

Air Quality and Artificial Intelligence: Swinging the IAQM into Action

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I remember distinctly when the first desktop computer arrived in our household in the mid-90s. On this momentous day of our family being catapulted into the internet age, my Dad set up his first email address, the name of which remains the same to this day: CaptainSwing. When I enquired as to why this name, my Dad informed me that Captain Swing was an (assumed) fictitious, mythical, figurehead from 1830s England. His fame came during the ‘Swing Riots’, a period where farm workers protested against the increased use of agricultural machinery, notably the threshing machine. Farmers of the day would often wake to find their brand-new threshers vandalised beyond repair, the assumed perpetrator always being Captain Swing. My Dad’s ‘joke’ was that it would be amusing for Swing to embrace the online world despite his Luddite past and fear of the impacts of technology.

In addition to Swing’s name, what stuck with me was the extent of anxiety and uncertainty that always has (and always will) accompany some technological advances. As I have spoken to colleagues and others in the air quality world

over the last few months, it has become clear that we are uncertain how Artificial Intelligence (AI) may impact our discipline and careers, but it is also certain that the deployment of AI in our world is already happening. The future is now, and it is moving at pace. When the IAQM was recently challenged to provide its current thinking around AI, we realised that more knowledge around its uses and potential challenges was required, before we could make a full statement. The IAQM needs to service the interests of its membership and respect the unique skills of those in our discipline, however, we must also embrace new technologies and efficiencies in working methods (preferably without dismantling farming equipment).

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While I would never claim to be an expert on AI (despite using ChatGPT a few times and watching Terminator 2), I have taken an interest in where it is cropping up lately in air quality

conversations. To support the IAQM membership in understanding and embracing AI, over the next 6-8 months, we will be producing a series of comment and insight pieces around AQ and AI. Our goal is to provide a better understanding of how the technology is being used currently in the sector, evaluate the risks and challenges of using AI in an AQ context, and to explore how it could provide opportunities for IAQM members in the future. The pieces will be informed by membership insights, so if you already have knowledge in this area, please do get in touch.

We are aiming to produce articles set around the following three themes:

1. AQ & AI: Right here, right now

This piece would cover how AI is already being used in the air quality world, for example in template reports and proposal writing. On this subject, it would be useful to understand people's experiences of this and how much time saving could actually be achieved, or whether the uniqueness of our assessments means that a level of human drafting and review is always going to be required. In addition to this, it would be great to hear more about stories where AI is being used to improve or cleanse air quality data sets. We would be particularly interested to hear from you if you are using AI in the air quality field as part of an academic or public sector position.

2. AQ, AI & Automation: When AI is not AI

Whenever a new buzz word emerges, everyone wants to show they are keeping up, even if the work they are doing doesn't strictly fall within the parameters of the trendy new tool or discipline. For me, automation currently feels like this in the context of AI.¹ (more detail here). As air quality practitioners, we are used to combining and adjusting datasets in line with specific guidance and rules. If A + B is less than C, then X equals no mitigation required. It makes sense to automate these processes, however we need to make sure we still know how to revert to a manual calculation for when the computer falls over (I suppose that is where professional judgement and experience kicks in).

I would be interested to hear from those currently exploring increased automation, both for commercial gain and for time-saving purposes. Where is the line between automating repeated tasks and maintaining a workforce who understand what is going on under the bonnet of the Excel file? How much do inconsistencies in datasets themselves limit the possibilities of automation (has traffic data ever been provided in a consistent format?). If there is an easy

automation fix to be sold, why has it not been done before – do we need further technological advances, are there licensing issues, or are we just waiting for the light bulb moment? Finally, where is the line between automation and AI relating to air quality, and really, does it matter if it is saving you time?

3. AQ & AI: Threats and Opportunities

The final piece in the series should concentrate on the ways that AI might enhance or challenge the things we do as IAQM members, and how it could impact our careers and professions. The knowledge of our community is deep and spread across a relatively small number of people. Is AI likely to change that? Is our industry seeing a shift from a broadly chemical measurement focus to an action and communication focus, where air quality is one of several health metrics to consider? If so, how could AI assist with this? One area of industry that is seeing early adoption of AI is the drafting of tender responses. Are we OK with this? Can we stop it if we are not? Could it change the way people commission work, necessitating the need for more interviews, for example?

It is an interesting time to be in air quality; a good chunk of the work done in the sector now follows well-established procedures and approaches, which at face value could make our workload ripe for AI and automation. The commercial aspects of many IAQM members' roles will again drive towards AI in an effort to gain a competitive advantage in the market. It will hopefully make some of those more laborious aspects of our jobs – 'snapping roads' for dispersion models for example – a thing of the past. Though clearly a good thing, we just need to make sure we are still needed, else we might need to give Swing a call!

What next?

If you are currently working in air quality and making use of AI, it would be great to hear what this entails. Equally, if you are taking steps to adopt increased automation linked to air quality assessment, it would be good to understand the challenges of this. Finally, if you have insights or opinions on how AI might impact future procurement approaches, we would like to hear from you. Please contact: Jamie.clayton@ricardo.com

Shameless Plug

Any IAQM/IES members who have made it this far should also take a look at the [June 2024 IES Environmental Scientist Journal: Where Green](#)

[Meets Machine](#). The whole journal is a good read, but of particular relevance to AI in our sector are the following articles:

- Artificial Intelligence and the environmental professions (Peter Humphrey, Gary Kass and Victoria Ward); and
- Digital environmental impact assessment: from evolution to revolution (Mark Elton).

Jamie Clayton is an Associate Director at Ricardo. Jamie has worked as an air quality consultant for over 15 years. In his early career his main focus was assessment through dispersion modelling; in recent years his focus has shifted to monitoring and improvement measures. He is interested in how the activities of air quality professionals will change in the future due to both technological advances, and prioritisation of different topic areas (such as sustainability/net zero or indoor air quality).

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Endnotes

¹ Homann, Maria (2024). *Leapwork - What is the Difference Between AI and Automation?* <https://www.leapwork.com/blog/ai-and-automation-what-is-the-difference>

These Insights Articles are designed to provide a view on topical issues affecting those working in air quality. This thought piece has been authored by Jamie Clayton, Associate Director at Ricardo and Committee Member of the IAQM.

About the Institute of Air Quality Management (IAQM)

The IAQM aims to be the authoritative voice for air quality by maintaining, enhancing and promoting the highest standards of working practices in the field and for the professional development of those who undertake this work. Membership of the IAQM is mainly drawn from practising air quality professionals working within the fields of air quality science, air quality assessment and air quality management.

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