Creating HTML Output with Output Delivery System

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Abstract

Are you looking for ways to improve the way your SAS output appears? The SAS® Output Delivery System (ODS) can help turn tired-looking output into great looking information with a purpose. Output delivery has entered a new age with ODS by taking advantage of font characteristics, color, a number of output layouts, and other features. This paper will illustrate coding techniques associated with creating HTML output using ODS.

Introduction

The Output Delivery System (ODS) gives SAS users an incredible potential for displaying output anyway that is needed. ODS introduces exciting features for displaying and interacting with SAS output. Gone are the days when the only available formatting choice was a basic output listing consisting of monospace, one-size fits all, fonts printed in black on a white background.

Today, users have a variety of choices for accessing and displaying SAS output. ODS provides users with many built-in format engines allowing users to expand beyond the confines of traditional SAS output. It does this by providing an assortment of output layouts including the HTML destination. This paper highlights all the necessary details for creating HTML output from any SAS procedure or DATA step using ODS.

Examining the Html Destination

The ODS HTML statement controls how links and references are constructed between one or more HTML destination files. The basic syntax of the HTML destination is illustrated below:

ODS HTML ODS-action;

< or >

ODS HTML HTML-file-specification < options >;

where one of the available ODS-action specifications are: 1) CLOSE, 2) EXCLUDE, 3) SELECT, or 4) SHOW.

When specifying an HTML-file-specification ODS routes one or more pieces of output to the designated file or files, (see your specific operating system documentation for syntax instructions). Four types of files may be specified with the ODS HTML destination: 1) body, 2) contents, 3) page, and 4) frame. Note: Files can be specified in any order. Each file is described below.

The **Body** file contains the results from the procedure or DATA step embedded with ODS-generated HTML code. Note: When specifying the HTML destination this is the only file required.

The **Contents** file consists of a link to each HTML table within the body file. It uses an anchor tag to link to each table. By using your browser software, you can view the contents file independently or as part of the frame file.

The **Page** file consists of a link to each page of ODS created output. By using your browser, you can view the page file independently or as part of the frame file.

The **Frame** file displays the body, contents, and page files as an integrated package. The Frame file integrates the other specified files into a cohesive application.

The following example illustrates the creation of a Web-ready Univariate procedure output by specifying the HTML format engine with the body=, contents=, page=, and frame= options.

SAS Code

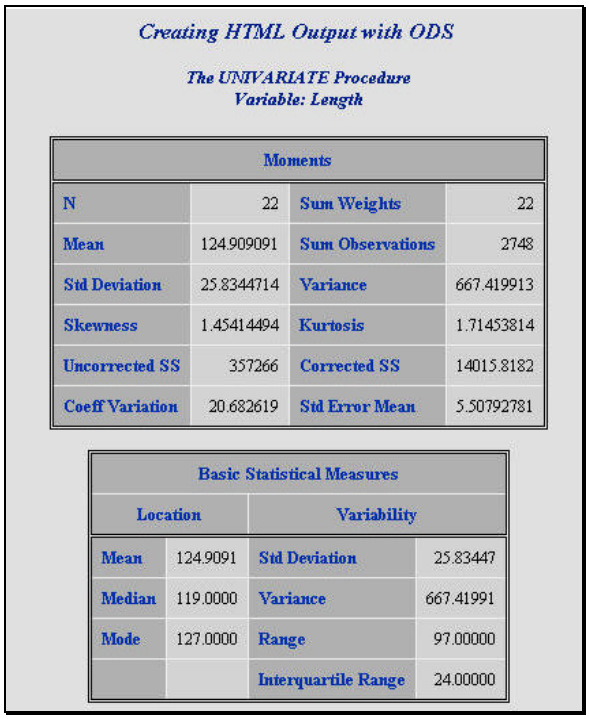
```
ODS Listing Close;
ODS HTML body='ods-body.htm'
     contents='ods-contents.htm'
         page='ods-page.htm'
        frame='ods-frame.htm';

proc univariate data=odslib.movies;
 Title1 'Creating HTML Output with ODS';
Run;

ODS HTML Close;
ODS Listing;
```

The HTML output appears below:

Output from Combining Output



Creating HTML Output with ODS

The UNIVARIATE Procedure
Variable: Length

Moments			
N	22	Sum Weights	22
Mean	124.909091	Sum Observations	2748
Std Deviation	25.8344714	Variance	667.419913
Skewness	1.45414494	Kurtosis	1.71453814
Uncorrected SS	357266	Corrected SS	14015.8182
Coeff Variation	20.682619	Std Error Mean	5.50792781

Basic Statistical Measures			
Location		Variability	
Mean	124.9091	Std Deviation	25.83447
Median	119.0000	Variance	667.41991
Mode	127.0000	Range	97.00000
		Interquartile Range	24.00000

Pagesize / Linesize Settings
The Options PS= and LS= have no effect when used with the HTML destination (opposed to most other output-producing steps that generate output to a print destination). If the PS= and/or LS= options are used with the HTML destination, they are simply ignored by ODS. The SAS System creates a type of "streaming" or continuous type of output embedding links between the pertinent parts of the FRAME set: body, contents, and page.

The SAS System does provide a way for users to paginate through output displayed in a body file by providing a way to designate an optional description of each page in the body file. The PAGE= file (when specified) recognizes each new page of output produced by ODS. What ODS does is create a section called ***Table of Pages*** containing links to the body file for easy navigation through output.

Combining Output Results

With the streaming capabilities of HTML output, results can be combined so they appear on the same screen (or page). Rather than having output controlled by one or more page breaks, HTML automatically displays output without page boundaries. The following example code illustrates combined output from the PRINT and UNIVARIATE procedures.

SAS Code

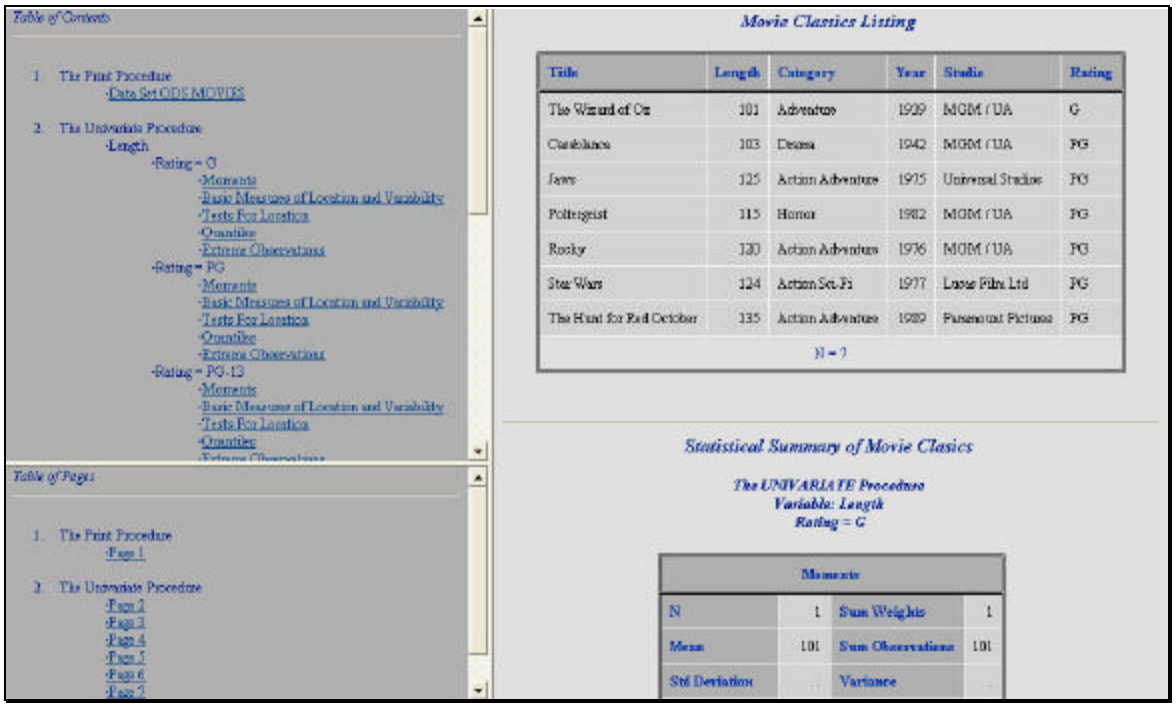
```
ODS Listing close;
ODS HTML path='d:\WUSS 2004\'
         body='combined-ods-body.html'
     contents='combined-ods-contents.html'
         page='combined-ods-page.html'
        frame='combined-ods-frame.html';

  proc print data=odslib.movies  noobs  n;
    title1 'Movie Classics Listing';
    where rating in ('G', 'PG');
  run;

  proc univariate data=odslib.movies;
    title1 'Statistical Summary of Movie Clasics';
    class rating;
  run;

ODS HTML close;
ODS Listing;
```

Output from Combining Output



Changing Output Labels

Specifying the PROCLABEL option lets you change the "default" label displayed on procedure output. To change the label produced and displayed by the UNIVARIATE procedure from "The Univariate Procedure" to "Movie Classics Statistics", the following code is specified.

SAS Code

```
ODS Listing close;
ODS HTML path='d:\WUSS 2004\'
         body='label-ods-body.html'
         page='label-ods-page.html'
     contents='label-ods-contents.html'
        frame='label-ods-frame.html';
ODS PROCLABEL 'Movie Classics Statistics';

  proc univariate data=odslib.movies;
    title1 'Creating HTML Output with ODS';
    title2 'HTML FRAME File with Changed Labels';
  run;

ODS HTML close;
ODS Listing;
```

Creating Pdf Output

To share output electronically, Adobe created a proprietary format called PDF. The objective of PDF is to enable the printing of output exactly as it is seen. The significance of PDF output is that it is a great format for Web deployment since it is completely independent of any printer destination. To create PDF output from the UNIVARIATE procedure, the ODS PDF option can be specified as follows.

SAS Code

```
ODS Listing Close;
ODS PDF FILE='ods-univariate.pdf';

  proc univariate data=libref.movies;
    title1 'Creating PDF Output with ODS';
  run;

ODS PDF Close;
ODS Listing;
```

Testing Web Output

Before transferring your Web files to a Web server, users should thoroughly test any HTML code to make sure they are problem-free. Many viewers will not return to Web pages that contain errors or do not work according to design. A word of caution***: Not all Web browser software handles web pages the same way.*** Microsoft Internet Explorer may display web pages differently than Netscape Navigator and others.

Before deploying web-based output to the Web or Intranet, it is important to visually inspect and test your output to see how your Web pages behave. Web validation services are available for users to check web pages for errors or inconsistencies. The following recommendations provide a few items to consider before deploying Web output.

1. Check spelling – check the spelling on each of your Web pages before making them available. If possible, use a validation service to identify errors in your use of HTML.

2. Test the Web pages to see how easy they are to access and browse through the information. You should verify that each Web page has a consistent design and layout.

3. Turn off images to test how Web pages will look and what information is displayed when viewers use Web browsers that cannot display in pages or when they turn off images.

4. Verify links to make sure each link takes you to the intended destination and that each link contains information of interest to your viewers.

5. Enlist a test audience to check out your Web pages and to solicit their feedback. This feedback is very important since it enables you to improve the way your Web pages look and operate. It is also important that you compare your test audience's feedback with your own objectives to determine which areas require more work.

6. Test your Web pages with different Web browser software to evaluate how they will look. The two most popular Web browsers are Microsoft Internet Explorer and Netscape Navigator.

7. Test Web pages on different computers because they can look and sound differently when the content consists of animation.

8. Determine the speed of transferring Web page content. If the content is too text-rich or image-rich, the excessive transfer speeds may cause viewers to tune-out rather than tune-in.

9. View your Web pages at different resolutions to determine the amount of information a monitor can display.

Conclusion

With the growing popularity of the Internet, the Output Delivery System (ODS) helps turn tired-looking monospace output into great looking information by deploying SAS output in Hyper-text Markup Language (HTML) format. ODS takes the pain out of creating and deploying selected pieces of SAS output in HTML format by providing a level of control not readily available with other methods. The HTML destination's syntactically-correct HTML output can be deployed to the Web, Intranet, Extranet, or on a stand-alone workstation for easy access with a Web browser such as Internet Explorer or Netscape Navigator. As users explore the power of the HTML destination and its options, they will begin to appreciate the relative ease in creating and accessing a SAS output application using a Frame set interface consisting of body, contents, and page.

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