Findings of the "Data Science for Actuaries" Survey

Singapore Actuarial Society Data Analytics Committee

IFoA GI Asia International Working Party

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The Data Analytics Committee (DAC) of the Singapore Actuarial Society (SAS) and the Institute and Faculty of Actuaries GI Asia International Working Party (IFoA GI Asia WP) conducted a joint online survey "Data Science for Actuaries" in November 2021 among members and actuaries mainly across the Asia Pacific region with the aim of:

- Finding out actuaries' skill levels, interest and involvement in data science in their work
- Identifying gaps in skills compared to the demand for data science skills in the market.
- Steering DAC activities to narrow any gaps found in knowledge and skills through training courses, data science competitions, resources for self-learning, and seminars, etc.

There were 75 responses collected from Singapore (27%), followed by China (20%), Malaysia (13%), Hong Kong (12%) and India (8%). There were also responses from the Philippines, Japan, Australia and the UK.

47% of respondents have more than 10 years' experience, 15% with 5-10 years' experience, and rest are actuaries and student actuaries with less than 5 years' experience.

Key Findings:

Based on the responses, over 95% of respondents agreed that data science knowledge and skills are important for future career development.

Across all experience levels the majority of respondents had a basic to intermediate level of knowledge on data science concepts. Majority identified the lack of knowledge/skills as the main barrier to the development of data science in an organization. Access to data and the availability of hardware/software were other major barriers. The lack of support from senior stakeholders also stood out.

Actuaries working in consulting or non-traditional companies (eg. InsurTech) have identified themselves as being able to explain machine learning or even be part of the implementation team.

Some respondents have considered or are considering switching career paths to a data science field. 43% responded "Maybe" to a switch but the rest had a resounding no. Those with less than 5 years of experience were more positive about switching career paths to data science compared to respondents with more than 5 years of experience. It is clear that

more experienced or senior respondents are hesitant to consider a career switch. This was particularly evident with respondents over 10 years of experience. In addition, respondents in consulting and other industries were more willing to consider a career switch to data science, perhaps necessitated by the demands of their jobs. Respondents in general insurance and reinsurance were the most hesitant to consider a switch.

Surprisingly, over 30% of respondents indicated that there are no data scientists in their organizations and around 43% responded that there are 1-5 data scientists in the company. This provides a great opportunity for actuaries to step into data science field in their organizations. However, a majority indicated that they have less than 30% involvement in data science related work in their organizations.

64% responded that a data science team owns the data science function in their organization. 36% responded that actuaries own it. In fact, it shows that actuaries are in a strong position to promote data science in an organization.

The majority of respondents identified Machine Learning or AI algorithms and modelling techniques as the most important skills data scientists can teach actuaries. Again, this indicates that actuaries are well aware of skill requirements to step into data science field. A majority were able to follow or contribute to Machine Learning discussions related to business.

According to the respondents, most popular tools used are AWS, Azure and Google Cloud Platform for Cloud platform; Excel and Power BI for visualization; SAS, R, SQL, Python and Excel for modelling. Some other tools have also been mentioned, such as Alteryx, Power Pivot, Databricks, Emblem. Example of use cases provided by the respondents include marketing cost distribution, sales analytics, lifetime value model, pricing/reserving/capital model processes, underwriting monitoring, reserving dashboard, API and web scraping, fraud detection, abuse and waste models, experience analysis, efficiency and persistency studies, predictive modelling such as multivariate analysis, GLM, etc.

Online courses and material, seminars, learning from peers, and books were identified as main sources to develop data science skills. Many had a preference for seminars and online tutorials/learning material. Blogs, YouTube, course forums and journal publications were the preferred online media sources to access data science topics.

Given that many respondents were already accessing online material, not surprisingly, a majority responded positively to setting up an online repository with data science learning material by the DAC committee and data science courses sponsored by SAS/IFoA.

In the past, the DAC committee had organized data science competitions with a great level of participation by actuaries as well as other professionals. However, many respondents were lukewarm towards participating in such competitions in the future. This could be mainly attributed to the lack of data science skills or the perceived idea that such competitions require a high level of skills to participate.

Conclusion and next steps

In conclusion, most respondents recognize the importance of data science skills for the actuarial profession and future career development. However, not all actuaries are equipped with in-depth data science knowledge, and the level of involvement in data science work within their organizations remains low. Although there are several resources for learning, hands-on training and professional courses tailored for the actuarial profession are still limited. The survey has also identified a growing demand for data science experience in organizations.

As next steps to this survey, the DAC committee will be studying the future prospects of data science adoption within actuarial profession and making further recommendation in enabling interested members to adopt and implement data science successfully within their organization.

The findings from the survey are discussed in more details in the reports attached:
2021 Survey Results

Please also see the documents attached for the survey questions and response summary:

- Survey Questions
- Response Summary