Masters introduction

Abstract

Statisticians and analysts have been using R for a long time. R programming environment has reproducible document standards embedded, such as R markdown. While R markdown requires the programmer to manually construct the structure of reproducible file, R list-down Package provides a programmatic solution to generate the files. On top of the already available R list down package, this paper demonstrates implanting graphs and interactive plots when users generate any reproducible documents by using trelliscopejs package. The concept is followed by a demonstration using gapminder dataset.

Introduction

The R markdown (Baumer, Cetinkaya-Rundel, Bray, Loi, and Horton, 2014) demonstrates the possibility of constructing reproducible documents using R language. The format allows author to integrate R codes, written work, data tables, visualization plots and much more information into one directly structured document. R markdown provides several output formats when users knit the file. Amongst scientific writings and analytical reports, documents knitted using R markdown, the majority are made up of chunks of R codes and narrative writings, which contextualize the R codes and the product of each chuck of codes. In this paper, the chunk of R codes and the narrative writings will be referred to computational components and narrative components respectively (Kane,Jiang and Urbanek, 2020).

R markdown

Statistical analysis tends to be more reachable and interpretable to public audience accompanied by the rapid rise of computing abilities. While the statistical computing threshold lowers with the invention of R language, the need to integrate computationally derived objects with narrative explanations are critical for any analysis. The usage of R markdown centralizes different data types with a specific format, further process with the technical work in an organized way.

The data cleaning and other processes usually requires other environments and configuration to manipulate. Such steps have different needs in computational purpose than report or presentations.

Before a highly informative presentation, multiple explanatory analyses are often carried out. These explanatory analyses contain numerous amounts of table, plots and graphs, most of them have comments and notes. R markdown can save the robust components and generate documents without spending time on layouts and formats.

The advantage of R markdown’s narrative feature can be demonstrated in two prospects. It can produce documents without extensive skill to be proficient in coding and consumes less time and effort to learn. In contrast of Latex whereas the syntax is relatively more complicated. On the other hand, statistical reports and presentations often contains numerous computational and narrative components. R markdown supports multiple file formats including modifiable ones such as word documents. The intention for any statistical report or presentation is to make audience with less to no statistical background to understand (Baumer, Cetinkaya-Rundel, Bray, Loi, and Horton, 2014). R markdown fulfils this concept by offering modifiable documents containing the statistical analysis while leaving collaborators and other users to develop narrative components with no hassle.

Nonetheless, the data cleaning and other processes iteratively repeats each time generating documents for presentation.

The list-down package

The basic function of the listdown package consists of 6 distinctive methods of which can be implanted into piping commands by various packages once the analysing and technical works are completed. The methods are (Kane,Jiang and Urbanek, 2020) :

• as ld yml() - turn a computational component list into YAML with class information

• ld cc dendro() - create a dendrogram from a list of computational components

• ld chunk opts() - apply chunk options to a presentation object

• ld ioslides header() - create an ioslides presentation header

• ld make chunks() - write a listdown object to a string

• ld rmarkdown header() - create an R Markdown header

• ld workowr header() - create a workflowr header

• listdown() - create a listdown object to create an R Markdown document

Trelliscopejs

Visualization using trelliscopejs package in list-down

2.

2.1Basic explanation of the list-down package

2.2workflow

As previously mentioned, the workflow for a typical scenario involving using list down is after the analytical and technical works are finished. Suppose when we finished a serial of work including codes, narrative explanation and other contents. All the results have been collected and all plots have been plotted, in our desirable order for publish or presentation, a document including multiple computational components is formed. The computational components are likely to be stored in different locations or even on different servers. By organizing them into a list format eases the processing and returns a less nested structure.

Once a list is created, the document containing one or multiple lists can be saved as RDS file format ready by the output R markdown document. Then we can use listdown() to specify how the computational component will be loaded, along with library needed, the decorators and other attributes presented once the M markdown document is knitted.

In the example, an explicit function was written named rld. The function shows a general syntax for rendering a listdown file into a html document. The ld\_make\_chunks() allows authors to add in extra component such as a header to the list of computational components.

3. Rendering and formatting

4. Adding plots to the listdown object

4.1 Trelliscopejs example

5. plotly example

6.conclusion

https://data.stats.gov.cn/search.htm?s=%E5%8C%97%E4%BA%AC%20%E6%88%BF%E4%BB%B7

Baumer, B., Cetinkaya-Rundel, M., Bray, A., Loi, L., & Horton, N. J. (2014). R Markdown: Integrating a reproducible analysis tool into introductory statistics. *arXiv preprint arXiv:1402.1894*.

Kane, M. J., & Urbanek, S. (2020). On the Programmatic Generation of Reproducible Documents. *arXiv preprint arXiv:2007.12631*.