Data Frame Summaries in PDF's

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Here are the instructions for setting up *R Markdown* documents in order to generate *pdf* documents with data frame summaries (`summarytools::dfSummary()`) that use *png* images.

1. The Graphics Problem

```
dfSummary(iris[5], headings = FALSE)
```

No	Variable	Stats / Values	Freqs (% of Valid)	Graph	Missing
1	Species [factor]	1. setosa 2. versicolor 3. virginica	50 (33.3%) 50 (33.3%) 50 (33.3%)		0 (0.0%)

Although generating *html* or *Word* documents from *Rmd*'s containing `dfSummary()` outputs is a smooth and painless process, there is a major problem when it comes to generating *pdf*'s. The graphs, instead of being vertically centered, appear as though they were sitting on top of all the other cells' content.

2. The Solution

To correct this issue, we need to redefine the `\includegraphics` command. If this breaks some other parts of your document[1], see section 2.3.

2.1 YAML Header

```
---
title: "My Own Private PDF"
output:
  pdf_document:
    latex_engine: xelatex
    includes:
      in_header:
      - !expr system.file("includes/fig-valign.tex",
                          package = "summarytools")
---
```

[1] There must be a *law of conservation of brokenness* sitting somewhere waiting to be formalized (although one could argue that this is merely a corollary to Murphy's law)

The solution presented here requires that some *tex* code be included in the YAML section of the Rmd document. You can use your own *tex* file, or use the one that is part of the package as of version 1.0 (July 2021). and include it in from the YAML section using `system.file()`.

The `latex_engine: xelatex` part is not mandatory for the solution to work. But there are several advantages to using it; I use it systematically and see only advantages to it, so I can only advise you do the same.

Using Your Own *tex* File

If you prefer including your own *tex* file, here is what it should (minimally) contain:

```
\usepackage{graphicx}
\usepackage[export]{adjustbox}
\usepackage{letltxmacro}
\LetLtxMacro{\OldIncludegraphics}{\includegraphics}
\renewcommand{\includegraphics}[2][]{\raisebox{0.5\height}%
  {\OldIncludegraphics[valign=t,#1]{#2}}}
```

Modified YAML Section

Supposing you choose to keep the name `fig-valign.tex`, your YAML section should now look something like this:

```
---
title: "My Own Private PDF"
output:
  pdf_document:
    latex_engine: xelatex
    includes:
      in_header: fig-valign.tex
---
```

The *tex* file's name is entirely up to you; `fig-valign.tex` is the name used for the one in **summarytools**' `includes` directory, but it has no special meaning whatsoever.

2.2 Example

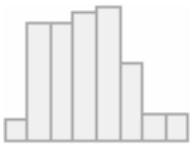
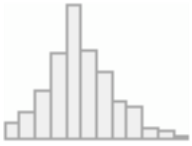
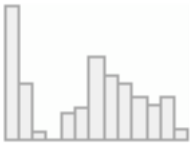
Here is a setup chunk which reproduces what has been used for this document, followed by a call to `dfSummary()`:

```
library(summarytools)
st_options(
  plain.ascii            = FALSE,
  subtitle.emphasis      = FALSE,
  style                  = "rmarkdown", # For any other summarytools objects
  dfSummary.style        = "grid",
  dfSummary.graph.magnif = .5,
  dfSummary.valid.col    = FALSE,
  tmp.img.dir            = "/tmp"  # Recommended for Linux/OS X;
                                   # For Windows, using "img" is
                                   # a good habit
)

define_keywords(title.dfSummary = "Data Frame Summary in PDF Document")
dfSummary(iris)
```

Data Frame Summary in PDF Document

iris
Dimensions: 150 x 5
Duplicates: 1

No	Variable	Stats / Values	Freqs (% of Valid)	Graph	Missing
1	Sepal.Length [numeric]	Mean (sd) : 5.8 (0.8) min < med < max: 4.3 < 5.8 < 7.9 IQR (CV) : 1.3 (0.1)	35 distinct values		0 (0.0%)
2	Sepal.Width [numeric]	Mean (sd) : 3.1 (0.4) min < med < max: 2 < 3 < 4.4 IQR (CV) : 0.5 (0.1)	23 distinct values		0 (0.0%)
3	Petal.Length [numeric]	Mean (sd) : 3.8 (1.8) min < med < max: 1 < 4.3 < 6.9 IQR (CV) : 3.5 (0.5)	43 distinct values		0 (0.0%)
4	Petal.Width [numeric]	Mean (sd) : 1.2 (0.8) min < med < max: 0.1 < 1.3 < 2.5 IQR (CV) : 1.5 (0.6)	22 distinct values		0 (0.0%)
5	Species [factor]	1. setosa 2. versicolor 3. virginica	50 (33.3%) 50 (33.3%) 50 (33.3%)		0 (0.0%)

2.3 A More Robust Solution

If redefining the `\includegraphics` command causes problems elsewhere in your document, following these instructions should take care of it[2].

1. Split the contents of `fig-valign.tex` into two files in your *Rmd* document's directory:
   i. `load-pkgs.tex` – contains only the first three lines (the `\usepackage` commands only)
   ii. `renew-cmd.tex` – contains the remaining lines, which store the existing `\includegraphics` command as a macro and redefine it.
2. Include the first file with YAML (`\\` indicates line feed):
   `output: \\ pdf-document: \\ includes: \\ in_header: load-pkgs.tex`
3. Before the `dfSummary()` chunk(s), paste this *tex* command, also on a new line:

   ```
   \input{renew-cmd.tex}
   ```

4. After the chunk(s), set the `\includegraphics` back to its original value using the following command on a new line:

   ```
   \let\includegraphics\OldIncludegraphics
   ```

[2]File names and locations are suggestions only; adapt the instructions to your own needs.

Proof That `includegraphics` Is Restored to Original

At this stage, the `\let\includegraphics\OldIncludegraphics` *tex* command has been executed.

```
dfSummary(iris[5], headings = FALSE)
```

No	Variable	Stats / Values	Freqs (% of Valid)	Graph	Missing
1	Species [factor]	1. setosa 2. versicolor 3. virginica	50 (33.3%) 50 (33.3%) 50 (33.3%)		0 (0.0%)

If the operation of restoring the command worked, the results should be back to being misaligned, just as they were in the very first section.

Closing Remarks

If you are a LaTeX guru and can think of a simpler solution, please do let me know either by opening an issue or by sending me an email; my address is available in the package's GitHub page as well as in the package's auto-generated pdf manual.

Useful links:

1. Introduction to summarytools (package vignette)
2. Summarytools in R Markdown Documents (package vignette)
3. Custom Statistics in dfSummary (supplemental documentation)
4. This StackOverflow question provides an additional example of how to revert a renewed command back to its original value.