasting.
- Correlation.

You can save the exploration as a metadata object which will have the visualization, data settings, and filters from your session and you can even export your exploration results as report in PDF format and can share via email.

Below is list of some functionality of visualization but there are many more to explore:

- Update the data properties from the properties window.
- Can assign different color to different category.
- Creating new calculated data items.
- Creating aggregated measure like average, min, max, median etc.
- Creating filters to subset the data.
- Creating ranks to select top or bottom aggregated value for a category.

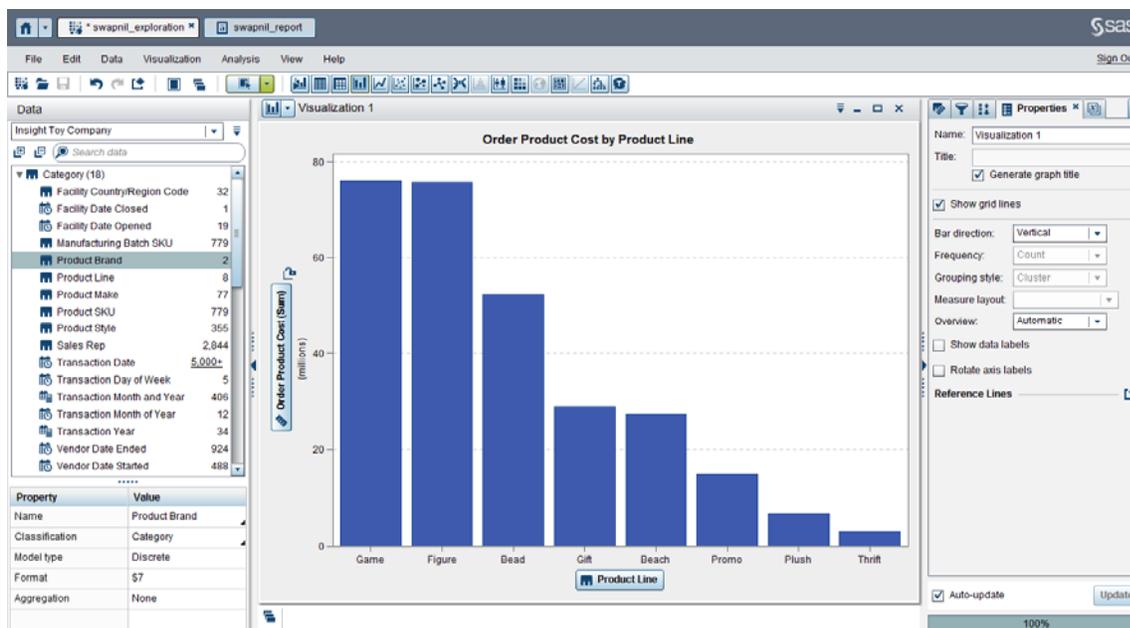


Figure 4. Exploration Window

DESIGNING THE REPORT

With the help of SAS Visual Analytics Designer you can create reports or dashboard which can be viewed on mobile devices. Designing the report was never so easy; you just need to drag and drop the tables or graphs from the objects window and can start building your report. There is no programming required to design these reports because everything is drag and drop here.

Example 1

In the below example you can see the design window. On the left hand side you can see the objects tab which will allow you to select tables, graphs, controls or containers for your report. You can add multiple objects to your report. From the data tab you can select the data source which will be used to create the report and can drag and drop the data items in the objects.

With the help of import you can import other report or report objects which were created from the explorer. But the reports which are exported from the explorer might look slightly different in the report designer

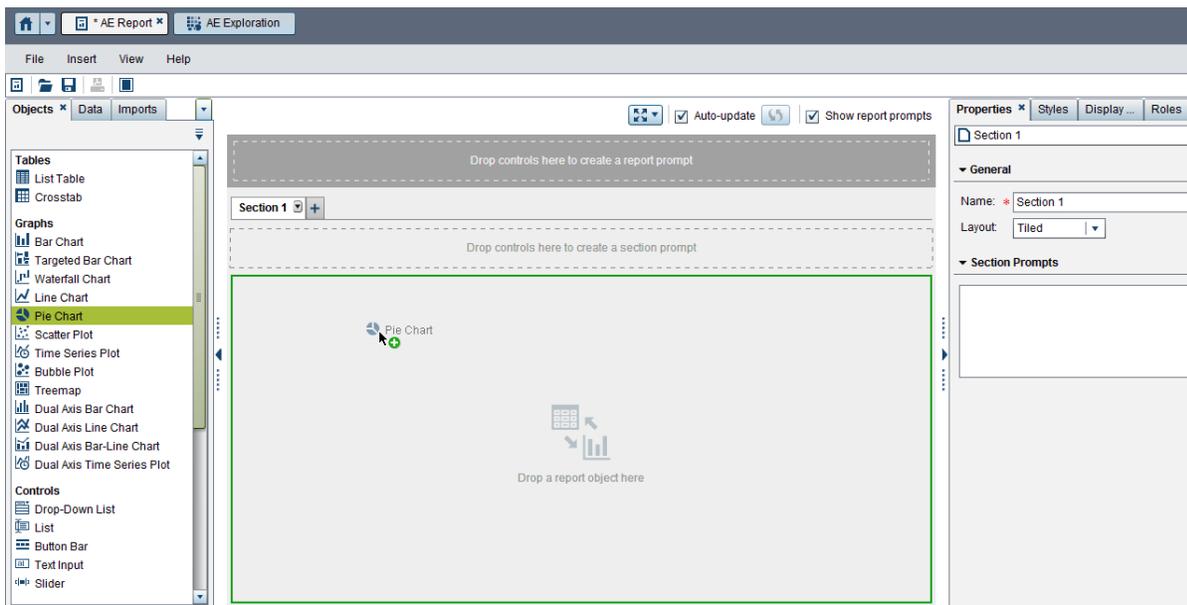


Figure 5. Selecting the Objects

Example 2

There are so many controls which you can use to filter the data like drop down list, list, button bar, text input and slider to filter the data. The use of control will enable you to group the data by a selected category. In the below example you can see the Gender and Age Group drop down filter which are added to the report.

You can have different sections and each section can have different layout for different report objects. There are three sections added in the below example.

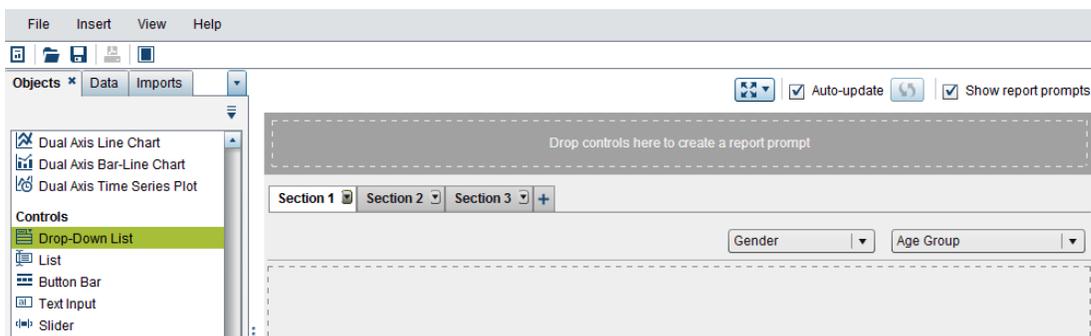


Figure 6. Adding Sections and Controls

Example 3

In the below example you can see there are two layout options present which are precision and tiled. The precision layout is capable of placing items on each other but the tiled layout will divide the screen for different objects. There is an aspect ratio tab available to see how the report will look like in tablet and wide screen tablet so that you can make some adjustment in your report if required.

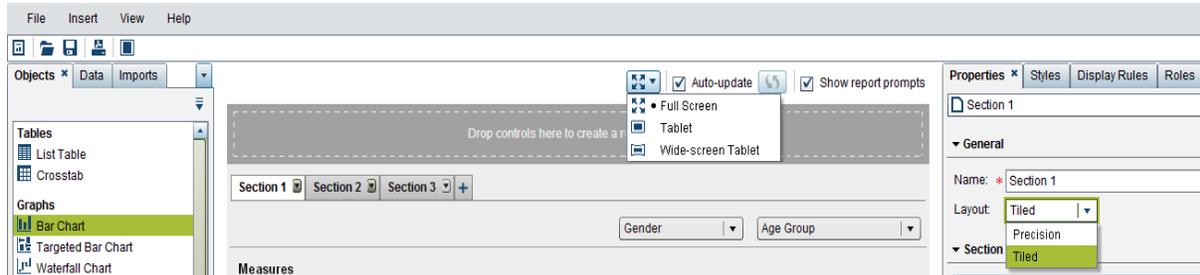


Figure 7. Updating the layout and viewing the aspect ratio

Example 4

On the right hand side of the report designer you have different tabs like properties, style, display rules, roles etc for an object. You can select the object and can change its properties. In the below example you can see the properties of a Pie Chart 1.

With the help of properties tab you can change the name, title, description etc for the object. In the styles tab you will see the options to change the border, fills, text styling, color etc.

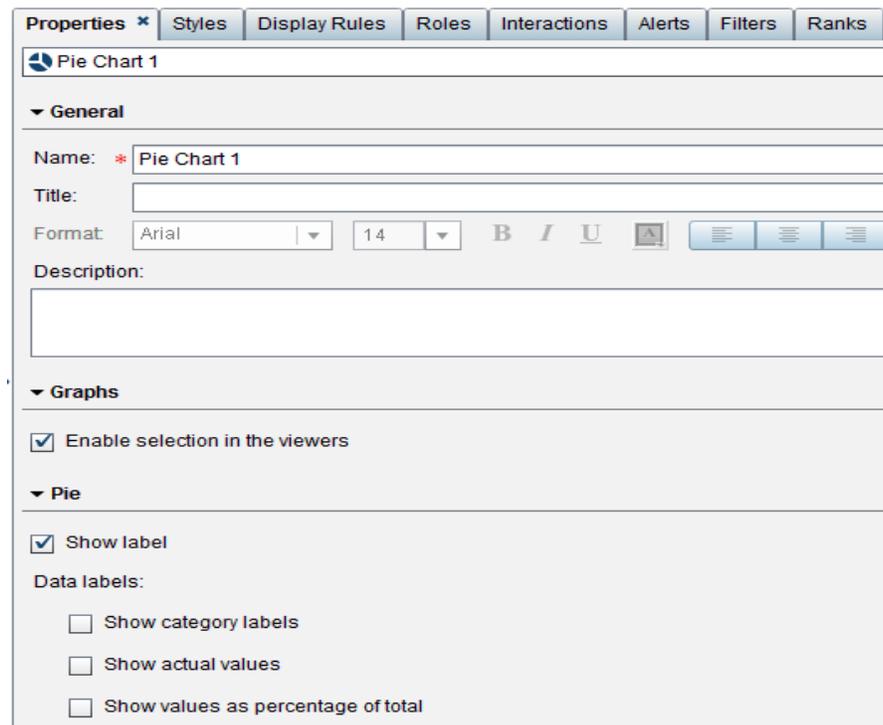


Figure 8. Properties Tab

Example 5

You also have an interaction tab which will help the user to interact between different report objects within a section. The interaction can be either by applying filter to the selected data or brushing (highlighting) the selected data. In the below example you can link the Bar Chart to Tree Map and Scatter Plot so that once you select one of the bar in the

bar chart it will filter the Tree Map with the selected bar values and highlight the values in the Scatter Plot.

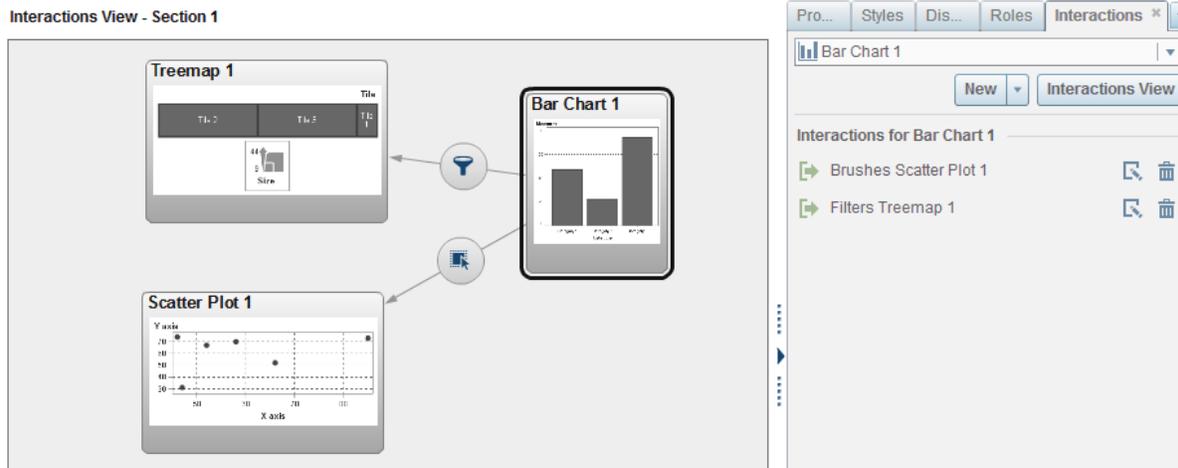


Figure 9. Adding Interactions

VIEWING REPORT ON MOBILE DEVICE

To view the report on your mobile you need to install SAS Mobile BI from the iTunes App Store or Google Play store. Once you install the app you can add a server connection to connect to your organization server by providing the details of the server and your credentials.

You can also login as guest and can access the reports which are made available to the public by the organization if the organization has setup the server to accept the guest connection.

Based on the interactions which are defined by the report designer like filter, brushing you can interact with the reports. With the help of filter you can restrict the data returned for the query for the report. And with the help of brushing you can highlight the selected data points in other reports.

In the below Figure 10 there are different sections for different category like Adverse event, Lab value, Patient Cohort as explained in Example 2 above.

You can use additional report level filters like Gender and Age group explained in Example 2, can drill down the report, and can maximize the particular report.

In the adverse event tab you can see four different graphs:

1. The adverse event (size) vs those that were Severe (color) report will give you an insight of different adverse event and severity of them. You can roll over the adverse events to know the exact number of adverse event in that category and how many of them are severe.
2. The next graph is the pie chart to show the adverse event by diabetes type. Once you select the region in the pie chart it will change other graphs based on your selection.
3. The next bar char is to represent the adverse event by primary medication and diabetes type which will give an insight of adverse event and medication given by diabetes type.
4. And the last graph will show you the correlation of selected measure for example the Thiazolidinediones drug and the chest pain.

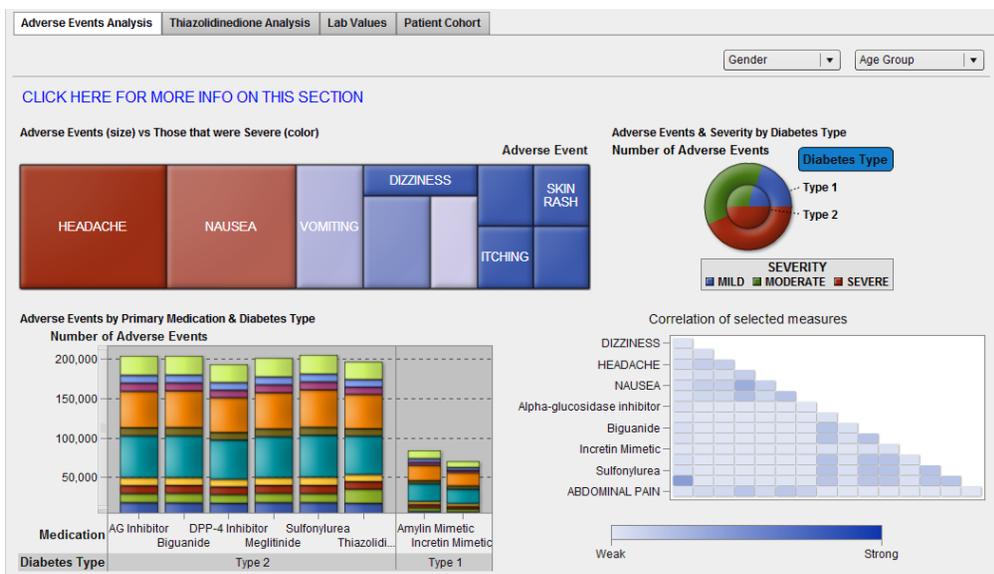


Figure 10. Adverse Event Report

In the below screen shot on the top you can see how we have applied the filter of gender (F) and age group (65-70) at the report level. You can also see a pie selected in the pie chart to filter the data for the tree map and bar chart i.e. severe adverse events are selected for those subjects who have Type 2 diabetes. The user has also annotated the pie chart to highlight that there are almost 50% of subjects having severe adverse event for type 2 diabetic patients.

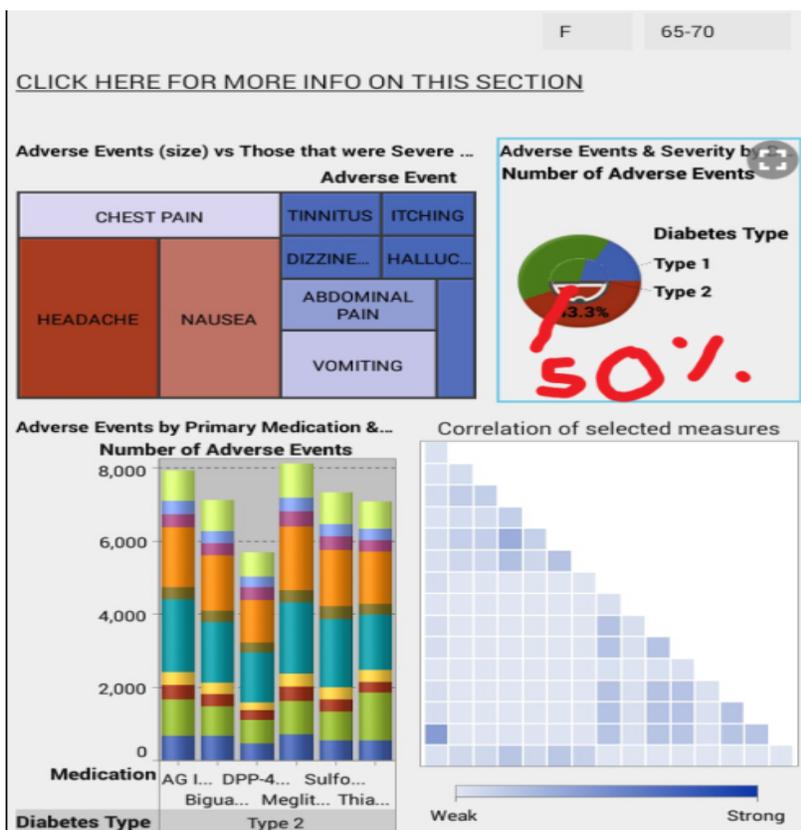


Figure 11. Adverse Event Report

THINGS TO KEEP IN MIND WHILE DESIGNING THE REPORT

1. Reports should not have too much data as it will create confusion; Keep fewer variables in the report.
2. Selection of color should be done cautiously as it should not give unbalanced contrast but should be visually rich.
3. Selection of font size should be perfect so that it is visible easily.
4. Selection of graph is important as it will help the analysis.
5. The report should as simple, clean and easy to understand.

Figure 12 shows some different kinds of graphs to select which will be able to communicate the relationship, comparison, ranking and accuracy of the data. It's always better to summarize the data if the detailed information is not required. Instead of creating multiple reports for different group it's better to empower the user to use filters.

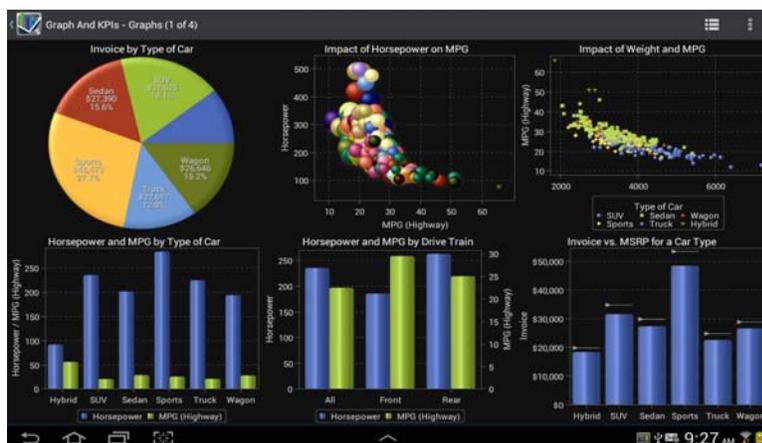


Figure 12. Different Types of graphs

DATA INTEGRITY AND SECURITY

The main concern for the organization to provide the data via mobile devices is the security of the data. While the information can be delivered instantaneously to the mobile devices, IT still has the underlying control of the data integrity and security. There are lots of security features which enable high end security of your data. Below is the list of some protection that can be enabled:

1. VPN can be implemented on top of the encrypted Wi-Fi as it forms a security layer above the Wi-Fi layer.
2. Data and report resides on a secure server to access the data you need to login to the server.
3. Downloading of data to the application is done using Secure Sockets Layer (SSL) which is the industry standard for secure transfer through internet.
4. Data encryption happens at the application level. SAS Mobile BI uses HTTP or HTTPS to enable the further encryption which makes the encryption multiple times. It depends on the organization to decide the level of protection they need for their data.
5. SAS itself has a protection feature called Tethering. SAS application fetches the report dynamically from the SAS application server instead of storing the actual report which cannot be accessed without successful login. It keeps the highly sensitive data secure in case of theft.
6. In case the device is lost or stolen, SAS visual Analytics Transport Administrator can protect the data by blacklisting the mobile device. And if the blacklisted mobile tries to connect to the server the data present will be erased from the mobile or tablet.
7. It also supports the 3rd party mobile device management software which provides per user per application based security. SAS provides support for two MDM packages one is Good Technology and the other is Mocana.

VIEWING THE REPORT OFFLINE

Reports which are generated in SAS visual analytics can be used offline which enables the user to interact with the reports without internet connection. IT can use the mobile tethering option to manage the user or user group to access the data offline. But the size of the data should not exceed 250,000 cells to view it offline.

APPLICATION UPDATE AND ALERT

The SAS mobile BI can receive automatic updates from Apple App Store or the Google Play store and even update the application in the background. It also uses the device notification system to alert the user when the report is updated which enables the user to stay informed about the updates without even logging into the application.

CONCLUSION

So what are you waiting for, go ahead and start designing the report in SAS Visual Analytics for SAS mobile BI for faster access to your data using the smartphone or iPhone. This application will make your life easier and your analysis simpler while interacting with your report. It's a very user friendly application and visually rich and doesn't need any programming background so wherever you go, online or offline stay updated and stay ahead of the market.

REFERENCES

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Designing for the Mobile Workforce - Peter J. Ina, SAS Institute Inc.; Khaliah H. Cothran, SAS Institute Inc.

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RECOMMENDED READING

- What's New in SAS® 9.4 SAS Institute Inc., Cary, NC, USA

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