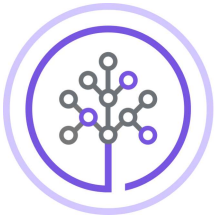

An Introduction to RMarkdown

R Markdown is an authoring framework for data science developed by RStudio. It is an integration of the R programming language and Markdown, that could be utilized to:

1. Save and execute R code
2. Generate high quality reports that can be shared with an audience. The generated report supports static and dynamic output formats including HTML, PDF, MS Word, Beamer, HTML5 slides, Tufte-style handouts, books, dashboards, shiny applications, scientific articles, websites, and more.

The two channels – Paper and Webpage.

Authors write content to be able to share their work and have other's read it. Formatting naturally becomes a integral part of an author's work. A major factor impacting the cost of printing text is formatting. Although computers have been used for decades, software for formatting is still helping to reduce the cost for printed publication.

This cost associated with printing publication is a much lesser concern today. The internet has become the mainstream information dissemination channel, and web pages have therefore become just as or more important of a text-carrying medium than paper.

Then a problem arose, since the two mainstream information dissemination have two fundamentally different formatting system – $\Tex$ and HTML, the transformation between the two is tough.

The Markdown Language

John Gruber invented the Markdown language to prevent users from working with the complicated HTML grammar – it is an effortless and straight forward markup language. In fact, the markdown was so simple such that many "markdown-style" markup languages were developed on the basis of it. R Markdown is one of them.

RMarkdown: R + Markdown

Initially, RMarkdown was developed for powerful data visualization tools in R. RMarkdowns allows users to add code chunks in Markdown files, and allows the code chunks' outputs to be embedded directly inside the generated report. This functionality is popular among academic users and those performing data analytics in the industry, as it automated the formatting tasks that used to be complicated and tedious.

R Markdown and the R Community

As opposed to Python, which is majorly used by person with Computer Science background, R is designed to be a tool for users instead of developers. The developers of R language does not assume that the R community have solid programming background. This assumption is applied by many R packages' developers as well. For

example, packages such as RShiny and htmlwidgets aim to provide users without knowledge about HTML/CSS/Javascript to create interactive web applications conveniently. The R Markdowns is another example of such tool.

As you continue your journey with RMarkdown, you will find that the pros of R Markdowns are clear:

- **It supports R Notebook**: Traditionally, including in courses we provide at IBM, we use Jupyter notebooks with an R Kernel. RMarkdown supports a tool called "R Notebook" that includes almost all functionalities of Jupyter notebooks. In addition, as R is most often used for statistical analysis, and the results (often R outputs) needs to be presented to the audience. RMarkdown can be converted into Beamer, HTML slides, scientific articles etc with its generic rendering tools, which is not possible to do conveniently with Jupyter Notebooks.

  As RMarkdown supports multiple languages, including R, Python, SQL, C++, Julia and more, the users of R Markdown goes beyond the R Community to the broader data science family.

- **Flexible Output Formats**: It is not a secret that Markdowns can be converted into HTML. But to make your converted HTML more pleasing, you need to write an additional `css` file for formatting – which isn't straightforward for someone without web development experience. RMarkdown has many builtin templates which users could utilise. An appropriate formatting can always be found, either technical or non-technical alike.

- **Reproducible Outputs**: Any audience who wish to reproduce the statistics you calculated can do it by running the code chunks in the RMD file themselves. Since the results are produced by code, whenever there are updates to the data source, we can simply knit the RMarkdown again to produce an updated report – it is as simple as clicking a button. And for data dashboards developed using RMarkdown, this also means you don't need to concern about updating your dashboards due to changes in source data.

- **Reliable Support**: The RMarkdown tool is developed by RStudio. This tool receives continuous support, updates, and new features released by RStudio.