

Developing Scotland's Artificial Intelligence (AI) Strategy Consultation

On behalf of the UK Computing Research Committee, UKCRC.

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The UK CRC is an Expert Panel of all three UK Professional Bodies in Computing: the British Computer Society (BCS), the Institution of Engineering and Technology (IET), and the Council of Professors and Heads of Computing (CPHC). It was formed in November 2000 as a policy committee for computing research in the UK. Members of UKCRC are leading researchers who each have an established international reputation in computing. Our response thus covers UK research in computing, which is internationally strong and vigorous, and a major national asset. This response has been prepared after a widespread consultation amongst the membership of UKCRC and, as such, is an independent response on behalf of UKCRC and does not necessarily reflect the official opinion or position of the BCS or the IET.

Question 1: What do you think of the proposed definition of AI for the purposes of the strategy?

The definition seems appropriate – However, the parallels to human reasoning detract from situations in which automated reasoning might go beyond human ‘intelligence’, for example in terms of scale or speed of analysis. The definition also might be further developed to consider the integration of AI within cyber-physical systems enabling new modes of operation that would not be possible if we relied solely on mirroring aspects of human intelligence.

‘A set of techniques used to allow computers to perform tasks normally requiring – and in some cases exceeding normal limits on -- human intelligence, such as visual perception, speech recognition, translation between languages and decision-making’.

Question 2: Do you agree that the strategy should be people-centred and aligned with Scotland's National Performance Framework?

Yes, although the strategy does not provide specific examples of what this might mean in practice. Public engagement in informed debate is a pre-requisite for the strategy to be successful. However, Scotland's leading research groups might be harmed by public or political pressure that is influenced by misconceptions about the underlying technologies. The strategy provides an opportunity to safeguard against these concerns.

Question 3: How do you think AI could benefit Scotland's people, and how do we ensure that the benefits are shared and no-one is left behind?

AI and Machine Learning, as described, in the consultation documents offers a myriad of potential insights into the social and economic challenges facing the people of Scotland. It is important that researchers work together with politicians and civil servants to ensure that these techniques can be deployed effectively to inform policy. It is equally important that these stakeholders work with community groups to understand the more nuanced causal relationships that explain patterns in data identified through the use of ML.

At the same time, we must ensure a sufficient pipeline of students and researchers in AI/ML to both meet the needs of policy makers but also to fuel economic regeneration. AI/ML represent important components in the future of Scotland's digital economy; but our ability to turn ideas into profit has had mixed success both within this specific area but also within the wider digital landscape.

Question 4: What do you think of the proposed overarching vision of the strategy, and the two strategic goals that are proposed to underpin this?

The vision is excellent and the two strategic goals are to be supported ("the people of Scotland will flourish, Scotland's organisations will thrive and prosper"). However, they seem orthogonal to the specific concerns related to the application of AI to both develop our economy and improve the national social well-being. Perhaps, the strategy could be slightly augmented with a few particular case studies to illustrate the potential means by which a national AI/ML strategy might bring tangible benefits to companies, public bodies and to individual communities.

Question 5: Do you agree with the representation of Scotland's AI ecosystem outlined in the scoping document? Is it missing anything?

The concepts of "responsible, ethical, trusted" AI are appropriate but they reflect an implicit criticism of existing technologies rather than a creative, aspirational agenda that encourages innovation. They should be balanced by "creative, aspirational and innovative".

The degree of trust in AI is not in the gift of politicians or developers, although they can help ensure it is **trustworthy**. At a more detailed level, this means that it must be open to detailed scrutiny, from the algorithms through to the training data and the efficacy of analysis to detect systematic biases. As with all research, it is vital that the financial interests of funders are also open to challenge, and that any trials are publicised in advance, with details of the hypothesis that is being tested, to avoid the common problem that the research question is invented after the results are known - which leads to the suppression of negative results and to spurious correlations being identified as causally significant just because they pass some P-value threshold by chance.

Question 6: Do you have any comments on the strategic themes that will be explored in detail?

The specific themes seem well considered but should again be balanced by greater optimism and enthusiasm. For instance, ML/AI are explicitly prohibited in many existing safety-critical standards because they are not amenable to conventional testing – it can be hard to be sure that you have seen enough test cases to prepare a system for its eventual working environment. Regulators need new tools to determine whether or not autonomous vehicles are acceptably safe. By addressing these hard problems, Scottish industry could open up new areas for innovation and prosperity. Regulation is not simply about preventing negative behaviours but it is also about establishing confidence in new and creative technologies.

Question 7: How can confidence in AI as a trusted, responsible and ethical tool be built?

Greater public engagement by researchers, engineers and scientists in discussing the strengths and weaknesses of these approaches. By ensuring high standards for data ownership not only by private but also by public bodies. By engagement in these issues from an early age through the national curriculum.

Question 8: Please comment on any other aspect of AI that you feel it is important for Scotland's AI Strategy to address.

It is important to identify and support AI/ML-based research in safety-critical systems, and in networked computer systems that need to be resilient. More than ever, society is increasingly reliant on these systems in all walks of life