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Analytics Software Languages for Problem Solving

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Abstract

This paper discusses how R Python SPSS and SAS can be used in research and the benefit that it would have to company's futures. By using stable forecasting, investors can predict the future bank failures. By using these software packages, organizations can govern the life cycles of their inquiries and be strategic in their in their future financial stability of an organization. This paper also discusses how each software can be used in different manners to determine the future financial stability of an organization.

Keywords: R, Python, Excel, SPSS, SAS, MINITAB, Software Programs, Globalization

Introduction

R, Excel, SAS, SPSS and Python are five software programs designed to run statistical analyses and output graphics, can be used for organizational research. R can run on any operating system, is open-source, and reflects many of the changing field preferences. It is also highly standardized. SAS is a paid software system that provides high performance analytics for banking research. Organizations can identify, investigate, and govern the life cycle of their inquiries. When it comes to data science one of the most common points of debate is R vs SAS vs Python vs Excel vs SPSS. It is a well-known fact that R, Python, Excel, SPSS and SAS are the most important five languages to be learned for data analysis.

When it comes to data science one of the most common points of debate is R vs SAS vs SPSS vs. Python. We should also include Excel, because, It does all of the functions that the other four programming languages provide. It is a well-known fact that R Python SPSS and SAS are the most important 4 programming languages to be learned for data analysis by data scientists. However, we can also utilize Excel, to perform most of the operations, especially the simple ones. Excel can be purchased when you purchase or download from Microsoft windows website.

In banking research, there are many software packages are being used including R, Python, SPSS and SAS. Among these packages Python and R open source, free of charge software programming languages. However SAS and SPSS are paid for by licensing companies or universities. (C. Ozgur et.al 2017)

SAS Programming Language

It is a programming language where the input language common spreadsheets as input mechanisms to generate output based on the results of statistical analysis in the form of tables and graphs as RTF PDF, HTML documents. It is an expensive language that is not affordable by most data scientists. Unless the organization helps individuals with financial aid, they will not be able to use SAS. However, both R and Python are free of charge, they could be accessed by anyone, anywhere. This is a biggest advantage of to all data scientists for using both R and Python free of charge.

Classroom and Online Training for Certifications <https://www.edupristine.com/>

SPSS Programming Language

It is also a programming language where the input language common spreadsheets as input mechanisms to generate output based on the results of statistical analysis but the difference from SAS is that the programming language for SPSS is easier to learn and more similar to Excel. However, just like SAS, it is not free of charge. However, we are able to solve large scale problems. <https://www.edupristine.com/>

Python Programming Language

It is another programming language free of charge like R. It is another open source programming language, free to access by everyone. Its code is easier to learn than R or SAS. Python is easier programming language to learn than both. <https://www.edupristine.com/>

R Programming Language

R It is an open source programming language, free to access and open to all to perform data analysis tasks. It is supported by the R Foundation for basically Statistical Computing. The R language is widely used among data miners for developing statistical software and data analysis. The source code for the R software environment is written primarily in C, FORTRAN, and R. Language R is freely available under the GNU General Public License and is pre-compiled binary versions that are provided for various operating systems. While R has a command line interface, there are several graphical front-ends also available.

Classroom and Online Training for R is provided under Certifications <https://www.edupristine.com/>

Excel

It also can be used to solve simple problems that other programs can solve. We can also utilize Excel, to perform most of the operations, especially the simple ones. Excel can be purchased when you purchase or download from Microsoft windows website (Microsoft, 2019)

MINITAB

Minitab is another software programming language that can utilize all of the benefits of other programming languages such as R, Python, Excel, SAS and SPSS. Currently Minitab is at its 18th edition. However, it is not only at its 18th edition, but using Minitab is also a good additional teaching tool. We can utilize this basic software that is similar to Excel because it has similar instructions. As opposed to R and Python being free of charge, MINITAB costs a modest amount more specifically \$100 non-renewing price for instructors and a 6-month rental for \$29.99 total and a 12-month rental for \$49.99 total for students. Not only are we able to utilize the software by providing Excel-like instructions, with MINITAB, we can create macros that can be used in teaching or research.

R

The software grew in popularity in response to the increasing overall demands on big data analytics and the need for programs which could handle massive data files. This changed how computational data could be handle done; the availability of a new and versatile tool is apt to reframe at least a portion of the discussions around calculation

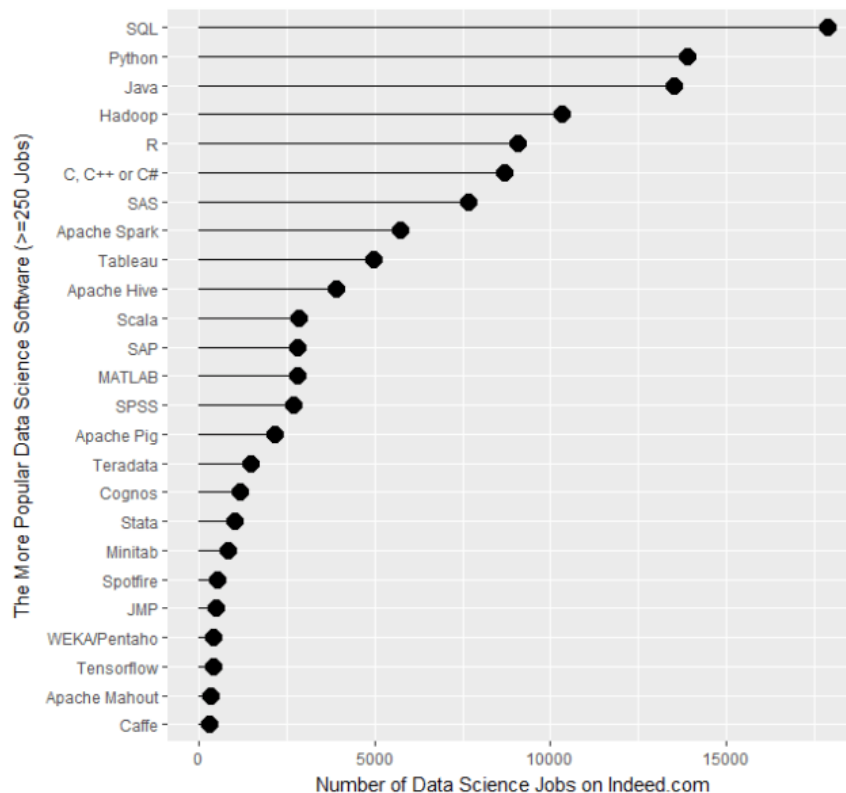
and application of R. For example, Rickert (2014) notes that there were at least 70 separate finance packages available in 2014.

R's flexibility as a software means that it is fully able to perform the necessary tasks for financial analytics. There have been several programs written to facilitate the usage of R in such a setting; one of the most popular is jrvFinance (Trajanov, 2017). This package, alongside the standard tools of R and the bundle package Rmetrics (Trajanov, 2017), allows users to perform the necessary standard financial computations in the software. The largest advantage of this program is that it is set up to mimic the Excel format, allowing familiarity with the system. As Varma (2016) notes in his overview of the jrvFinance package, there are several specific commands to ensure that the correct operations are being performed.

R's Growth and Comparison to Other Software

R's growth in the data analytics field has come to surpass SAS, SPSS, Stata, and MatLab, leading to an increase in job postings where applicants must know how to use R. The overall trend of R is observable in Figure 1, stated from Muenchen (2017).

Figure 1. Number Of Data Science Jobs Posted On A Job Search Website With Over 250 Job Hits



SAS & R for banking and finance

Continuous innovation(https://www.sas.com/en_ph/news/press-releases/2017/january/2016-financials.html)

Analysts named SAS a leader in predictive and advanced analytics, customer intelligence, data management, data integration and data quality. According to IDC, SAS holds a 31.6 percent share of the advanced and predictive analytics market.[2] SAS has also been recognized by industry analysts as a leader in fraud detection, risk and retail analytics. (Cary, 2017).

Maintaining this leadership is heavily dependent upon innovation. Year after year, SAS reinvests about twice the average of major technology firms into R&D – 26 percent in 2016. This unwavering commitment to innovation is behind the ground-breaking new SAS Viya technology – dubbed by analysts as changing the industry. SAS

continues to introduce new innovation around this open and cloud-ready high-performance analytics and visualization platform – most recently with SAS Visual Investigator, which marries advanced analytics with dynamic and interactive visual workspaces. With it, organizations can identify, investigate and govern the entire life cycle of an investigation, search or inquiry. SAS plans to introduce even more to the SAS Viya family in the first quarter of 2017. (Cary, 2017).

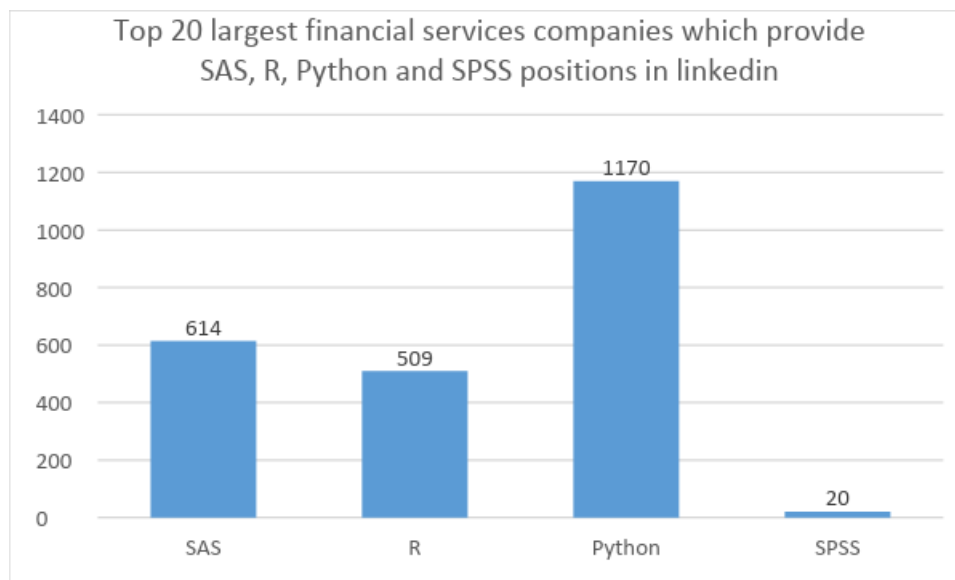
Looking further ahead in 2017, SAS will continue innovation in its core focus areas, including analytics, visualization, data management, customer intelligence, risk and fraud. Additionally, SAS Viya, artificial intelligence, cloud and it will be strong investment areas for SAS. (Cary, 2017).

Table 1. SAS vs R vs Python vs SPSS

SAS	R	Python	SPSS
614	509	1170	20

For example the following figure shows the companies in financial services that utilize SAS, SPSS, Python and R.

Figure 2. Top 20 Largest Financial; Services Companies With SAS, Python, R & SPSS



We can also show how largest financial services companies utilize SAS, SPSS, R, Python as the top software packages on LinkedIn

Top 20 largest financial services companies which provide SAS, R, Python and SPSS positions in LinkedIn

(<https://www.forbes.com/global2000/list/>

https://en.wikipedia.org/wiki/List_of_largest_financial_services_companies_by_revenue)

Deposit insurance is a key element in modern banking, it guarantees the financial safety and stability of the depository financial institutions. If an insured depository institution fails to fulfill its obligations to its depositors, the insuring agency will step in to honor the principal and accrued interests. (Dar-YehHwang Cheng F.Lee K.Thomas Liaw

Table 2. Word's Largest 20 Banking & Insurance Companies

Rank	Company	Industry	Headquarters
1	Berkshire Hathaway	Conglomerate	United States
2	AXA	Insurance	France
3	Allianz	Insurance	Germany
4	ICBC	Banking	China
5	Fannie Mae	Investment Services	United States
6	BNP Paribas	Banking	France
7	Generali Group	Insurance	Italy
8	China Construction Bank	Banking	China
9	Banco Santander	Banking	Spain
10	JP Morgan Chase	Banking	United States
11	Société Générale	Banking	France
12	HSBC	Banking	United Kingdom
13	Agricultural Bank of China	Banking	China
14	Bank of America	Banking	United States
15	Bank of China	Banking	China
16	Wells Fargo	Banking	United States
17	Citigroup	Banking	United States
18	Prudential	Insurance	United Kingdom
19	Munich Re	Insurance	Germany
20	Prudential Financial	Insurance	United States

Conclusion

In this paper we showed how software packages R, SAS, Python, SPSS and MINITAB, Excel can be utilized in research. We also give an example in banking and financial services utilize these software packages. However, the most important part of this paper is that it provides cost structure for each software package and how R and Python are open source software programs and prepackaged programs can be easily accessed on the internet or books provide the information needed for those two software packages under free of charge or very inexpensive conditions for both R and Python, The cost structure for the other four software packages are shown. While SAS and SPSS can solve larger problems, it does come in with a certain cost structures as shown in the paper above. On the other hand, Excel is available if someone purchases Microsoft. As with R and Python, there are prepackaged software programs for Excel. However, compared to SPSS or SAS, Excel can only solve problems at a much smaller scale. Perhaps, the problems it solves would be available for small businesses. MINITAB is similar in structure to SPSS and Excel, from a cost standpoint it is much cheaper than SPSS or SAS. However, even though it can't solve as large of a problems in SAS or SPSS, it can solve problems larger than solvable by Excel. Perhaps, it is suitable for small or medium size firms.

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