An Interactive User Interface Improves Data Visualizations in R

NATHAN SWEEM
CALIFORNIA STATE UNIVERSITY, SACRAMENTO

BRETT AMIDAN AND KIMBERLY FREEMAN
PACIFIC NORTHWEST NATIONAL LABORATORY
Background

An interactive user interface application was created using the R statistical computing environment and the Shiny package to visualize historical data on the performance of mutual funds and exchange-traded funds (ETFs).

```r
> library(shiny)
> runApp("FinApp")
```
Objectives

► To use the latest advancements in R and Shiny to improve the interactive capabilities of the application
Historical data for these funds was scraped from the Yahoo! Finance webpage.
Using historical data, the application allows the user to analyze this historical data based on categories and families.
The application generates a performance envelope (or “cloud”) based on the user’s choices of mutual fund and/or ETF categories and fund families.
The user also has the option to choose a baseline (shown in blue) to overlay on the cloud and a center for the analysis.
The application generates an interactive table of the selected mutual funds and ETFs, and assigns each a rank based on their atypicality.

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Category</th>
<th>Family</th>
<th>Net Assets</th>
<th>Expense Ratio</th>
<th>Rank</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPath® Bloomberg Coffee SubTR ETN</td>
<td>JO</td>
<td>Commodities Agriculture</td>
<td>Barclays Funds</td>
<td>100.15M</td>
<td>0.75</td>
<td>1</td>
<td>3003.701</td>
</tr>
<tr>
<td>iPath® Pure Beta Coffee ETN</td>
<td>CAFE</td>
<td>Commodities Agriculture</td>
<td>Barclays Funds</td>
<td>5.17M</td>
<td>0</td>
<td>2</td>
<td>3486.153</td>
</tr>
<tr>
<td>William Blair Emerg Mkts Sm Cp Gr I</td>
<td>BESIX</td>
<td>Diversified Emerging Mkts</td>
<td>William Blair</td>
<td>305.42M</td>
<td>1.4</td>
<td>3</td>
<td>18107.062</td>
</tr>
<tr>
<td>William Blair Emerg Mkts Sm Cp Gr N</td>
<td>WESNX</td>
<td>Diversified Emerging Mkts</td>
<td>William Blair</td>
<td>305.42M</td>
<td>1.65</td>
<td>4</td>
<td>17916.373</td>
</tr>
<tr>
<td>City National Rochdale Emerg Mkts N</td>
<td>RIMIX</td>
<td>Diversified Emerging Mkts</td>
<td>City National Rochdale</td>
<td>777.4M</td>
<td>1.61</td>
<td>6</td>
<td>15835.620</td>
</tr>
<tr>
<td>iPath® Bloomberg Sugar SubTR ETN</td>
<td>SGG</td>
<td>Commodities Agriculture</td>
<td>Barclays Funds</td>
<td>40.90M</td>
<td>0.75</td>
<td>8</td>
<td>2847.023</td>
</tr>
</tbody>
</table>
The user can then choose which specific mutual funds and/or ETFs to overlay on the cloud.
The application overlays the user’s selections on the cloud and adjusts the plot window according to the mins and maxs of those selections.
The application also plots interactive charts of the selected mutual funds and ETFs.
The application has been modified to attentively match the data with current available data found on Yahoo! Finance using the XML and RCurl packages.

Additional modifications were constructed to allow the user more flexibility in making their selections of categories and fund families.
These changes will allow for improvements in the comparisons of mutual funds and ETFs of the same category.

This application will improve data visualizations in the analysis of atypicalities of mutual funds and exchange-traded funds.

Future changes could be made to assign a positive/negative value to atypicality scores.

Additional interactive capabilities could be added to plots.
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