

ACTUARIAL DATA SCIENCE WORKING GROUP

A Framework to get started

The Data Science working group has been very active in 2020. From writing training material (tutorials), developing and offering training courses, suggesting specific self-study materials, to promoting wider awareness of actuarial data science in general, we are hard at work thinking about the future of the profession.

Activities of the working group

The working group is divided into a mathematical sub-group and a strategic sub-group. The mathematical team has published nine tutorials to date covering the practical use of machine learning methods on actuarial topics. There are further tutorials planned before the end of this year and more for next year as well.

The most recent tutorials are (see QR code):

- The Art of Natural Language Processing: Classical, Modern and Contemporary Approaches to Text Document Classification
- Peeking into the Black Box: An Actuarial Case Study for Interpretable Machine Learning
- Convolutional neural network studies: (1) anomalies in mortality rates (2) image recognition

The strategy team is organizing a series of «Après-Midi» events for the second half of 2020. These interactive sessions aim to impart relevant know-how as well as to facilitate an exchange of working experience. To support more

intense study, the working group prepared an overview of actuarial data science topics and associated learning material, which we present below.

In addition to our strong content-oriented focus, the working group aims to increase awareness of the many areas of possible impact of developing data science methods and applications on the actuarial profession. Therefore, the working group publicizes upcoming third-party training events (online and offline) as well as letting our community know about relevant books and papers. We aim to broaden data science knowledge for actuaries using the LinkedIn platform, where you will find our latest news.

Anja Friedrich



www.actuarialdatascience.org/ADS-Tutorials

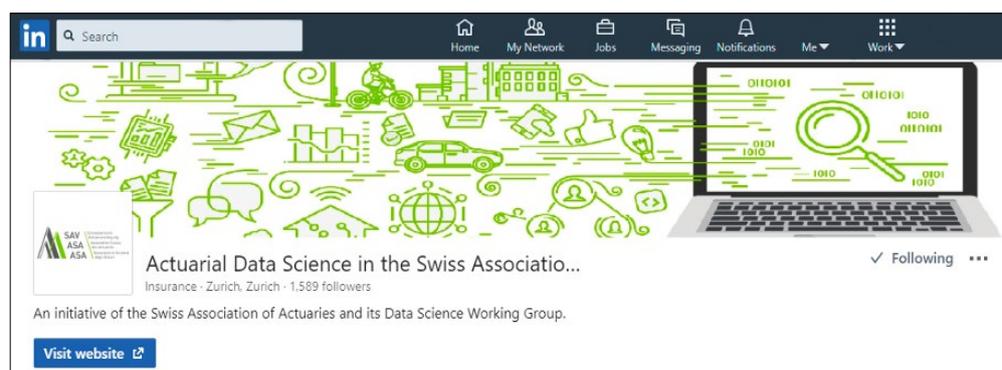


Figure 1: LinkedIn Page for regular updates

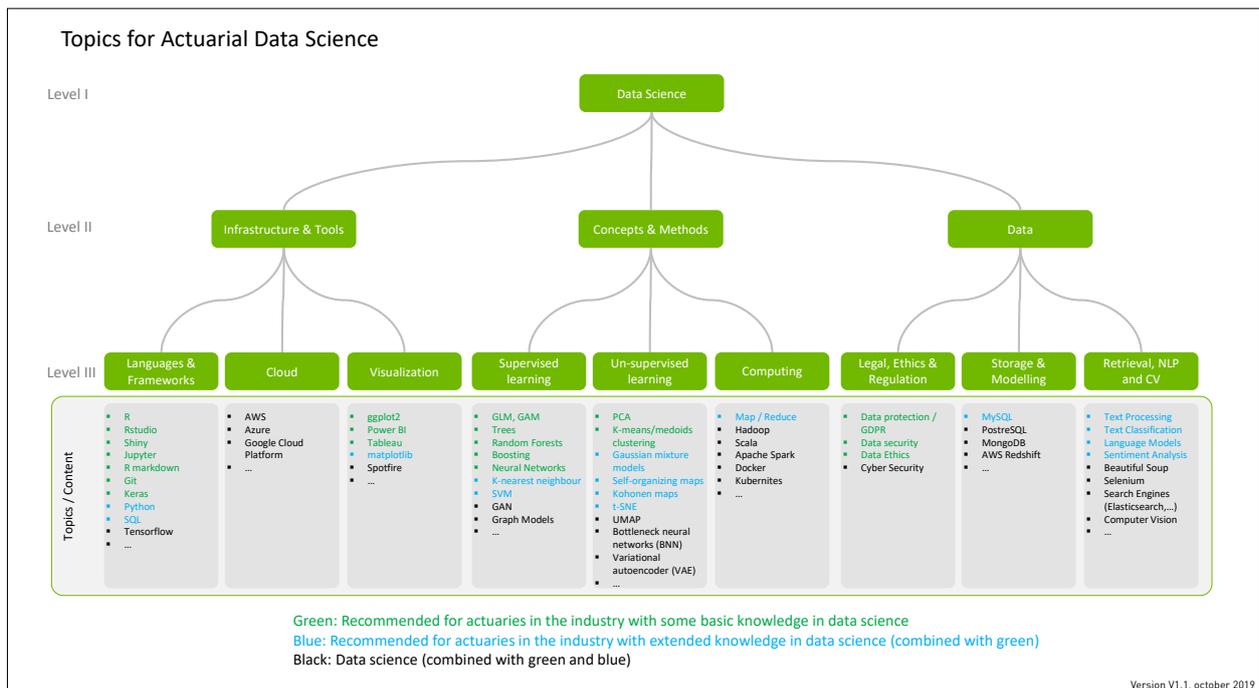


Figure 2: Overview of Topics for Actuarial Data Science

Hands-on actuarial data science

There are lots of options to learn more about data science, but it is often hard to know where to start and, in particular, what topics are most relevant for actuaries. Undoubtedly, you have to start somewhere, no matter if your interest or activities will be higher level or you want to get into a deeper practical exploration of data science techniques. In order to help actuaries to dive into these topics, the working group prepared a framework overview of data science which suggests the topics you should learn more about as you progress. This is to be understood as a guideline, not a substitute for following your areas of greatest interest! In general, data science comprises three foundational areas of knowledge one should familiarize with in order to apply data science hands-on (which we refer to as «Level II» in figure 2):

- Infrastructure and Tools
- Concepts and Models
- Data

Each component is divided into further overall aspects we refer to as Level III components (see figure 2). Within each «Level III», there are several topics listed that are more concrete areas for study. Topics highlighted in green are well suited to start with and to get a good overview of fundamental components related to data science. The blue ones are advanced tools and topics for deeper application. If you have caught

the bug after getting through these topics and you want to really deepen your actuarial data science know-how, the black labelled topics are in our view «hard core» data science topics you can start looking at. In addition, the website of the actuarial data science working group has an overview of books and courses to deepen your data science skills. The overview ranges from theoretical knowledge to practical application in R (Link for ADS Overview/see QR Code below).

As noted, this overview is not a «how to» guide, but rather a framework to help you structure your approach for learning and giving guidance on what is most relevant. You can adapt it to your personal circumstances and the needs your role as an actuary requires. We expect this framework to evolve over time as data science itself evolves. The insurance industry is just getting started incorporating data science concepts into its business, so the requirements of actuarial data science will adapt with further engagement as well.

Thomas Hull



Link for ADS Overview