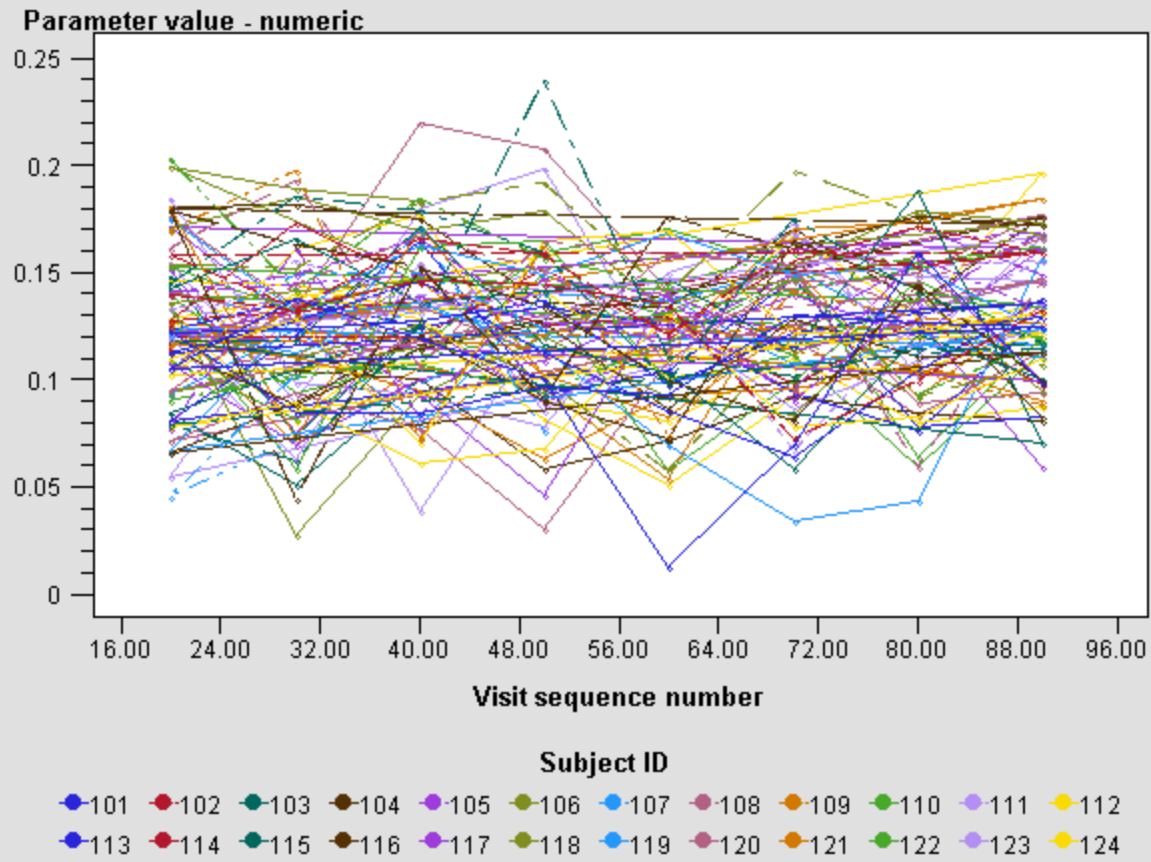




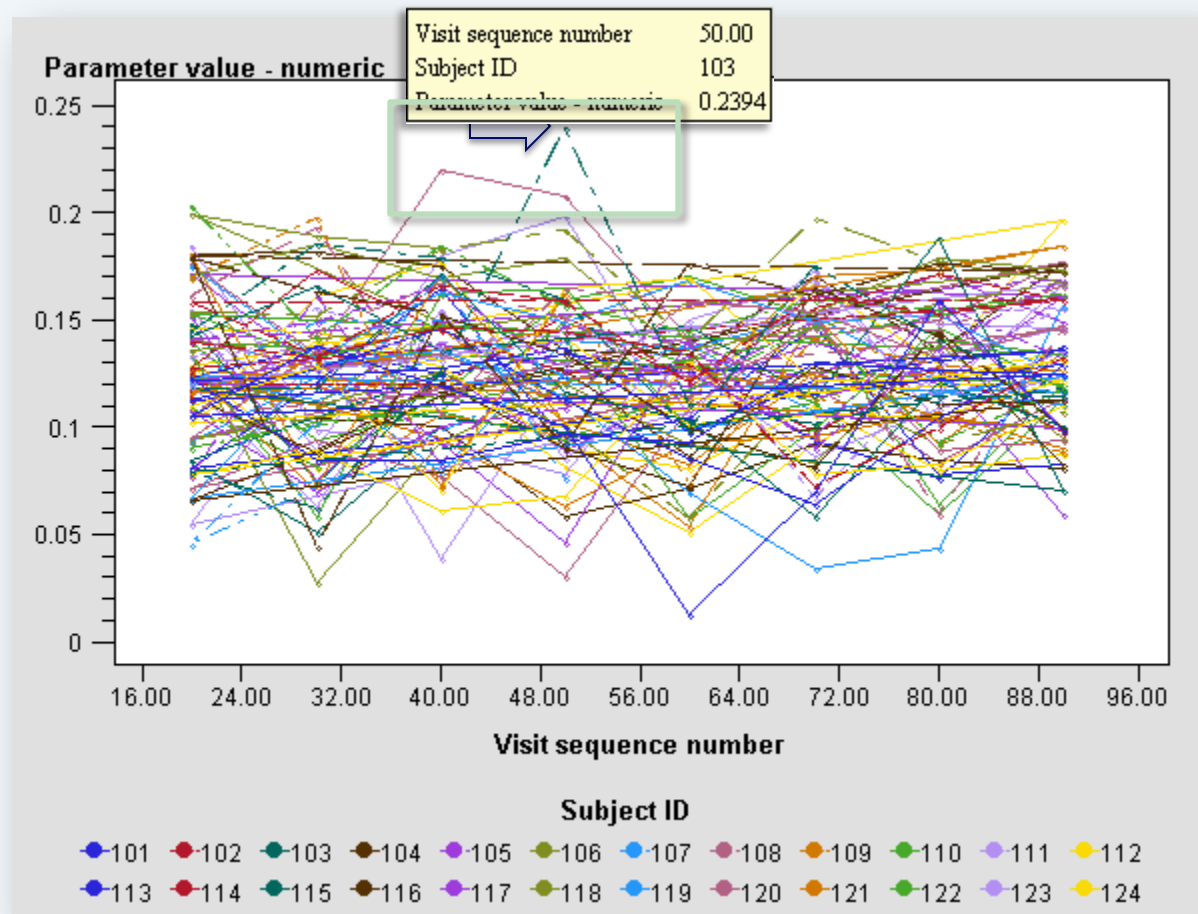
Interactive graphs in SAS with the power of JAVA

**By Ashwin
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Static graph

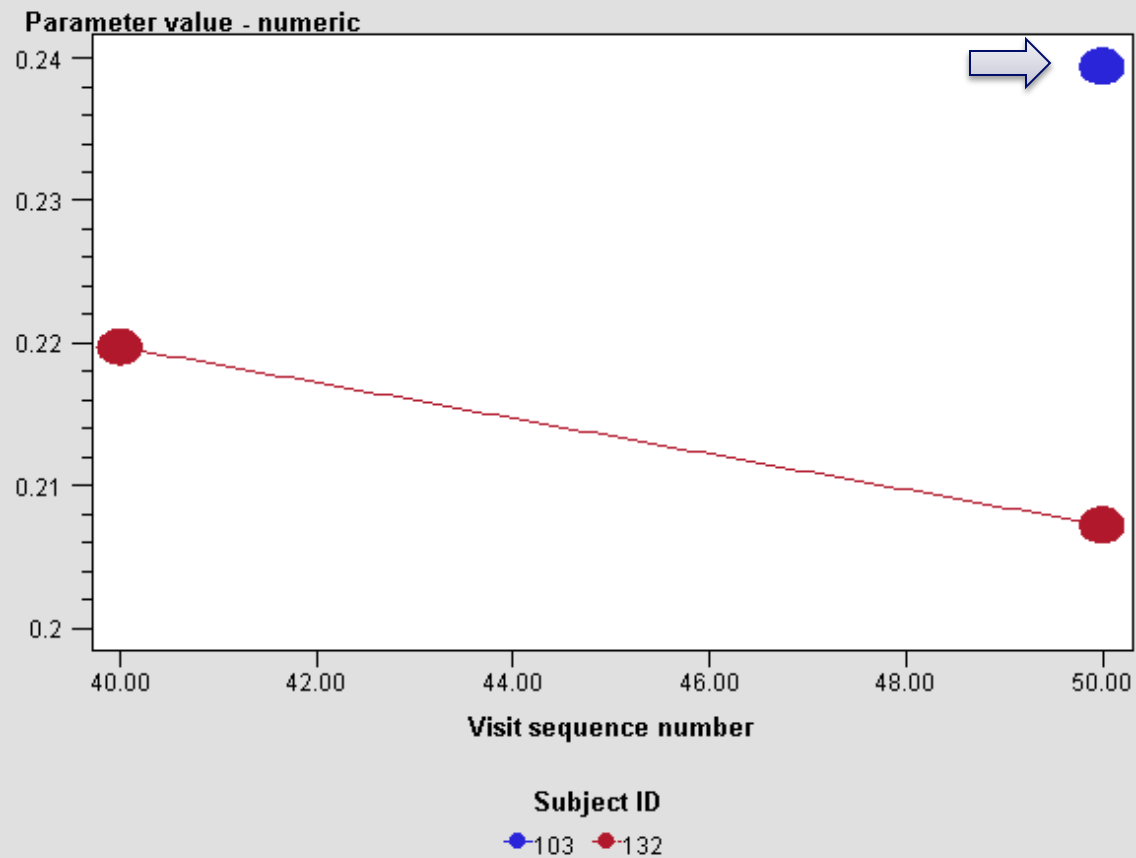


Interactive graphs



Drill down

Level 1 > Level 2

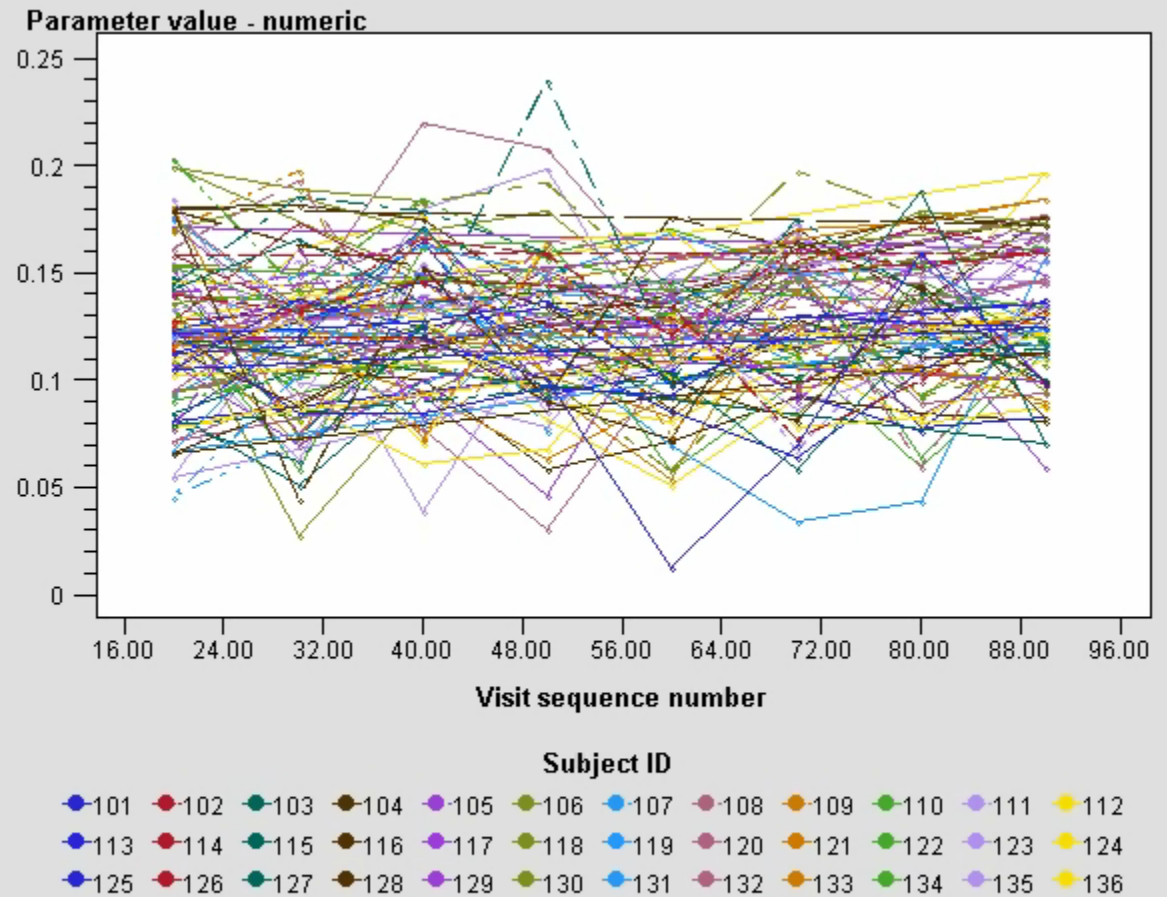


Subject Details

The screenshot shows a PDF viewer window with the file path C:\ash\103.pdf. The viewer includes a menu bar (File, Edit, Go To, Favorites, Help), a toolbar with various icons, and a search bar. The main content area displays the text "Subjid 103 details:" followed by a table of subject information.

Subjid 103 details:

Treatment Start date	1-Jan-2014	
Treatment end date	5-Jan-2014	
Drug taken	Tratment A	
AE	AE date	AE
	2-Jan-2014	Head Ach
	3-Jan-2014	Leg pain
	4-Jan-2014	Head Ach
Did subject take correct treatment	Yes	
DS date	6-Jan-2014	
Screening date	29-Dec-2013	
Serious AE	No	



How does it work?

- SAS system implements several new technologies such as java applets and activex controls to provide
 - Pop-up data tips
 - Drill down links
 - Interactive menus
- Java drivers when used with ODS generates javascripts that a java enabled web browser can use to render a graph using SAS/GRAPH applets for java

Background on ODS

- Was introduced in version 7.01 , to produce SAS output
- With ODS it was possible to generate output in html files using device = options on a goptions statement to indicate the type of output you want to display in your html page
- First version had only gif device driver
- Version 8 brought activex and java device drivers
- The client graphs are rendered on the client computer that is running the browser and displaying the graph

Background on ODS (Contd...)

- Rendering a graph on the client computer makes it possible for you to customize the graph without re-running the SAS/GRAPH PROGRAM that generated it
- The ODS html output contains all the html tags and javascript code needed to produce SAS graphs produce output on the client computer
- When the html file is opened in a viewer that is capable of rendering graph from javascript you can customize query and otherwise interact with the graph
- the browser executes the java scripts which renders all the generated graphs

Limitation of JAVA drivers

It can only be used with procedures GCHART, GCONTOUR GMAPS
GPLOT

if you specify these drivers with other SAS/GRAPH procedures the GIF
driver is used instead

The java device driver

- The java device driver produces interactive graphs that run in the graph, map, and contour applets
- Which gives users to interact with the output of gchart, gplot, g3d
- It allows display of data values, change the type of graph to pan rotate and zoom and to change colors fonts axes legends and variable rows
- This can be enhanced by setting applet parameters and specifying ODS options
- Applet parameter let you configure drill down and override default values in the user interface

Programming steps to be followed to generate output for the graph applet

- Filename odsout 'C:\xxx\xxx.htm';
- goptions reset=all device=java;
- ods listing close;
- ods html file=odsout;
- To enable data drill down with javascript use this :
 - Ods html file = odsout parameters=(
 "DRILLDOWNMODE"="Script"
 "DRILLFUNC"=MapDrill
);

Programming drill down details

```
data _null_;  
  file odsout mod;  
  put ' ';  
  put '<SCRIPT LANGUAGE="JavaScript">';  
  put 'function MapDrill(appletref)';  
  put '{';  
  put ' ';  
  put 'window.open("C:\\\\ash\\"+ MapDrill.arguments[11]+".pdf");';  
  put ' ' ;  
  put '}' ;  
  put '</SCRIPT>';  
run;
```

About Java applet

- The SAS system has 3 separate applets for the client graphs for java:
 - ContourApplet
 - GraphApplet
 - MapApplet
- Depending on the procedure used SAS automatically references the appropriate JAR files in the output HTML file
- For GPLOT GraphApplet is used and the jar file is called graphapp.jar

Dive into the HTML source and javascripts

```
</script>

<noscript></noscript>
<PARAM NAME="DRILLDOWNMODE" VALUE="Script">
<PARAM NAME="DRILLFUNC" VALUE="MapDrill">
<PARAM NAME="TYPE" VALUE="application/x-java-applet;version=1.5">
<PARAM NAME="ENCODING" VALUE="windows-1252">
<PARAM NAME="SCRIPTABLE" VALUE="true">
<PARAM NAME="CODE" VALUE="com.sas.graphics.applets.GraphApplet">
<PARAM NAME="JAVA_CODEBASE" VALUE="file:///C:\Program Files\SAS\SASGraphJavaApplets\9.2">
<PARAM NAME="ARCHIVE" VALUE="graphapp.jar,xml1.jar,jgstex.jar">
<PARAM NAME="BackColor" VALUE="#E0E0E0">
<PARAM NAME="XMLPARM1" VALUE='
<?xml version="1.0" encoding="windows-1252" ?>
<SASReport version="1.0" xmlns:style="http://www.sas.com/sasreportmodel/styles">
  <Data>
```

So where is the data stored?

```
<IQData type="2DEmbedded" name="GraphData">
  <EmbeddedData>
    <Variables>
      <Variable SASFormat="F7.2" encoding="Text" name="VISITNUM1" varName="VISITNUM1" label="Visit Number" />
      <Variable encoding="Text" name="PPORRESN9" varName="PPORRESN" label="PPORRESN" />
      <Variable encoding="Text" name="SUBJID4" varName="SUBJID" label="SUBJID" />
    </Variables>
    <ValuesList>
      ,
    >
    <PARAM NAME="XMLPARM2" VALUE='
      <V>20</V>
      <V>0.1532</V>
      <V>106</V>
      <V>30</V>
      <V>0.1516</V>
      <V>106</V>
      <V>40</V>
      <V>0.1822</V>
      <V>106</V>
      <V>50</V>
      <V>0.1918</V>
      <V>106</V>
      <V>60</V>
      <V>0.1391</V>
      <V>106</V>
      <V>70</V>
      <V>0.1971</V>
    </PARAM NAME="XMLPARM2" VALUE='
  </ValuesList>
</EmbeddedData>
</IQData>
```

How does the drill down code looks like ?

```
</html>

<SCRIPT LANGUAGE="JavaScript">
function MapDrill(appletref)
{

/* open a alert box to show parameter */
alert("State = " + MapDrill.arguments[11]);
window.open("C:\\\\ash\\" + MapDrill.arguments[11] + ".pdf");

}
</SCRIPT>
```

Possible uses of interactive JAVA in our work

- Reviewer could quickly do analysis of PK/LAB graphs, without cross referencing with datasets
- For clinical trial signal detection
- For creating quick mockups for RAP
- For final review before submission

Credits

- Bhupesh K Singh
- Shi-Tao Yeh

Reference

- **Interactive Graphs from the SAS® System**
<http://www2.sas.com/proceedings/sugi31/181-31.pdf>
- SAS user guide (
<http://support.sas.com/documentation/cdl/en/graphref/63022/HTML/default/viewer.htm#a002490223.htm>)

Thank you!