

Institute and Faculty of Actuaries, **Regulatory Board**

Subject	Data Science deep dive
Meeting date	25 July 2023
Previous Steer/Approval	February 2021 – data science guidance published. September 2022 – approved as part of 2023/24 thematic review activity.
International issues considered?	Yes
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Reviewer	David Gordon, Senior Review Actuary
Purpose	Steer

A: Executive summary

- This paper introduces a ‘deep dive’ for the Regulatory Board (‘the Board’) on Data Science, with a focus on recent Artificial Intelligence (AI) developments and associated considerations for actuaries.**
- [IFoA regulatory guidance](#) has previously been published covering ethical use of data science.**
- The Board’s Horizon Scan currently contains an entry relating to the use of complex models, and this topic is a key example of this.
- This paper provides some background information, an analysis of the key considerations for actuaries, and some important issues for the Board to consider.
- The following guests have been invited to the meeting to provide further background and expert views:
 - Andrew Bennett, Financial Reporting Council (FRC) – currently leading research activity in the FRC Actuarial Policy team in relation to AI and machine learning (ML).
 - Chris Paterson, Government Actuary Department (GAD) – carrying out research commissioned by the FRC on AI/ML use by actuaries in the UK.
 - Josh Blake, Lane Clark Peacock (LCP) – a member of the IFoA AI Ethics working party.
- There is a number of initiatives in train which will help to inform the Board on potential actions to take. These will however take more time to complete and in the meantime the Board is asked to consider issuing a Risk Alert to remind IFoA members of their responsibilities, given the fast-paced nature of developments in this space (see Appendix for an initial draft).

B: Introduction

7. While there is no single definition of data science, it can be broadly thought of as scientific, computational, and analytical methods used to process and extract information from underlying data. It is synonymous with large and complex datasets, and AI tools and techniques (including ML). Data science brings together fields including maths, statistics, and computer science.
8. Although wider data science techniques, including AI, have been developing over a number of years, the last year has seen accelerating profile, accessibility, and potential capability for such techniques. It is important that actuaries remain at the forefront of this technical work, supported by the IFoA. It is also vital that actuaries play their part in ensuring ethical approaches and outcomes, seeking an appropriate balance for consumers and commercial stakeholders.
9. AI enhances existing risks or introduces new risks for data usage and associated models. Actuaries must follow existing technical and ethical standards in this work and are encouraged to keep abreast of any additional guidance which is either already in place or is emerging from a range of regulatory and industry sources.
10. From an IFoA perspective there is relevant current activity from a number of sources:
 - An FRC commissioned research exercise is being carried out by GAD, focused on the use of AI/ML techniques by actuaries working in the UK. This is ongoing, with conclusions expected later in the year.
 - The IFoA AMS team is currently working on a wider data science thematic review, which aims to include looking at international activity in this space. The AMS team is hoping to report on this in early 2024.
 - There are several relevant IFoA working parties and communities focusing on the use of data science techniques in a range of actuarial domains.
 - Additionally, there is significant activity from both UK and international regulators focused on putting in place legislation and/or regulation covering the use of AI.

C: Relevant regulatory and standards activity

11. This section provided a handful of key examples of recent regulatory and standards activity relevant to data science. There are a number of other examples developing globally.
12. The PRA and FCA issued a joint discussion paper, [DP5/22](#), in October 2022, focused on AI and ML. This asked a series of questions, and the [IFoA provided a response](#) through the Policy team.
13. The UK government Department for Science, Innovation and Technology, issued a White Paper in March 2023 [“A pro-innovation approach to AI regulation”](#).

14. The EU has advanced potential legislation for the use of AI techniques across a range of industries ([the EU AI Act](#)).
15. The FRC has [updated TAS100](#) and produced associated guidance, in particular the recently issued [guidance on models](#), with provisions that are relevant to the use of complex data science techniques.

D: Considerations for actuaries

16. This section sets out a non-exhaustive summary of key considerations for actuaries using data science techniques.
17. There may be bias in the underlying data, with steps required to mitigate this. Data science techniques often involve larger and more complex datasets, exacerbating this particular risk.
18. There is a need to ensure that the use of complex data and modelling techniques does not breach any existing regulatory requirements, particularly in relation to protected characteristics.
19. Existing assessments of model risk, and model governance in place to mitigate this, may need to be reviewed, to ensure they remain sufficiently robust in the context of emerging AI/ML models.
20. There may be a range of potential models and tools to choose from, which brings additional challenges as to the most appropriate choice for a given problem.
21. It is important that there is ethical and transparent use of data and models, balancing consumer, and commercial outcomes. There are often ethics policies in place at firms which will be applicable to the work of actuaries in this domain.
22. Explanations and validation of complex data and modelling techniques are likely to be more challenging than for more traditional actuarial models.
23. Communication to users is an essential element of the process, particularly in relation to risks and limitations associated with data and models.
24. Increased use and capacity of AI brings challenges to the education sector. The IFoA has safeguards in place to protect the integrity of its own examination process.

E: Conclusions

25. Data science and AI techniques and tools are currently developing at a high pace. It is important for those with responsibility for setting regulations or standards to keep abreast of developments and act accordingly.

26. Actuaries are likely to play a key role in the ongoing development and use of data science techniques, especially within financial services. This needs to be done in an ethical manner, operating in the public interest.
27. The Regulatory Board has a number of options to deploy, including consideration of existing guidance and professionalism material. Activity over the remainder of 2023, including by the IFoA executive, will help to inform that further.
28. In the meantime, the Board is asked to provide a steer on the publication of a Risk Alert to remind IFoA members of their duty to act in the public interest in developing and using complex data science techniques, and to follow existing technical and ethical standards for actuarial work. A possible draft is included as an Appendix and would be subject to further review and opportunity for feedback before any publication.

F: Appendices

- Draft Risk Alert