Chapter 154

Density Plots

Introduction

When analyzing data, you often need to study the characteristics of a single group of numbers, observations, or measurements. You might want to know the center and the spread about this central value. You might want to investigate extreme values (referred to as outliers) or study the distribution or pattern of the data values. Several plots are available to allow you to study the distribution. One such plot is the density plot.

Density Plot

The *Density Plot* shows the smoothed distribution of the points along the numeric axis. The peaks of the density plot are at the locations where there is the highest concentration of points.

Data Structure

A density plot is constructed from a numeric variable. A second variable may be used to divide the first variable into groups (e.g., age group or gender). In the two-factor procedure, a third variable may be used to divide the groups into subgroups.
Density Plot Window Options

This section describes the specific options available on the Density Plot window, which is displayed when the Density Plot button is clicked. Common options, such as axes, labels, legends, and titles are documented in the Graphics Components chapter.

Density Plot Tab

Density Section
You can modify various density calculation parameters, the color, and the direction of the density faces.

One Factor

Two Factors
Density Plots

Layout Tab

Orientation Section
You can orient the density plot horizontally or vertically.

Object Spacing and Size Section
You can change the size of the gap between individual densities.

Connecting Lines Tab

Connect Between Groups Section
You can add reference lines at group means and percentiles.
Titles, Legend, Numeric Axis, Group Axis, Grid Lines, and Background Tabs

Details on setting the options in these tabs are given in the Graphics Components chapter.

Example 1 – Creating a Density Plot

This section presents an example of how to generate a density plot. The data used are from the Fisher dataset. We will create density plots of the \textit{SepalLength} variable, breaking on the type of iris.

Setup

To run this example, complete the following steps:

1. **Open the Fisher example dataset**
   - From the File menu of the NCSS Data window, select \textit{Open Example Data}.
   - Select \textit{Fisher} and click \textit{OK}.

2. **Specify the Density Plots procedure options**
   - Find and open the \textit{Density Plots} procedure using the menus or the Procedure Navigator.
   - The settings for this example are listed below and are stored in the \textit{Example 1} settings template. To load this template, click \textit{Open Example Template} in the Help Center or File menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variables Tab</strong></td>
<td></td>
</tr>
<tr>
<td>Data Variable(s)</td>
<td>\textit{SepalLength}</td>
</tr>
<tr>
<td>Horizontal (Group) Variable</td>
<td>\textit{Iris}</td>
</tr>
<tr>
<td><strong>Report Options (in the Toolbar)</strong></td>
<td></td>
</tr>
<tr>
<td>Variable Labels</td>
<td>\textit{Column Names}</td>
</tr>
<tr>
<td>Data Labels</td>
<td>\textit{Value Labels}</td>
</tr>
</tbody>
</table>

3. **Run the procedure**
   - Click the \textit{Run} button to perform the calculations and generate the output.
Density Plot Output

Density Plot of SepalLength

- Setosa
- Versicolor
- Virginica

SepalLength
Example 2 – Creating a Density Plot with Subgroups

This section presents an example of how to generate a density plot with subgroups. The data used are from the fictitious Tree dataset. We will create density plots of the Diameter variable, grouping on Species, with subgroups according to Sunlight.

Setup

To run this example, complete the following steps:

1. **Open the Tree example dataset**
   - From the File menu of the NCSS Data window, select Open Example Data.
   - Select Tree and click OK.

2. **Specify the Density Plots (2 Factors) procedure options**
   - Find and open the Density Plots (2 Factors) procedure using the menus or the Procedure Navigator.
   - The settings for this example are listed below and are stored in the Example 2 settings template. To load this template, click Open Example Template in the Help Center or File menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables Tab</td>
<td></td>
</tr>
<tr>
<td>Data Variable(s)</td>
<td>Diameter</td>
</tr>
<tr>
<td>Horizontal (Group) Variable</td>
<td>Species</td>
</tr>
<tr>
<td>Legend (Subgroup) Variable</td>
<td>Sunlight</td>
</tr>
</tbody>
</table>

   | Report Options (in the Toolbar) |             |
   | Data Labels                    | Value Labels|

3. **Run the procedure**
   - Click the Run button to perform the calculations and generate the output.
Density Plot Output

Density Plots

Density Plot of Diameter

- **Red Maple**
  - Full Sun
  - Part Sun

- **Sugar Maple**
  - Full Sun
  - Part Sun

- **Black Maple**
  - Full Sun
  - Part Sun

Sunlight
- Red: Full Sun
- Blue: Part Sun