PROJECT PROPOSAL

ABSTRACT

The research topic I choose to write annotated bibliography is SAS programming language. I decide to do this study because I noticed during job searching that many analyst jobs require strong knowledge of statistical analysis software application such as SAS, which is also widely used in the finance industry such as banking and insurance. This makes SAS programming skill an important skill to learn extensively. The research questions that I am going to answer in my project can mainly be concluded by two questions, "What SAS is" and "Why it matters". To answer the question "What SAS is", I will explain the basic of SAS coding, for example its basic syntax, DATA step processing, working with variables and observations, and shortcuts in programming. Then I will draw the connection between SAS and R, and further demonstrate the importance of learning SAS programming by showing how SAS skill is used in Big Data analytics, machine learning, and data visualization.

The topic is relevant to this class since as a beginner of computer programming, I believe that many people have the same question as I do, that is what are some useful programming languages to learn or begin with. However, the blogs on the Internet cannot fully explain or fulfill my curiosity about the similarities and differences among SAS, R and Python. I have read both positive and negative reviews on those different programming languages, but the most effective way to understand them is to research a topic deeply enough to satisfy one's own need. Thus, I expect the audience of the annotated bibliography to find answers about some of the questions they may have on SAS programming.

DELIVERABLES

1. Book: *SAS Programming And Data Visualization Techniques: A Power User's Guide* by Philip R. Holland. (August, 2015)
2. Book: *Step-By-Step Programming With Base SAS® Software*. Cary, NC: SAS Institute Inc. (2001)
3. Article: Big Data Analytics: What it is and why it matter. SAS http://www.sas.com/en_us/insights/analytics/big-data-analytics.html
4. Article: Machine Learning: What it is and why it matter. SAS http://www.sas.com/en_us/insights/analytics/machine-learning.html
5. Article: Analytics: What it is and why it matter. SAS http://www.sas.com/en_us/insights/analytics/what-is-analytics.html
6. Article: Data Visualization: What it is and why it matters. SAS http://www.sas.com/en_us/insights/big-data/data-visualization.html
7. Book: *SAS Programming For Enterprise Guide Users.* Cary, NC: SAS Institute Inc. (2010)

8. Book: *Applied statistics and the SAS programming language 5th ed.* by Ronald P. Cody and Jeffrey K. Smith. (2006)
9. Article: *SAS Programming Basics* http://www.ats.ucla.edu/stat/sas/seminars/sas_programming_basics/SAS%20Programming%20Basics.htm
10. Book: *Cody's collection of popular SAS programming tasks and how to tackle them*. By Ronald P. Cody. (2012)
11. Article: *Estimating Multilevel Models Using SPSS, Stat, SAS, And R*. By Jeremy J. Albright and Dani M. Marinova. (July, 2010)
12. Book: *Applied Data Mining for Forecasting Using SAS(R)*. By Tim Rey , Arthur Kordon, Chip Wells. SAS Institute (2012)
13. Book: Kleinman, Ken, and Nicholas J. Horton. *SAS and R: Data management, statistical analysis, and graphics*. CRC Press, 2014.
14. Article: Brookstein, Ellen, Allan Glaser, and Laurie Koch. *"Getting that New SAS® Programming Job-A Management Perspective."*
15. Book: Elliott, Alan C., and Wayne A. Woodward. *"SAS Essentials: Mastering SAS for Data Analytics."* (2015).
16. Article: Long, S. B., Mueller, H. B., & Gentleman, J. F. (1986). P*rogramming SAS for casual Analysis*. American Statistician, 40(3), 233.
17. Book: Spencer, Neil Hardy. (2004). *SAS programming: the one-day course.* Boca Raton : Chapman & Hall/CRC.
18. Book: Padgett, Lakshmi V. (2011) *Practical statistical methodsa SAS programming approach* Boca Raton, FL : CRC Press.
19. Book: Shostak, Jack. (2014) *SAS programming in the pharmaceutical industry*. Cary, NC: SAS Institute Inc.
20. Book: Ottesen, Rebecca A.,, Delwiche, Lora D.,Slaughter, Susan J.. (2015) *Exercises and projects for the little SAS book*. Cary, NC: SAS Institute Inc.

PROCESS

1. Narrow down the main topic SAS programming language to five to six subtopics for further research purposes.
2. Once subtopics are determined, search relevant articles, books, or other resources that can better explain the topic.
3. Read table contents and abstract of books to select chapters that is most relevant to the chosen subtopics.
4. In the process of researching, try SAS programming language using SAS software.
5. Filter sources. Arrange the order of subtopics to read and write about, 4 books or articles per week.
   The guideline for writing an annotated bibliography:
   - Author (Ex. Is the author qualified to write the article?)
   - Purpose (What is the purpose for writing the article or doing the research?)
   - Intended Audience

- Author Bias
- Information Source
- Author Conclusion
- Justification
- Relationship to other works

6. Go to writer's workshop to check grammar and the quality of my work.

CHALLENGES

1. SAS is a programming language new to me. So it may takes a lot of time for me research this new topic.
2. Most of the sources on SAS programming is about SAS syntax, but there are not many literatures on statistics of how SAS skill is used in companies and required in job qualification.
3. SAS software is not free, so I may need to purchase one or use ones on campus computer.
4. Most of the books are really long to read, so I have to select the sections that are most relevant to the topic.
5. Before research this topic, I thought SAS is a certificate, an exam like CFA. I think most people know SAS by the SAS Certification, but know less about SAS programming language.