The AI of The Possible: Developing Scotland's Artificial Intelligence (AI) Strategy, Public Engagement Report
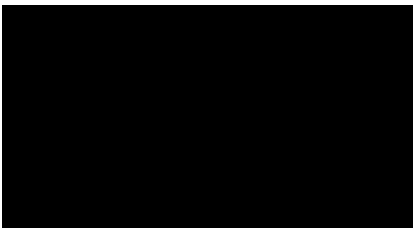
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This report presents the summary findings following a series of public engagement activities to inform the development of Scotland's Artificial Intelligence (AI) Strategy.

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September 2020

Acknowledgements

About the authors

Democratic Society work towards more and better democracy, creating opportunities for people to become involved in the decisions that shape their lives and for them to have the skills to do so effectively. We have extensive experience and expertise in stakeholder participation and engagement, which we bring to all of our projects, ranging from our work on engaging citizens in decisions around climate action to exploring how citizens can have a greater voice in shaping digital transformation. Find out more: www.demsoc.org.

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Executive Summary

Democratic Society was commissioned by The Data Lab and Scottish Government to design and deliver a public engagement programme to inform the development of Scotland's Artificial Intelligence (AI) Strategy. Originally scheduled to take place in person, the COVID-19 pandemic required most of this work to be carried out online. While this came with its own challenges, it also led to the adoption of new workshop formats that enabled rich, meaningful, and insightful conversations.

This report shares the findings from our workshops and outlines the hopes, concerns, and aspirations of participants for AI in Scotland. Given the scope of the project, these are clustered to reflect the themes of four working groups – Skills and Knowledge; Developing AI; Ethical and Regulatory Frameworks; Data Infrastructure; and are ultimately brought together in Joining the Dots.

The discussions reveal that participants are largely optimistic about the potential of AI to improve their lives and positively transform a range of sectors, such as education, in Scotland. However, there remain concerns about issues, such as bias, and trade-offs, such as privacy, that currently accompany the use of AI. This does not signify that participants do not see a place for AI in Scotland's future. On the contrary, they believe that there exists a distinct opportunity for Scotland to become a global leader in ethical AI.

Emphasis is placed on AI for public good, which is understood to mean for the benefit of wider Scottish society. Along these lines, it is underlined that people - not solely profit - be kept at the heart of the AI Strategy. For this to happen, participants suggest that AI be developed in a trustworthy and transparent manner shaped by a diversity of expertise and perspectives. Just as importantly, they strongly urge that the benefits and opportunities afforded by AI be equally accessible to everyone, including and especially those in rural areas. To raise awareness about rights and risks and help people make informed decisions, participants call for more open and honest conversations about AI, akin to the kind they shared during the workshops.

Therefore, it is our recommendation that this conversation not be stopped here, but broadened to allow the widest possible range of voices and opinions to continue feeding into the AI Strategy, thereby adding to its richness and relevance.

How this report is structured

This report is an assimilation of key findings from 15 online public engagement workshops with 49 participants. For the sake of clarity and brevity, the findings have been clustered based on recurring themes and patterns instead of being presented as an exhaustive list.

While the findings are interconnected in themselves, they have also been arranged along the lines of benefits - where mentioned - concerns, and suggestions outlined in a manner that corresponds to the remit of each of the five working groups.

An additional sub-section on questions to be clarified has been included to reflect the topics that participants wanted to know more about outside of the information presented during the workshop. Although the focus remains on the online workshops, findings have also been briefly compared with key points from two in person roundtable discussions in Inverness before the start of public engagement activities.

Throughout the report, summary findings have been supported by quotes from participants so as to demonstrate their sentiments in their own words. It must be noted that quotes have been recorded by note-takers during the workshops, and every effort has been made to ensure participants' thoughts and opinions are reported accurately.

It is also important to note that although some opinions, such as those on education and healthcare, were in response to the example scenarios that were used during the workshop, participants equally drew on their own direct and indirect experiences and knowledge of AI and reflected on the scenarios in relation to their own experience.

1) Background

Artificial Intelligence, or AI, is already part of everyday life. We use AI every time we search Google or ask Alexa a question about the weather. Netflix uses it to predict what we would like to watch based on our viewing history and that of others. It can be also used to create ever more disruptive technologies. AI is being used to make cars that do not need drivers and to pilot drones to deliver your online purchases, and soon doctors could be using it to help assess symptoms more quickly and accurately, ensuring that patients get prompt access to the correct specialist treatment.

Scotland is talking about AI now because it will increasingly have an impact on our lives. The Scottish Government is committed to the aims of the National Performance Framework[1] and a co-ordinated AI Strategy is one component of ensuring that we create a more successful country that can realise its potential and thrive.

Democratic Society was commissioned by The Data Lab to design and deliver a public engagement programme with a range of stakeholders from across Scotland. Our aims were to increase knowledge and awareness of the AI Strategy and to capture the hopes, concerns, and aspirations of the different people with respect to the future of AI in Scotland.

2) Our approach

Recognising that AI is a complex and rapidly evolving field, a starting point for the public engagement workshops was to put ourselves in the participants' shoes to determine some of the questions we ourselves would like answered on AI. Some of these included: What would I, as a member of the public, need to know to easily grasp what AI is? What are the basics? What is relevant in Scotland? What would I find interesting? What would affect me personally?

We proceeded to tailor these questions to align with the focus of the working groups convened by The Data Lab to work on strategic themes: Skills and Knowledge, Developing AI, Ethics and Regulatory Frameworks, Data Infrastructure, and Joining the Dots. However, we were mindful that the language we used had to be simple and jargon-free so as to be understood by everyone regardless of their skills or awareness levels.

The original engagement programme involved two in person weekend events – in Glasgow and Inverness – with 30 participants each. The plan was to have in-depth discussions with small groups with one facilitator per table, alongside inputs from expert speakers who would share their knowledge and answer any the questions participants may have. Two separate workshops with young people and children were also scheduled, so as to include a greater diversity of voices in Scotland's AI Strategy.

Despite the restrictions brought on by COVID-19, we were nonetheless successful in carrying out two roundtable discussions with experts on rural perspectives, which in turn

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[1] See: https://nationalperformance.gov.scot

laid the foundation for the rest of our engagement activities with the wider public (see Appendix 3).

With the COVID-19 pandemic requiring us to move our public engagement online, we had to adapt our original workshop design and format to not only ensure flexibility, but also enough interest and engagement so as to not overwhelm people who may already be spending large parts of their day online. In the end, we ran 15 workshops – family (with 'family' interpreted in the widest sense) and individual - with 49 participants representing a broad range of age groups, skills, education levels, and geographic locations. More on participant recruitment and workshop design can be found in Appendices 1 and 2.

At the same time, we developed free and easily accessible online materials, including reusable resources for educators, parents and guardians working with different age groups. We created these resource packs to enable young people, children, and anyone else to learn about the basics of AI whilst at home[2]. We also streamlined our conversation packs into one interactive information pack with links to quizzes on topics including healthcare, autonomous vehicles, facial recognition, equality & bias in AI, and the changing landscape of work (see Appendix 4). Responses to the quizzes will also feed into the shaping of the AI Strategy.

We reached out through networks to disseminate information and invitations to participate to a wider group of people as well as paid advertising on social media outlets. We developed a communications plan for The Data Lab social media team to inform more people about the development of the Strategy, increase traffic to the Strategy website, and encourage more engagement with the quizzes.

2.1) Supporting participation

Our aim was to involve the broadest possible range of voices to feed into the AI Strategy. However, we anticipated that the change to online delivery would introduce additional barriers for recruitment and participation, which is why we offered a gift for participants time (£60 per family, or £20 per individual) and digital support in the form of a 1-1 phone calls and emails to support people with any technical needs. However, it was apparent that the digital divide still remained a barrier and that participants would need access to a device and internet connection to take part, as reflected in our recruitment as well as our workshop findings below.

3) Summary findings from online workshops

This section presents the key findings that emerged from our online workshops to capture people's hopes, concerns, and aspirations on AI. As such, they are outlined in the form of perceived benefits (where stated), concerns, and suggestions. Questions that arose outside of the scope of the material covered in the workshop have also been noted. A brief comparison with points from roundtable discussions in Inverness is also included.

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[2] See: https://www.scotlandaistrategy.com/for-schools

3.1) Skills and Knowledge

The main focus of this working group was ensuring Scotland's people and organisations have the skills and knowledge required to benefit from AI. The below findings reflect this scope.

3.1.1) Benefits

Participants who worked, or were about to begin working, in the technology sector were optimistic about careers in AI and digital technology. They were positive that every new technology carried tremendous potential for innovation and creativity - with the Industrial Revolution periodically cited as a case in point. This confidence was also reflected in the wealth of opportunities that they saw for Scotland to develop more jobs in AI and build a new skilled future workforce.

"If you find a gap in the market, you create a whole new world of workers. Things that we can't possibly imagine will emerge."

"... this is just another evolution. I work with technology every day; I think there's a lot of potential for innovation. I know what the trajectory in my area means, so I feel secure."

3.1.2) Concerns

Participants frequently talked about concerns about job losses and changing roles. Many were fearful about jobs being replaced by automation and the prospect of what they expected to be a bleak work future dominated by robots. Participants were also concerned about reskilling and retraining, with several expressing doubts as to how this would be possible for everyone given some of differing skill sets, and the pace at which technology evolves.

"The robots are coming, and the future of work scares me. What are all the people going to do?"

"With the emerging technologies, if you miss the wave of learning it becomes harder to re-enter the workforce."

"What happens to people who work in supermarkets and to those without degrees?"

"I don't think Scotland has got the infrastructure or money to retrain people, so that's what I would have grave concerns about."

Linked to the replacement of jobs by AI was the diminishing value of human beings expected to be brought about by automation. In working through the scenarios, we used to discuss the future of work, warehouse workers and bus drivers were singled out as being particularly susceptible to feeling replaced or undervalued. This was in part based on the premise that people in these jobs may be more reticent to change and that the nature of these jobs would make reskilling and retraining a harder task.

> *"They [warehouse workers] may have been in that job for 10 years or so, and now they're being replaced, and they now need to look for another career because they can't compete, or move to the same job in another location if the job is totally replaced."*

> *"I think it is less about whether they replace repetitive tasks, it is about how the people that are being replaced are retrained and how they move on in their life. It is about what they do afterwards. People will need to be replaced."*

It is important to note that this challenge led some participants to contend that being replaced by AI also held a more visceral dimension, one that could lead to increased mental health issues in the future.

> *"I think there are a few challenges [with AI and the future of work], but I pick the feeling of being replaced or undervalued. I think that the other challenges may be easy to overcome, but this one has more human impact, for example on people's mental health."*

At the same time, the above risk was not thought to be applicable to teachers who, participants maintained, could not be replaced by AI regardless of technological advancements. This was because teachers were seen to embody human qualities of intuition, compassion, and empathy - abilities that AI was currently devoid of. However, it was observed that teachers might be placed under a different type of burden in attempting to keep abreast of technological trends.

> *"I don't think teachers will ever be completely replaced by AI because it's nice having someone at the front of the classroom so if you have a question you can go and ask them, and it's a lot easier for them to understand."*

> *"Teachers pick up on social cues, such as kids having issues at home. This could be missed with AI."*

Participants recognised that building a new workforce adept at AI would rely on the Scottish population having a certain skill level. This was identified as a challenge on account of the lack of awareness currently surrounding AI. Although a large number of participants were mindful of having encountered some form of AI in their daily lives - be it via Netflix recommendations, predictive text suggestions, or smart devices such as Alexa - there remained nevertheless a consensus to differentiate between AI and digital technology. In addition, attention was also drawn to the need to demystify AI and algorithmic decision making for society as a whole.

It was noted that science fiction continued to feed popular imagination and that the absence of a shared but informed understanding of AI was an impediment to education and awareness raising. A connection was also made between a lack of awareness and disinformation. It was highlighted that the absence of balanced information on AI also exposed the Scottish population to the risk of manipulation via filter bubbles and disinformation.

> *"I think there's a little bit of a misnomer about what AI actually is. People think AI is just technology and it's actually not – if you look at Schwarzenegger movies of what AI can potentially do, that's a bit extreme, but what we have are smartphones and cheap holidays."*

> *"When I think of AI I think of robots and flying machines that you can see and touch, but if you google something and then go to your emails or Facebook it's selling it to you – that is AI. Continuously reminding you of stuff you're trying to forget."*

> *"Something that stood out for me is how you help people understand this. So many people won't know what an algorithm is. How does this affect education?"*

Specific to where the creation of technology jobs was currently happening, several participants observed a clear skew towards (capital) cities at the cost of rural areas. It was felt that this harmed the career prospects for those living outside of the central belt due to an unequal access to technology training and employment opportunities. Related aspects of this urban-rural divide are also featured in each of the sections below.

> *"A challenge is that tech jobs are mostly growing in the city - replacement jobs need to be created in rural areas. We are seeing a movement of jobs from warehouse workers to AI developers, so jobs move from rural to urban areas. We see it in England; London is the only area where things happen and everywhere else is left behind."*

3.1.3) Suggestions

In referring to the example of Dundee as an international gaming hub, participants recommended the creation of a similar cutting-edge technology hub as a means of attracting talent and new businesses. It was anticipated that such a setup - complete with tax breaks for new businesses - would create new jobs and counter potential unemployment challenges.

> *"Scotland needs to be bold in this global market and bring new companies to Scotland, we need to showcase what we do. Since Dolly the sheep we haven't invented anything since penicillin probably."*

> *"This is a massive opportunity for Scotland to do something impressive by being one of leading countries in the world in this space. AI is clearly the future – let us invest in it and be seen as world leaders/experts."*

However, it was education, including in Science, Technology, Engineering, and Mathematics (STEM), that was deemed a top priority in ensuring that Scotland has the right skills for the future of work and in making sure no one is left behind. Participants strongly recommended starting early, with AI skills featuring as an integral component of primary school curriculums. AI and data literacy were highlighted as being a crucial step towards building foundational skills in technology as well as preparing students to recognise algorithmic bias and the challenges of algorithmic decision-making, covered in sub-section 3.3.2. It was also suggested that any future technology or AI Strategy address the Attainment Challenge with respect to achieving equity in educational outcomes.

> *"I have a question about how schools are adapting their curriculum to new and emerging technology. For example, are they all learning to code? Are they learning about the dark side of technology?"*

> *"A dedicated education programme is needed for emerging tech and the benefits of AI. The technology Strategy [an integrated one] for Scotland should have a clear measure against the attainment challenges to bridge the gap in child*

Notwithstanding the importance of STEM skills, the need to inculcate creative as well as entrepreneurial thinking was also underscored. This was seen as a means of future-proofing the education system whilst preparing for a versatile workforce.

> *"The key thing for Scotland… is the education system is not set up for the future. If we were to actually transform the education system, it's currently really rudimentary maths, physics… pass-fail… it's not geared up for the new workforce of the future...it's not all about maths, you need people to come up with entrepreneurial ideas."*

Emphasis was also placed on accommodating a multitude of learning styles - not solely in the case of students but also adults training in digital technology and AI or participating in reskilling schemes. The consensus amongst participants was that different social and demographic groups assimilated knowledge differently and it was imperative to take this into account when developing new educational programmes.

> *"Are the older generation prepared to use it? We need to look at end user adopters too."*

> *"Maybe it's about really thinking about how women learn, the pace at which women learn and the environment to make it a safe place for women to have a chance to build their creative skills. It doesn't have to be a big college course, could be private tuition or groups. People need time to build their skills up."*

Another suggestion pertaining to education was that of awareness raising amongst the general public. In a point linked to the demystification of AI noted in the sub-section above, several raised the need to move beyond the popular 'terminator narrative' of AI as dangerous machines out to destroy humanity. The shaping of a positive message was considered to be pivotal in addressing any concerns people may have around AI. To this end, participants signalled a need for more communication and education with a focus on use cases and the benefits of AI. At the same time, it was imperative that these be communicated in a simple and relatable manner so that participants could make informed choices when using AI.

> *"More real-world examples of how AI is being used would help shape where we want to go with AI."*

> *"The more people are aware of what AI is and how it is used, the more they will be able to engage with it. Take steps now to engage people."*

Viewing their participation in these workshops as a turning point, participants called for increased public engagement to support people in feeling more positive about AI. Public

engagement was also regarded as a means of inspiring people to get involved in AI, and of becoming more aware of the risks and rights associated with it.

> "[My vision for ethical AI in Scotland is] allowing everyone and anyone to have a say. People who don't know [enough about AI] need to be educated and it needs to be clear and concise. Exactly what you [Democratic Society]'re doing here I suppose. Allow people to give feedback and allow it to grow."

3.1.4) Questions to be clarified

Specific to the use of AI in automation, participants wanted to understand whether it was possible to compare the quality of work that humans and robots could do and whether humans could match robots in this regard. They were also curious about the new types of jobs that would be created and whether companies would still need to hire people to do those jobs.

3.1.5) Comparisons with roundtable discussions

Reflections from roundtable discussions on skills and knowledge coincided with those from online workshops in several regards. These included the need to raise awareness levels amongst the Scottish population by educating them about the risks and opportunities presented by AI in a simple, relatable manner; supporting STEM education in schools to promote skills; embedding AI in school curriculums; and bridging the urban-rural digital divide in terms of infrastructure. The need to share best practices was also highlighted. Suggestions that did not come up in the online workshops included tech meetups and local groups, supporting online reskilling in AI through groups such as CodeClan, and programmes to support immigration for workers skilled in AI.

3.2) Developing AI and AI-enabled services

The main focus of this working group was ensuring the development of AI and AI-enabled products and services in Scotland includes positive and widespread adoption of AI for the benefit of Scotland's people and organisations. The below findings have been outlined to fit this scope.

3.2.1) Benefits

Almost all of the workshop participants were enthusiastic about the general potential of technology and AI-enabled products and services to improve their lives and society in general. In terms of personal gain, intelligent gadgets such as driverless cars, gaming consoles, virtual reality, augmented reality, jet packs, and hoverboards featured at the top of list, with the influence of science fiction clearly discernible in this regard.

"I'm thinking about the future of work… but the future of life as well, technology in the home, back to the future - the one that goes into the future, that's my favourite film. Flying cards and hover boards – the fun you can have with AI and robotics"

The biggest value of AI-enabled products and services was perceived to be in terms of savings - of time, effort, and energy. Participants looked forward to being free of tedious tasks and having more free time to undertake more enjoyable activities and forging more meaningful social bonds.

"[Excited about] technology that can predict things that I like. It saves so much time and gives you new ideas."

"Excited to save money, save time, and help those with additional support needs."

The potential of AI to serve different sectors was also recognised. These included business (more accurate customer recommendations); farming (irrigation systems, automated fruit picking); emergency services (self-driving fire engines that can analyse spread of fire, water pressure, etc.); fraud prevention; and road safety management (fewer accidents).

"The best potential (as a marketer) is the ability to track and predict behaviours for business and personalisation and create better customer experience."

More repeated patterns emerged with respect to the education and healthcare sector. It was thought that both students and teachers stood to gain a lot through the use of AI in the classroom. The most cited benefit was that of matching teachers with students who needed more support. More accurate marking and simultaneous interpretation - both of which would further relieve teachers of administrative tasks - were also mentioned as related advantages.

"Automating routine tasks (e.g. marking) is something teachers have been complaining about for a while. If their time can be freed up in terms of doing all the routine, boring tasks… that would give them an opportunity to spend more time with pupils in general but those who need help with additional support needs."

Gains pertaining to the health sector comprised the early detection of diseases, such as cancer, to save lives; more targeted and cost-effective treatment for patients; ambient health monitoring; more accurate social prescribing; and the potential of AI-enabled products for independent living. The prospect of AI to assist those with disabilities - through the use of smart gadgets, such as Alexa or robot guide dogs - was a recurring theme mentioned by participants working in the field as well as those who had experienced some form of disability themselves.

> "In the 70s - 80s, AI was a niche market... 30 years ago I wasn't provided with tech. Alexa is a great tool for disabled people"

3.2.2) Concerns

Some of the broader concerns that participants had around the development of AI stemmed from their personal understanding of it. Several were apprehensive of the loss of the human element that they associated with AI. Spontaneity, compassion, and empathy were singled out as being amongst the most defining human traits that, participants believed, could never be replaced by AI.

> "I just think 'where's the fun in human life' if I go to a concert and an algorithm will sit at a piano and compose a piece of music."

> "AI nurses don't have compassion to look you in the eye and tell you bad news."

> "We communicate more with body language in what we say. AI is never going to understand what a 13-year-old is trying to tell it purely by the words. They need to understand if the kid is upset… "Teachers get to know their kids through what they've written down and what they're scoring them on. They can interpret what they're saying… that human element is never going to get eradicated"

The eventual disappearance of human contact when going about daily lives was another cause for concern. In using the example of bus drivers, participants emphasised the importance of the former's physical company, which they felt was part of a valued service routine. Moreover, it was underlined that, in certain jobs, a human presence could intuitively pre-empt confrontations or provide assistance which would be problematic to do via automation. Participants also had concerns about the reduced personal responsibility on the part of bus drivers and the over-reliance on AI.

> *"People love being bus drivers, they love driving around and chatting to people, so a question is 'should we automate bus drivers'? Is it saving so much that we need to get rid of these wonderful people ...need to think about the social impact, is it worth saving money? Save the bus drivers, I'm going to go to George Square next week, bus drivers matter!"*

> *"If disabled people came onto the bus, how would the robot be able to put down the ramp for someone in a wheelchair, or if someone is blind how would they ask the driver where the bus is going and to help them find a seat. That wouldn't happen if automated – things like fights and accidents wouldn't be able to be sorted."*

The above point was also tied to that of human judgement. Online diagnosis via AI-enabled products or services was put forward as an instance during which participants would find it difficult to trust AI and would prefer a human doctor instead.

> *"[My] cousin is a consultant cardiologist. [AI] Robot doctor, nurse, is probably a long way away but you need someone like my cousin to have thoughts and feelings as a human being... Might affect judgement of AI in the future, don't think you can ever replace it [human judgement]."*

More pointed reservations related to human judgement and the use of AI in healthcare surfaced as we worked through the different scenarios. One participant who was familiar with Machine Learning and physiological prediction warned against the harmful and invasive nature of this application. Other participants alluded to a 'Big Brother' scenario wherein people would pay a higher insurance premium or have their healthcare sessions reduced, or altogether denied, because of pervasive monitoring.

> *"Big brother scenario could happen wherein you might have to pay more for insurance because someone from Direct Line knows you have slightly high blood pressure even though you're not feeling poorly. Have to be sensitive about this and not open floodgates so quickly."*

"What is worse than Machine Learning predicting what we can do next is that it will direct us as to what to do next and that's dangerous."

Some participants also felt a sense of disquietude about sentient robots and what these would mean for our equation with technology as a whole. Whereas technology was regarded as currently serving humans rather than us having to serve it, it was unclear how the 'servant-master' dynamic would alter as technology advanced and what that would eventually mean for the human race.

"How far do you train the robot before they take over and start having a mind of themselves? It's probably going to happen, let's be honest, but probably not in our lifetime."

In discussing future manifestations of AI, such as Avatars, exclusion was another challenge that emerged. Whereas some participants cited affordability as a barrier to accessing AI-enabled products and services, others noted the lack of essential telecommunication infrastructure in rural areas to benefit from the AI. The latter is a challenge also noted in sub-section 3.4.1. Similarly, those who had worked with people with disabilities regretted that AI was being developed for a certain section of the population with those outside the norm, such as people with disabilities, deemed an afterthought.

"One thing I got from the video was about [AI] and then thinking where I live because I live in a rural area where the infrastructure is not there yet. And now we don't even get a good enough broadband to start off with that."

Related to exclusion was also the lack of diversity amongst the people shaping AI itself. One participant spoke of their own experience of attending a civic tech event only to discover an all-male audience. It was clear to participants that the dominance of a select demographic in the development of AI was tied to reinforcing prejudices and perpetuating bias – a point also covered in sub-section 3.3.1.

"[the most important thing to consider about AI for Scotland is] diversity in who actually shapes it [AI] in the first place. There's a lot of people writing books about how it goes horribly wrong - the people making the tech are all young white men and they have no idea about anybody else's life, and they build in bias inherently."

3.2.3) Suggestions

Suggestions around developing AI were largely in alignment with the concerns noted above. Those participants who had drawn attention to the challenges of exclusion strongly recommended that AI be developed with the widest possible range of users in mind, especially those with disabilities.

> *"Scottish government should support ideas of [AI] development so that disabled people could be aided to live independently."*

Consistent with the above suggestion was that of enabling more people to have a say in the development of AI. Participants were unequivocal in calling for similar public engagement activities as a medium for sourcing ideas on AI-enabled products and services. Having more people involved in the conversations - and ultimately building AI - was also seen as a means of mitigating inherent bias.

> *"How do you get citizens involved, get more input, get people excited? AI ambassadors. You need to bring in diversity of thinking."*

> *"We could have sessions like this [workshop] which drive ideas into the system."*

Participants expressed a strong desire to see Scotland take a leading role in the development of AI and become a global competitor in the field. This vision of Scotland as a centre of excellence was framed around the notion of human-centric, open source AI in keeping with the country's values. Whereas the reference to open source entailed free availability, human-centric was understood to mean benefiting the public rather than private technology companies at all times.

> *"Nice to think about AI creative commons rather than businesses – more open source and more control and open to all. This takes away the risk if something goes wrong. It's not just to monetise for profit but for everyone."*

> *"Putting people first - that's the kind of AI I am excited about."*

In accordance with the above aspirations, the overwhelming majority of participants advocated the use of AI for public good. Public and third sector organisations were seen as playing an instrumental role in this regard, both in the development and oversight of AI.

Collaboration between different professionals, such as software engineers and doctors or ethicists and developers was suggested as a means of getting the basics right and building a foundation for the use of AI towards public benefit.

> *"This has shifted my thinking around the collective good and I suppose there's an opportunity here around how Scotland can compete into the future in this. Public sector organisations doing the good. I can't really articulate it yet – but there really is something quite powerful in this and what it could do for us as citizens of Scotland."*

> *"Smaller charities/enterprises struggle to invest in tech as the focus has been on social media, but there are bigger opportunities and risks here...Non-profits involved in tech/AI would be great."*

> *"The elephant in the room is that people developing these solutions aren't talking about ethics, they do not have the toolkit to do so. It is rare for developers to be trained ethicists – we need to go back to basics before you can start planning further or else, we will keep producing the same inaccurate solutions."*

3.2.4) Questions to be clarified

It is of note that suggestions on developing AI did not touch upon the climate crisis, and only a handful of participants had questions about AI applications and their relevance to sustainability, in particular, tackling pollution and more green energy and mobility. Public safety was another topic that participants were interested in knowing more about, more specifically the use of AI to thwart terror attacks, including at airports. Interest was also expressed in the capabilities of robots and whether they could be expected to do more creative tasks in the future, such as decorating, cooking, and ultimately even building other robots. A question was also raised as to how AI was monetised and whether it was possible to create alternate investment models that did not involve technology giants. Another participant who was familiar with Machine Learning was curious about whether it was possible to classify and train machines to learn more about people themselves.

3.2.5) Comparison with roundtable discussions

The round table discussions on developing AI revealed several similarities with those that took place online. In particular, the need to collaborate and partner with different organisations and develop certification for companies and products as GDPR-compliant was noted. The need to focus on place diversity was also mentioned connecting to the point of an urban-rural divide. Along these lines, it was suggested that parts of Scotland

which have unique landscapes, such as the Highlands, be used as a testbed for AI development.

Other points that were also reflected in the online workshops but not covered within the purview of developing AI included promoting STEM education, shaping a positive narrative around job creation, and reviewing the dominance of private sector procurement models. Related to the point of tax breaks for companies to attract talent, the idea of improving tax regimes and credit access for companies developing AI solutions was also mentioned. A hitherto unmentioned point was that of an audit to explore how AI technology could be used practically in smaller organisations.

3.3) Ethical and regulatory frameworks

The main focus of this working group was ensuring that Scotland has the ethical and regulatory infrastructure in place to support positive and widespread adoption of AI for the benefit of Scotland's people and organisations. The below findings have been outlined to reflect this scope.

3.3.1) Concerns

There was a clear appreciation amongst workshop participants of the benefits and opportunities that AI brings, as noted in the sections above. At the same time, there was also a clear recognition that, like technology, AI is not neutral - it can be used towards societal benefit or harm, common good or individual gain.

> "[it is] t*he same technology – one could be used for healthcare and the other for dropping bombs. Quite worrying that what you develop for good can be used for something so bad. If we're in charge of our own [technology] and we do have the ethics behind it... but it's so hard, one line of code between the two things.*"

> "*[the most important aspect of AI is] keeping it under control. How do we make sure the risks don't outweigh the benefits?... It's a question of what benefits society versus individual needs.*"

The majority of participants were familiar with the concept of bias in AI algorithms, albeit to varying degrees, and referred to it whilst discussing ethical challenges of using AI. However, there were some who were learning of it for the first time upon watching the video explainers (see Appendix 2) and wanted further information on how and where algorithmic bias manifests itself. They nonetheless shared the same misgivings about AI reinforcing prejudices, especially against women and minority groups.

"*Most AI reflects what it sees in the data it's been shown. Data is swayed in one particular way and is trained to not see certain groups.*"

"*Another issue is that most test data is on white men...it is not going to have the most accurate results.*"

Participants associated bias in part with the lack of diversity in shaping AI technology and the exclusion of certain groups in the conversations around it, as stated in sub-section 3.2.2. The underrepresentation of women in the technology industry - currently 23% tech jobs are held by women and the number is even lower in the case of AI development - was also referenced as a factor in contributing to bias. Equal attention was drawn to the inability of particular age groups to participate in the conversation on technology due to (self-perceived) limited data literacy skills.

"*We are not a diverse and inclusive society. It's likely that the people writing the algorithm and looking at this aren't likely to be terribly diverse. There's likely to be inherent bias. However, we could look to make the processes more inclusive in how we develop them, otherwise we just fall behind.*"

"*[biggest challenge is] effect on young people and low number of women in [tech] industry right now, if they're already underrepresented then how will they be represented in future.*"

"*Conversation should be focussed on the younger generation primarily because I don't think it's a conversation that people of my generation have the capacity and skills to answer… it's not a conversation you can have with Scotland, because so many people are not part of the conversation right now.*"

Digital exclusion was also thought to stem from unequal access to digital technology itself. Participants underlined that not everyone was in the position to avail themselves of the benefits offered by AI - a point linked to the urban-rural digital divide.

"*Social inequality jumped out at me– internet connection should be a utility like water, electricity.*"

"Although a lot of people have access to that kind of technology [AI] there's a danger that sections of society will miss out, which is a particular concern then it comes to things like healthcare."

The risk to privacy posed by AI was repeatedly identified by participants as being a serious issue. The types of privacy infringements expressed can be narrowed down to three trends: tracking, monitoring, and profiling. Participants felt uncomfortable with the amount of personal data held by companies such as Facebook and Google through tracking of online activities or via smart home devices, such as Alexa. Monitoring was cited as a general concern to people's privacy and their civil liberties as a whole.

"[Am] scared about how you have a conversation about something and it pops up on your phone - it's quite creepy."

"I'm not comfortable with it because I want my privacy – I don't want someone to always monitor me. Like what's happening in China for example – people are always monitoring, I don't like this idea as we live in a free world."

Whilst acknowledging the advantages of monitoring in healthcare, concerns were raised about the more insidious uses of this technology, such as technology giants potentially harvesting people's physiological data to improve their products and services. The use of monitoring in workplaces was also cited as another problematic application with implications for ethics at work.

"Companies and work ethics become an issue where companies are monitoring your progress and ability to do a task. We may not be able to spend more time on [other] things."

> *"If you're using health trackers like Fitbit to track patient data, it should be able to be disconnected from that server... But the idea with Google acquiring Fitbit is you'd have my heart rate monitor when people are watching your YouTube videos, which Google also owns, you could monitor how people's heart rate reacts to seeing different things on screen. So, if you look at the terminal screen, your heart rate goes up. And Google then has an indication that you find that thing attractive."*

As in the case of monitoring and health, it was clear to participants that the use of surveillance and profiling for public safety would involve trade-offs and give rise to other tensions, such as ethnic and racial profiling. A small number of participants had first-hand experience with surveillance technology and recognised its potential for misuse. Others acknowledged that it was still early days but that, without safeguards, vulnerable members of the community would continue to be unfairly profiled - a point also linked to bias.

> *"I know it's being used to stop black people in London & Birmingham and based on their ethnicity and I don't think the technology should be used for that purpose."*

> *"I have attended rugby matches and seen how it works. I have worked for a security company and am accepting of it [facial recognition] if it's for public safety. Reruns of video are programmed to pick up ethnic minorities and people with beards…[am] on the whole positive but something to be watched."*

An issue inextricably linked to privacy was that of consent. Participants were unanimous in their concern about the absence of transparency surrounding the use of their data. Some felt that current website terms and conditions and cookie notifications did not give them a meaningful chance to understand what they were signing, whereas others expressed a need for more control over their personal information so as to prevent irresponsible usage. The lack of transparency - both in communication and usage - was also cited by participants as grounds for distrust of technology and those who promote it.

> *"Privacy and consent are foundational things to get right. Despite GDPR, we see terms and conditions that just run on, people just tick boxes - it comes down to consent washing."*

"When I am signing up on Google, for example, I see all these privacy notes, but I don't really know what I am signing up to."

"[I am] not sure of the reach of AI - for example, passport facial recognition, is it used for filing or criminal recognition also? Or used for advertising? We might know it's being used, but we don't know where data is being extracted in experimental ways."

"The moment you don't have control over the data about you; so that means there's less you can do about it yourself so if you wanted a complete picture of your health you couldn't unless you had an apple app."

Connected to the lack of transparency around data control and ownership was the absence of clear regulation to hold technology companies, such as Facebook and Amazon, to account in case of irresponsible usage. This was attributed in part to the global scale at which these companies operate and the disproportionate power they wield over national governments. Participants nonetheless emphasised the need for mitigating the control these companies have on people's data. The competition faced by smaller Scottish companies and businesses in the face of unfair business practices by technology giants was also mentioned as a concern.

"How do we regulate the products and services e.g. Amazon, when they are at global scale – they are bigger than [Scottish] regulatory bodies themselves."

" [What] bothers me the most is the power of big companies. I think if we look back, we can see where that's gone horribly wrong in the past. And, and I think we look at the current situation, we're all in around COVID and the kind of perceptions of globalisation and the kind of frailty of society... but when you look at who is in control of the these technologies and who is in control of the companies that use them the most, they're all over in the States, they're all in California...I think there's no clear redress for our national government, never mind the individual citizen. So, I certainly have huge concerns about that."

The question of liability was also extended to the use of AI. In responding to the scenarios that we used during the workshops, participants raised concerns about accountability and redress in cases when algorithmic bias results in discrimination or when automated decision making causes grave errors, such as an accident caused due to a decision taken by an autonomous vehicle, especially given the reduced personal responsibility of drivers.

"It is going to be extremely difficult to make challenging a decision by AI in recruitment - when you find that you haven't done well in an interview, it's not normal to challenge that decision. It isn't a good place to use it [automated decision making] if you are concerned about the inability to challenge it.'

"If you see a doctor or you see a lawyer, there are mechanisms for redress if something goes wrong. Where does that fit with AI?"

"A bit like we were talking about there with the police using it [facial recognition] – who's going to make sure that they aren't programming it to target a certain group?"

"It's about accountability too. Realistically they [autonomous cars]'re probably more safe but what about when something goes wrong it's high profile. There is a problem about who's responsible? And what is done to prevent it happening again."

"It goes back to the legality of things – what happens if there's an accident [with autonomous cars]? Where are your rights? This is not publicised."

The above points were also thought to apply to the unintended consequences of AI which also weighed on some of the participants' minds. Participants wanted to better understand the ramifications of a mismatch between data and reality and the consequences of AI-powered infrastructure failures.

"If data [from a health monitor] doesn't correspond [to reflect the activity a person has undertaken], it might seem to a medical doctor like something was wrong with you which would be a waste of time."

> *"One thing I was wondering about was...an error or something or say it [AI]'s in control of a hospital power supply and then it crashes."*

3.3.2) Suggestions

Inclusion was foremost in the list of suggestions by workshop participants, especially when asked about their vision for ethical AI in Scotland. Participants maintained that every Scottish person should be able to equally benefit from the opportunities afforded by AI and that this would need to start with equal access - to learn, use, and understand AI.

At the same time, participants cautioned against a standardised approach to tackling the digital divide, recognising instead that different people had different abilities and skills - a point echoed in relation to building skills and knowledge in AI in sub-section 3.1.2.

> *"My vision is that everyone has the skills, access and ability [to use AI] in order to improve their lives."*

> *"My vision would be that people have the opportunity to be educated about it [AI] or to take part or not and everyone has the same level of information about it."*

> *"...Let's not get into AI and be a forwarding thinking country, then think and be 'oh what about people with disabilities'… "I would like to see disabled people in the literature and taking part" To look at how people in society engage in thinking about inequalities and always to think about reducing those inequalities so everyone has a fair chance for engaging. Any Strategy has a moral underpinning but who has a final check on that moral compass? Accessibility, we should make sure that everything is accessible to everyone. Whether disability or across Scotland. A one size fits all [approach] will not work."*

Congruent with the calls for more public engagement observed with respect to skills and knowledge and developing AI, participants expressed a strong desire for more open and honest conversations - as had been carried out during the workshops. The majority of participants saw this as a means for raising awareness on the risks and rights associated with the use of AI and, by extension, a means to help people make more informed decisions. Letting more people have a say was also seen as an avenue to bring a diversity of voices and opinions in the shaping of AI - an aspect strongly tied to inclusion.

"The risks to privacy in this country are probably greater than almost anywhere else in Europe, so from that point of view, I think a wider public discussion about what this means is absolutely needed...a deeper understanding amongst the general public about what the implications for their country may be."

"[My vision for ethical AI in Scotland is to] have a clear message – people will engage with AI if they have enough information to make informed decisions."

Several participants were of the opinion that transparency was crucial to securing the public's trust in AI. Participants wanted to better understand how data is captured, used, stored and shared and for this to be communicated in a simple manner.

"[My vision for ethical AI in Scotland is] making sure that AI is transparent. This is about public trust and making sure they actually know how AI is being implemented and how it is affecting them; ensuring that they know what data about them is being used and how it's being used."

"[The most important thing to consider about AI is] to ensure that we build trust in the public on how it is actually used. We can see it's quite a mysterious thing how they use our data and generate something. It might be nice to know about what's actually going on with that data."

It was also noted that this level of transparency with data would also make it easier to mitigate algorithmic bias by making it easier to identify where bias may have been introduced. To this end, it was suggested that Scottish companies use a badge of trust to differentiate themselves as being users of ethical AI. Disclaimers indicating the use of AI when accessing a product or service were also proposed.

"Most AI is coming in from outside Scotland - how do you differentiate? We could do what you do in business , this could be a USP for Scottish AI come back to the basics and the ethics around that – have an ethical database or badge of trust on your website to indicate there is a social purpose behind it and transparency – we have to brand ourselves as being different and better."

The notion of transparency was not limited to the use of data. Participants maintained that those who make decisions about AI - companies and governments - as well as those who develop policy around it should also be transparent in their approach. With respect to accountability, some participants favoured a code of ethics/conduct to ensure that the Scottish public was appropriately protected against inappropriate usage and algorithmic bias. Other suggestions included regulatory bodies, a database of ethical standards, and related frameworks. Some participants emphasised that, given the complexity of the challenge and the pace at which technology evolves, any proposed regulation needed to be agile and continuously evolving. In a similar vein, it was pointed out that Scotland's legal infrastructure also needed to be improved to keep pace with new developments in AI.

> "[My vision for ethical AI in Scotland is that] I would like to see a standardised code of ethics. Having focus groups to develop guidelines – what we want, what we're against. The financial conduct authority and whistle blowing program introduced something similar for AI for companies to get investigated and whistle-blower rewarded. It comes down to intentions – do we want AI for good?"

A sentiment that was shared by many of the participants was the need to use AI for public good. Although the finer details varied, what was common to this notion was that AI be developed and applied in a manner that benefits all of Scottish society, as reflected in the above section. One suggestion in terms of ensuring no one was left behind was to establish a Strategy with multiple working groups each addressing different aspects of AI but without being too siloed.

> "...A subgroup for how AI is defined and who's looking at equality. A subgroup about how we're working with schools. Subgroup about who's overlooking the moral things. Subgroup about having AI support agencies – e.g. for people who don't know how to access smart TVs. We have computing charities right now, so a bit like that. AI shouldn't be one policy in one department, you need a representative in all areas in policy development...Needs to be across the board."

In keeping with the suggestion on shaping a positive message covered in sub-section 3.1.4. It was also recommended that more attention be paid to the narrative on how AI can benefit everyone in Scotland and not solely technology companies.

3.3.3) Questions to be clarified

The main queries related to ethics and regulatory frameworks revolved around automated decision making. Participants were interested in better understanding how algorithms work and how they arrive at a decision - a point linked to transparency. In a similar vein, another participant questioned whether AI could only make narrow decisions due to technological limitations or whether this is what their use was limited to use by technology companies.

Questions were also raised as to whether there was enough trust amongst the Scottish population to allow AI-automated systems to make decisions that affect society.

3.3.4) Comparison with roundtable discussions:

The roundtable discussions on ethical AI echoed the need for human-centric AI and open access, as noted in the online workshops. The need to update current regulation, such as GDPR, was another parallel. The challenge of keeping people's – staff and patient were explicitly mentioned – data safe and ensuring true anonymity was also raised.

3.4) Data Infrastructure

The main focus of this working group was ensuring that Scotland has the data infrastructure required to support positive and widespread adoption of AI. The below findings have been outlined to fit this scope.

3.4.1) Concerns

In comparison to other aspects, such as education, inclusion, privacy, etc. a smaller number of participants referred to data security and storage as important considerations for AI in Scotland. This is arguably in part due to the technical nature of the topic as well as the varying levels of skills and knowledge amongst participants. Questions were raised along more broader lines on how data was anonymised, secured, and protected in a manner that could keep personal information safe and prevent security breaches, such as hacking. The lack of clarity on where data is stored, by whom, and for how long were other concerns that emerged.

> *"The most important thing to consider about AI, I would say, is the data side of things. Can we keep data secure? What kind of ways can we use to make sure users' data is protected and used in an appropriate way?"*

> *"One of the concerns I have is how long does the data sit there? A couple years or my lifespan? In theory you could keep it for centuries and time will tell. There's not enough conversations around that."*

As observed in each of the above sections, participants invoked the issue of an urban-rural divide in Scotland by noting that there were pockets of places in Scotland outside of the central belt that were forgotten in terms of both transport and telecommunications infrastructure. More specific reservations were raised by participants who exhibited an advanced level of data literacy and skills. These revolved around technicalities such as interoperability and the risk of merging databases. A participant who had prior experience of requesting personal data called attention to the lack of open formats in which personal data is made available. In drawing on their own experience with the NHS, another participant called into question the current procurement models that favour the private

sector.

> "*My experience with working with the private sector and the NHS is that the NHS gives away nearly everything and gets very little back. And that model has to change. So to give you an example, if the NHS wants to develop AI in Armenia, they will apply for a grant most of the time, and private sector will respond to that grant, somebody will win, and then they will develop the AI and then the AI is owned by the private sector and the NHS then has to purchase it back then that model has to go. And then Scotland can be a world leader going out and targeting poorer countries enabling them to get a reduced cost as well but it's that the ethics goes right in the middle of and it's going back to guarding the system and the procurement - how it's done underneath that is really important here.*"

> "*Something that's missing there is infrastructure - IT infrastructure basically. There's a strangle-hold with who has the data and who maintains it. It's a very old clunky industry, looking at my experience...So many storage places and there's private organisations that are working with these and they're doing it in a way that's not for the benefit of society. We need to break away from that.*"

3.4.2) Suggestions

With the COVID-19 pandemic forcing most of society to shift online, several participants emphasised the need to accelerate the digital transformation in Scotland, including in rural areas. Central to this was the idea that each region have access to the same level of capability. This was seen as an opportunity to not only bridge the digital divide but to also gain a competitive advantage in the field and not be left behind as a country.

> "*For it [AI] to be implemented, we need to have an infrastructure across the whole of Scotland including the rural parts.*"

> "*If we don't get on the bus now and have the infrastructure and capability we'll get left behind [other] countries. We have a rich heritage of innovation – let's carry that on.*"

As a concrete first step, one participant recommended boosting Scotland's data centre capacity which trails behind that of Europe. For more information, please see footnote below.

> *"So, I think there's some really pragmatic steps that we can take there...In terms of data centre capacity per capita, we trail the whole of Europe. So, if we're going to become this data centre capital of Europe or the world wherever we need the capacity, we need the data centres and the clusters and the processing and storage."*

Other suggestions touched on the need to develop a more robust data infrastructure that was fit for purpose. This meant protecting privacy and consent by imposing controls over how companies use data and the type of data they are allowed to store - a point reflected in concerns around inappropriate usage covered in the previous section on ethics (sub-section 3.3.1). In a similar vein, one participant recommended focussing on techniques of data security that move away from centralisation and accordingly address the ethics of privacy and consent.

> *"[My vision for ethical AI is] decentralised AI like Bitcoin or something like that where you get rid of the monopoly by big companies, or where the data never leaves your device and the AI is sort of baked into the device itself, which could alleviate a lot of the problems around what happens to my data."*

A broader yet recurring suggestion was that of building trust. It was noted that bad press on security breaches was a cause of concern as it might make people fearful about using technology and AI and one of the ways of countering this was to build a positive narrative around the benefits of AI and compliment it by implementing data security and being transparent about how data was being collected, shared, stored, and used.

> *"The security and data aspect of it is to make sure it's secure so that you're building trust and data is not shared in the wrong way."*

3.4.3) Questions to be clarified

The main queries pertaining to data infrastructure revolved around data sharing. One participant was interested in knowing how information sharing amongst public health agencies, such as FDA and Medicines and Healthcare products Regulatory Agency (MHRA), would change post-Brexit, another wanted to better understand data security when sharing with third parties.

3.4.4) Comparisons to roundtable discussions

Similar to the online workshops, roundtable discussions touched on data centre capacity albeit in more detail. The need to identify national and security infrastructure for Scotland

to potentially support cloud providers based in Scotland was specified. Another parallel with the online workshops was the urgency to upgrade broadband infrastructure as a first step. The need to implement privacy and security infrastructure was also mentioned. Given the expertise of those present during the table discussion, more technical aspects were noted. These included nodal and distribution infrastructures and ISO and zero solutions data formats.

3.5) Joining the dots

This section was understood to mean the bringing together of the above four themes and as such outlines how they are interconnected.

3.5.1) Key themes and how they connect

It is evident from the preceding sections that the challenges and opportunities presented by AI are linked inextricably. In analysing these, several underlying and cross-cutting themes emerge. These include becoming a global leader in ethical AI; bridging the digital divide; developing AI for public good; shaping a positive narrative around AI; and allowing more people to have a say in how AI is shaped and developed. Each of these is discussed separately below.

The notion of Scotland as a global competitor in AI was of particular significance to participants. This was seen as a means of attracting talent and countering unemployment by building new skills in AI. However, it is worthwhile noting that this aspiration was tied to that of ethical AI - of being a centre of excellence for open source, human-centric AI. Participants thought it necessary to combine Scotland's values and heritage together with its talent in industry and academia so as to become a global showcase for ethical AI.

> *"There is a culture here you don't get anywhere else, we need to be a Scottish smart city with heritage."*

> *"AI is coming and fast. In terms of Scotland, we should lead and be an exporter not an importer of AI. We have a valued legal system and the cultural values for AI to be human-centric – to benefit the user at all times. We need to export this to the rest of the world, we do not want to be importing from sources who might not have considered the ethical dimension; that's the imperative – become a showcase, a centre of excellence for the world on what tech for good means and create a future economy of it."*

There was clear recognition that achieving the above ambition as a global leader in AI was in part contingent on the Scottish population having a certain skill level. This was currently hindered by a digital divide. In the 21st century, the digital divide encompasses more than access to technology: it is also the divide between those who use digital technologies to improve their lives and those who do not. Workshop findings reveal the presence of a conspicuous urban-rural digital divide in Scotland. Without access to essential data

infrastructure, people in rural pockets of Scotland do not have the capability to participate in, or contribute to, a digital society. This in turn can adversely affect their prospects of gaining digital skills and undertaking jobs in the technology industry, thereby leaving them ill-prepared for a future of AI and automation.

> *"There are countries ahead of us and we don't want to get left behind – with no infrastructure it's not going to happen. Living in a rural area, the information is not there. Broadband and electricity meters need to be established first and coming back to education, social skills are good but anything about AI they [people in rural areas] don't understand. They need education to use AI so that they don't feel left behind, and people aren't discriminated against."*

The link between digital exclusion and social exclusion was also discernible. Whereas cost was cited as a barrier for economically marginalised groups, attention was drawn to the design barriers that other groups, such as those with disabilities, face when accessing digital and AI-enabled products and services. Unless efforts are coordinated to foster social and economic equality as part of the AI Strategy, there is a real risk of vulnerable groups being left behind.

> *"AI/tech tends to be mainstream and disabled people are an afterthought."*

It was suggested that one of the means of ensuring digital inclusion was to develop AI through an ethos of public good. Participants were unanimous in their belief that the advantages of AI should benefit all of Scottish society, including low income and ethnic minority groups. This was also apparent from the safeguards they felt needed to be put into place to protect those sections of the population vulnerable to algorithmic bias and discrimination.

> *"We shouldn't look for profit or cost, but we should look for how this benefits the whole of society. If AI starts to reduce police on the streets, then this isn't a good thing. We should be looking at how AI can enhance our quality of life. That should be our focus."*

> *"I think we need to focus on the good but be mindful of the harms. Try to make sure that the kind of projects or solutions that Scotland invests in are for the good of all citizens of Scotland and not just the few. Particular groups can be discriminated through bias – certain minority groups can be adversely impacted and I think this needs to be top consideration for an ethical AI Strategy."*

While the need to attract technology companies – and hence grow as a technology hub – was recognised, there was widespread agreement that the manner in which these companies operate should not leave the data of Scottish citizens exposed to inappropriate usage - also an important consideration with respect to the idea of public good and not private gain.

> *"I can be an optimist only if there are legislations in place to mitigate the power that [big technology] companies have."*

Participants highlighted the need to align several priorities to ensure that Scottish people stand most to gain from AI. These included industry and academia working together so that companies are incentivising employees to learn new skills and provide retraining programmes for people at risk of losing their jobs to automation; schools investing in a new curriculum; and more widespread practice that does not ignore smaller Scottish technology companies. Trust was mentioned as being integral to the implementation of technology for public good. The shaping of a positive narrative was thought to be instrumental in building trust amongst the Scottish public in AI. Emphasis was placed on education and awareness, including on the benefits of AI. To this end, clear, relatable communication - including through the sharing of best practices - was deemed a good first step in helping break down misconceptions about AI and helping people understand - and consequently adopt - AI-enabled applications. It is important to note that the notion of trust was seen to be applicable to those who develop it as well as those who utilise it as part of their products and services.

> *"AI has to have a symbiotic relationship with society, to be slowly adopted. The purpose should always be for the betterment of society. Not just a cost benefit. We need a balance. We need to be showcasing what you can achieve with it and remove the stigma, so we embrace it positively."*

"In the past I've been quite pessimistic [about AI] but I'm starting to change my mind… there's a human future there and it's starting to tap into human capability, making connections to new ways of working, that's what we need to tap in to. There's a big job in terms of selling that to the wider population. My gut feeling is that the wider public will fall on the pessimistic side. If we can educate people on what the human future looks like, that's something to leverage."

"Communication and education are really important, we need to earn the public's trust with these types of technologies - the cards [on the jamboards] describe quite well how to go about it. Make more people aware of the benefits of tech. There is good work going on in the education space with programmes to upskill people...hopefully this is part of our communities so we can diversify people that work in these areas or at least participate in focus groups or whatever to shape Strategy."

The opportunity to participate in the shaping of the AI Strategy was especially appreciated - and therefore strongly recommended - by participants. Allowing more people in Scotland to have a say was regarded as a means of sourcing ideas, sharing thoughts and perspectives, and feeling more positive about AI. Participants therefore called for more public engagement to be carried out so as to feed a greater variety of lived experiences into the AI Strategy. At the same time, they recommended that the nature of this engagement be open and honest, akin to the manner they had experienced during the workshops.

"Engagement is key. We're talking about everybody's interests here instead of focussed and narrow views – think of it as a more democratic and social purpose rather than commercial, with equality of access and benefits targeting a wider range of people. Another key word is transparency – we need to know what's behind it and its motives. AI is nebulous, it hides in the background, we're not sure what feeds into it and what comes out of it. We need to be honest about that.

"Before this [workshop] I would be fearful about AI, but this has been replaced with positivity."

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4) Post-workshop feedback

Participants were overwhelmingly positive about the value they derived from participating in the workshops. Based on the evaluation feedback received, the opportunity to hear different opinions and perspectives and gain new insights, and learn from one another, was particularly appreciated. Satisfaction was expressed at the quality of facilitation, workshop format and group sizes (3-4 people), the blend of presentations and discussions, and the opportunity to share one's views. Whilst acknowledging the limitations of online formats, a handful of participants suggested having slightly larger group sizes and longer discussion times. There was clear appreciation overall of being involved in the development of the AI Strategy and regular future updates were indicated as being welcome. Participants felt strongly about the need to continue the conversation on AI and encouraged the holding of more such public events and workshops.

"This was a very interesting and worthwhile event. Good cross section of attendees from across society."

"A fantastic workshop for a very worth-while cause. AI is here and will grow, there will need to be a lot of debates on how best to use it."

"I found it very interesting and liked hearing other people's point of view, making me reconsider my own thinking on certain issues and highlighting issues I hadn't thought of at all. Thanks"

"I found the session really interesting and I really appreciate the effort that has gone into the workshop to allow people in Scotland to build awareness and share their views on AI. It was also hugely appreciated that my stepson could join us and participate remotely. I left feeling really energized and optimistic about AI and its place in the future of Scotland. Thanks for involving us and I look forward to hearing more about the Strategy."

"Wouldn't want this to be a standalone event, i.e. being able to continue the discussion."

"I like that I was encouraged to speak, and it felt that I had something to offer."

"Experiences like this are great to learn about Scotland's AI Strategy, it would be very helpful to have occasional talks (monthly?) where ScotAIStrategy speaks about the work it has been doing and the direction it is going to further keep us informed."

"This is how all strategies should be developed, with greater participation of a wider group of people."

Appendix 1: Participants and recruitment

There were two routes for people to participate in the workshops – either as part of a family group (with 'family' defined in the widest possible sense) or as individuals. The recruitment process aimed to find and select participants with different backgrounds and experience. It is important to note that this was not intended to be a representative sample involving random selection, as this was beyond the scope and budget for the project.

We started by issuing an open call. The open call was circulated through existing local and civil society networks and via social media (including paid advertising). Local groups and organisations were directly contacted (via email or phone) to inform them of the call for participants and with a request to share with their networks. While we experienced a high level of interest and support from these groups before COVID-19 restrictions were put in place, we found it hard to re-connect while civic society and public sector organisations were closed or had reprioritised emergency action. This is why we prioritised applicants that had already expressed interest (via the website) for the in-person workshops and then identified groups that were not represented.

The data provided in the expression of interest form was used to select participants and to ensure a broad mix of demographics. Applicants that were not selected were sent information about alternative ways in which they could engage with the Strategy process, including the online consultation and quiz. In total, we received 90 expressions of interest for the online workshops from family groups and individuals. Some applicants were not invited as we prioritised participants living in Scotland, or because the expressions were received after we had allocated the workshop spaces.

Participant demographics

A total of 49 people participated in the family and individual workshops from a target of between 45-50 participants. This number does not include six cancellations and no shows. Below, we provide a breakdown of participants based on their supplied demographic information. A small number of participants declined to provide a full profile.

Age	
12-17	4
18-24	5
25-34	7
35-44	10
45-54	8
55-64	9
Unknown	6
Gender	
Men	28
Women	19
Unknown	2
Ethnicity	
01 White Scottish	37
02 Other White British	6
07 Mixed or multiple ethnic group	1
08 Pakistani, Pakistani Scottish or Pakistani British	1
09 Indian, Indian Scottish or Indian British	1
13 African, African Scottish or African British	1
Unknown	2
Highest level of education	
First degree	6
Highers, GCSE, O Level	2
HND, HNC, Vocational qualifications	3
Postgraduate degree (Masters, PhD, EngD)	8
Unknown	30
Employment status	
Employee, part-time or full-time	10
Long-term sick or disabled	2
Self-employed	5
Unemployed	1
Unknown	31

Table 1. Demographic breakdown of workshop participants

Notes and reflections

- The workshops brought together a mix of ages and demographics
- Notably, designing our workshops for families meant that we had more participation from young people, with the youngest participant aged 12.
- Over 65s were not represented in our workshops, although we had issued invitations to people in this age group who had expressed an interest in participating. Our networked approach, whereby we contacted groups that work with this age group, did not boost participation. This could arguably be due to a lack of digital skills, access, or confidence in participating in online forums – a challenge linked to UK's digital divide wherein adults over 65 make up for the largest

proportion of adult internet non-users.[3] This trend of digital exclusion is also observed in Scotland.[4] We therefore believe that any future engagement will need to adopt an alternative, potentially hybrid online-offline, approach to engaging with this age group.

- A slight skew was observed with respect to gender balance. We had not requested full demographic information in advance of each family workshop to allow flexibility, which was the main reason for the imbalance. Additionally, the majority of cancellations or no shows were women. We invited more women to our workshops, and in our individual workshops the gender balance was mostly split with 13 women and 14 men.

- We had an overrepresentation of participants from ethnic minority groups (8% vs national average of 4%), which we felt was reasonable when considering the key issues around racial bias in AI and the importance of amplifying the voices of people disproportionately affected.

- We found that a handful of participants were already engaged in thinking about or discussing AI through work in tech and related fields. In at least two cases they had instigated the participation of their families in workshops, though the families came with a mixed level of interest in AI and, as we found to be the case across the workshops, it was the first time they had discussed the subject as a family.

Geographic distribution

- The majority of participants were from the central belt, with 15 from Edinburgh and four participants from Glasgow.

- At the same time, participants from rural areas were also present: Three from Highlands, two from Scottish Borders, and one from Aberdeenshire.

- It must be noted that participants from family workshops mostly came from the same household and area in Scotland, and this affected getting a wider area demographic spread i.e. if a family was from Edinburgh, this meant we would have 4-5 participants from Edinburgh. However, notably where you see one participant from an area, these are more likely to be individuals joining as part of a group, and there is therefore more spread across these areas.

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[3] See:
https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04

[4] See: https://digit.fyi/report-finds-digital-exclusion-is-still-a-huge-issue-in-scotland/
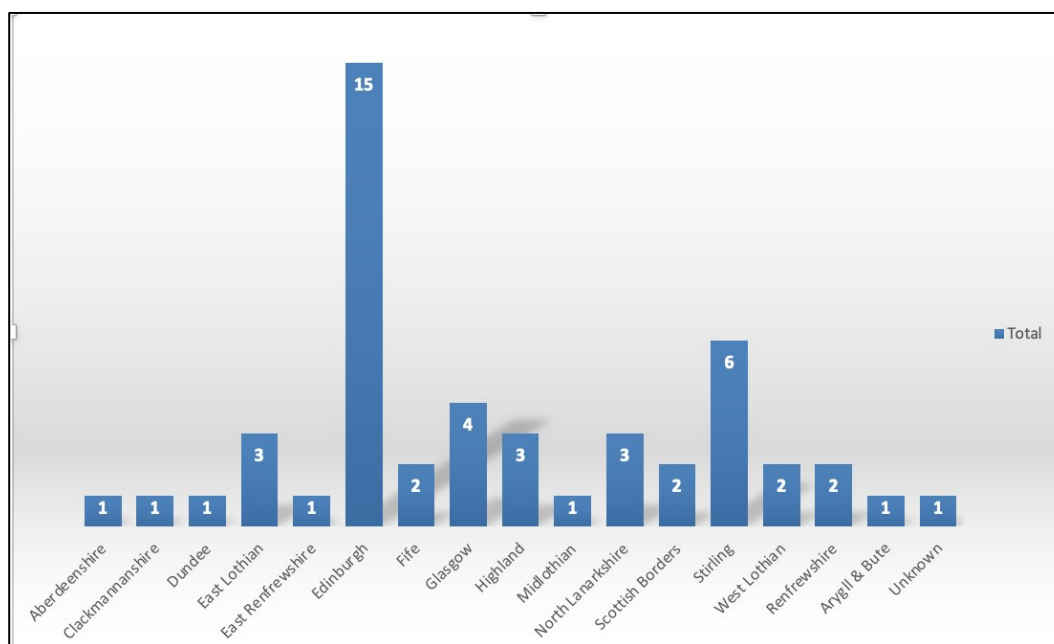
Fig.1: Geographic distribution of workshop participants

Appendix 2: Workshop design

We facilitated 15 family and individual 2-hour workshops between the 10th June and 1st July. Each workshop involved small groups of either family units or individuals as part of a group, typically between 3-5 people. We chose small group sizes to enable each person to have the space and time to contribute meaningfully to the discussion on AI.

Recognising the need for flexibility, we allowed participants to choose a time and date that suited them from a range of options, using Calendly and Appointlet for scheduling. Participants also had the option to request digital support and we could provide this 1:1 via phone and email. Each workshop had one facilitator and one note-taker. The facilitator focused on participant inclusion and wellbeing and to ensure equity of voice. The note-taker ensured that data was collected and could be coded and analysed quickly.

Before the workshop

In advance of each workshop we posted or emailed a pack of materials and pre-workshop information, including background information on AI and AI in Scotland, details about data and consent, to all participants.
The tools we used for the sessions were:
- Zoom (or Whereby, if Zoom was not appropriate for some)
- Google Jamboards
- Screen-sharing videos and slides

After the workshop

We emailed each participant with a final survey asking questions including
- *Is there anything else you would like to add about AI and the future of Scotland?*

- *Do you have any comments about the event? Or ideas about how this could be improved?*

For family members who didn't sign-up on behalf of the family, we also asked for their demographic information, along with providing further information in an email, covering where they can learn more about the Strategy and the working groups; quizzes; activity packs; and video links shared during the workshops. After participants had completed their final survey's we would send out a cash or voucher thank you.

Workshop format: Future of Work

The questions we posed during our workshops were shaped to accommodate a range of views, abilities, and understanding on AI and AI in Scotland. We anticipated a self-selection bias within those who chose to participate, but were also mindful of those who may be as uncomfortable discussing the topic. This meant our questions had to come from a place of universal understanding. We also wanted to ensure the questions we asked were broad enough to allow people to express their views and ideas freely, but focussed enough to stay on topic and glean participants' hopes, aspirations, and concerns around AI. Below is the format we adopted during the workshop on future of work.

Section	Purpose	Flow
Welcome and introductions	Welcome participants and check consent.	- Introduction to the workshop, the facilitator, note-taker and participants - Data consent check - Tools introduction - Conversation guidelines
Questions: - Did you receive the information, and manage to do the pre-reading? - Do they agree to the privacy policy? (sent in advance). We record verbal consent at this point, but also check continued consent in the final survey.		
Icebreaker	https://www.masswerk.at/eliza/ https://www.pandorabots.com/mitsuku/	(*questions and/or showcase of chatbots*) - Introduction to two chatbots - Participants share reflections on technology
Questions: - What is one thing about technology you are excited about? - What is one thing about technology that scares you?		
An overview of the strategy for Scotland	Introduce participants to the AI strategy and explain the purpose of the public engagement.	- Introductory video - Participant reflection and discussion
Questions: What was interesting, or new to you? (*after introductory video*)		

| Intro to AI and AI in Scotland | Basic introduction to AI and exploration of participants understanding and current views of AI. | • How is AI used? An video introduction to AI https://www.scotlandaistrategy.com/video-gallery/what-is-ai-the-royal-society
• An explanation of the 4 main types of AI (*visual perception, natural language processing, robotics and machine learning*) including some AI application examples that people could relate to
• Participant reflection and discussion |

Questions:

- Were any of these examples familiar? Can you think of your own examples of AI? (*after 4 main types of AI explainer*)
- In this last section, did you learn anything new? What was most interesting to you, and you would like to know more about?
- **Considering what you've learned - what do you think is the most important thing to consider about AI, and how it will impact life in Scotland?**

Fig. 2: AI Workshop Question Example on Jamboard

| Break | | |

| Intro to AI and the future of work | video and discussion on the future of work | • Future of work video and discussion [link] |

Questions:

- Having heard what Anthony said, are you an optimist or pessimist about the future of work, and why? (after playing video on future of work)

| Job Scenarios: *warehouse worker, bus driver and teacher* | Participants to consider challenges and opportunities for AI based on real-life scenarios of jobs that could be replaced, displaced or created by AI | • Jobs scenarios presentation
• Challenge & opportunity card activity & discussions |
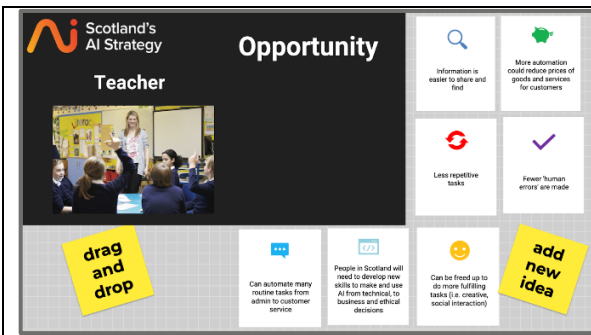
Fig. 3: Jobs Scenario Opportunities Card
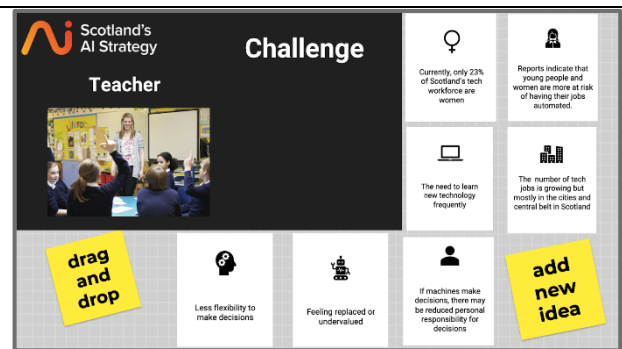
Fig. 4: Jobs scenario Challenge Card

Questions:
- What do you think is the biggest challenge, and the biggest opportunity, for the people in those jobs? Pick the biggest challenge and the biggest opportunity (*For warehouse worker, bus driver and teacher job scenarios*)
- *Note taker presents summary of what participants have said*. Do you have anything else to add to the summary? Is that a fair reflection of the conversation?

An expert opinion on the future of work	To summarise this section, we provided a short expert opinion statement from David Bell.	Experts opinion explainer from David Bell, an academic from University of Stirling with a specialisation in Economics
Break		
A vision for AI in Scotland and the future of work	Participants to reflect on everything they know and have learned, and to share their vision for AI in Scotland and the future of work.	<u>Question:</u> What's your vision for AI in Scotland and the future of work?
Building the skills and sharing the benefits	Participants to reflect on their vision and how Scotland can ensure we build the skills and share benefits.	<u>Question:</u> How might we make sure no-one left behind and Scotland has the right skills and support for the future of work?
Key point summary from the notetaker	Opportunity for participants to check that we have accurately captured their key points.	• Note taker shares a summary of key points recorded from participants discussion • Participants have an opportunity to add, highlight or amend key points
Wrap up and close		• Information about next steps • Participants thanked for taking part and told about next steps.

Workshop format: Ethics & bias

For this workshop, our aim is to dive deeper into some ethical considerations that people might have for the future of AI in Scotland. To spark this conversation, we delved deeper into some examples of AI that people might be familiar with, such as facial recognition, recruitment, and healthcare and encouraged them to think about how they're currently being used. For this we wanted our participants to consider what rights might be important for people who are subject to the use of AI-enabled services. We used some prompt cards to help them think about the most important ethical challenges for each of these examples.

Section	Purpose	Flow
Welcome and introductions	Welcome participants and check consent.	• Introduction to the workshop, the facilitator, note-taker and participants • Data consent check • Tools introduction • Conversation guidelines
Questions: • Did you receive the information, and manage to do the pre-reading? • Do they agree to the privacy policy? (sent in advance). We record verbal consent at this point, but also check continued consent in the final survey.		
Icebreaker	https://www.masswerk.at/eliza/ https://www.pandorabots.com/mitsuku/	(*questions and/or showcase of chatbots*) • Introduction to two chatbots • Participants share reflections on technology
Questions: • What is one thing about technology you are excited about? • What is one thing about technology that scares you?		
An overview of the strategy for Scotland	Introduce participants to the AI strategy and explain the purpose of the public engagement.	• Introductory video • Participant reflection and discussion
Questions: • What was interesting, or new to you? (*after introductory video*)		
Intro to AI and AI in Scotland	Basic introduction to AI and exploration of participants understanding and current views of AI.	• How is AI used? An video introduction to AI https://www.scotlandaistrategy.com/video-gallery/what-is-ai-the-royal-society • An explanation of the 4 main types of AI (*visual perception, natural language processing, robotics and machine*

		learning) including some AI application examples that people could relate to • Participant reflection and discussion

Questions:
  • Were any of these examples familiar? Can you think of your own examples of AI? (*after 4 main types of AI explainer*)
  • In this last section, did you learn anything new? What was most interesting to you, and you would like to know more about?
  • **Considering what you've learned - what do you think is the most important thing to consider about AI, and how it will impact life in Scotland?**		

Break		
Intro to AI and ethical implications	Video and discussion on the areas of ethical concern	• Ethical implications intro, video and discussion: 3 areas of ethical concern video: https://www.youtube.com/watch?v=1LyacmzB1Og
Question: • What questions does this raise for you? (*after 3 areas of ethical concern video and explanation*)		
Bias in AI explanation before moving onto next section		

Ethical Scenarios: *Facial recognitionl, recruitment and AI in healthcare*	Participants to consider the most important ethical challenges for facial recognition, AI and healthcare and recruitment	• Ethical scenarios presentation
		• Ethical challenges prompt cards and discussion
		  o Police and the use of facial recognition (more information http://afr.south-wales.police.uk/
		  o Recruitment
		  o Healthcare (Dr David Lowe talks about AI in community healthcare https://www.youtube.com/watch?v=YfYcXxwIV4Y)

Fig. 5: Ethical Challenges Prompt Cards: Jamboard

Questions:
- Are you generally comfortable, or uncomfortable with facial recognition by the police in this example? What do you think are the most important ethical challenges here? You can use the cards as a guide or come up with your own.
- Are you generally comfortable, or uncomfortable with recruitment in this example? What do you think are the most important ethical challenges? You can use the cards as a guide.
- Are you generally comfortable, or uncomfortable with AI in Healthcare in this example? What do you think are the most important ethical challenges? You can use the cards as a guide.
- *Note taker presents summary of what participants have said*. Do you have anything else to add to the summary? Is that a fair reflection of the conversation?

Break		
A vision for ethical AI in Scotland	Participants to reflect on everything they know and have learned, and to share their vision for ethical AI in Scotland.	Question: What is your vision for ethical AI in Scotland?
Steps for reaching this vision	Participants to reflect on their vision and consider what steps Scotland might need take to reach their visions using the prompt cards if they choose.	Question: What steps might we take in Scotland to reach this vision?

Fig. 6: Ethical AI Prompt Vision Cards: Jamboard

Key point summary from the notetaker	Opportunity for participants to check that we have accurately captured their key points.	• Note taker shares a summary of key points recorded from participants discussion • Participants have an opportunity to add, highlight or amend key points
Wrap up and close		• Information about next steps • Participants thanked for taking part and told about next steps.

Appendix 3: In-person roundtable discussions, Inverness

We held two in person round table sessions in Inverness in January 2020 together with The Data Lab, primarily focussed on engaging rural business, civic industry and networks on the AI Strategy and exploring rural priorities. Although these events were targeted at people from rural pockets with an interest and expertise in technology, we wanted to know more about their thoughts on any future public engagement for an AI Strategy as well as the themes of the different working groups. We also gathered some public engagement take-aways from these sessions, with the key ones being the necessity for greater, more in-depth knowledge, understanding, and awareness of AI; the removal of jargon and the need to "make it real" for people; the use of case-studies; and the framing of a positive – or, at the very least, neutral – narrative so as to avoid the story of AI being told from a fear-mongering or negative perspective. It was emphasised that, for people to adopt AI, it would be important for them to relate to it. Other points raised as part of these discussions have been briefly compared with the main findings from the workshop at the end of each of the individual working group sections in the main sub-sections above. These public engagement take-aways helped us shape what we did next. We made adjustments to our content to accommodate for varying levels of awareness on AI and technology. We avoided jargon and technical terms, such as 'algorithms' and, if used, we would use a simple explanation to convey what it meant. We ensured our materials and workshop design provided a balanced view on AI. To this end, we shared and used real-life case-studies and scenarios to help engage people and make it more relatable for them to get into meaningful discussions.
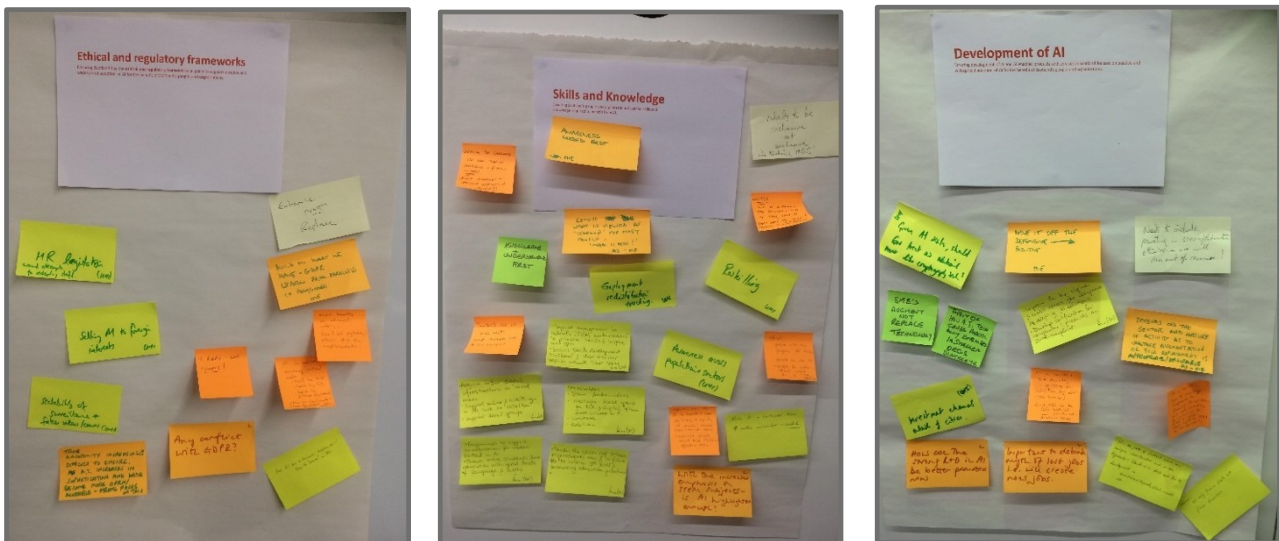
Fig. 7: Post-its captured from Inverness discussions

Appendix 4: Quizzes, conversation packs, video resources, and workshop packs

Quizzes

To tackle some of these barriers of time, place and access, and to inform the development of the AI Strategy for Scotland, we created some online materials and resources with the aim to reach across a wider spread of Scotland.

Fig. 8: Explainer on AI

These included a series of online public quizzes[5] on topics of public interest including AI Basics, Autonomous Vehicles, Facial Recognition, Equality & Bias, AI and the Future of Work, and AI and Healthcare. They are designed to help people learn more about AI and feed in their thoughts to the Strategy development process.

A sentiment analysis from the responses to the quizzes has been carried out by The Data Lab. It is important to note, however, that the sample sizes were considered too small too effectively extrapolate the results. At the same time, certain parallels are apparent between the summary findings from our online workshop and the quiz responses, with the biggest one being the need to address equality and bias in Scotland's AI Strategy – a key concern raised by workshop participants.

A noteworthy divergence of opinions is seen in the case of people's vision for AI. The quiz responses indicate that morality is an important element consideration whereas this is an aspect that only appeared tangentially, if at all, in discussions on healthcare. One reason for this could be the match and search parameters used by The Data Lab's algorithm during the sentiment analysis.

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[5] See: https://www.scotlandaistrategy.com/get-involved

In responding to the values that they would like to see associated with AI, transparency and honesty were at the top of the list, echoing a similar suggestion that arose during the online workshops.
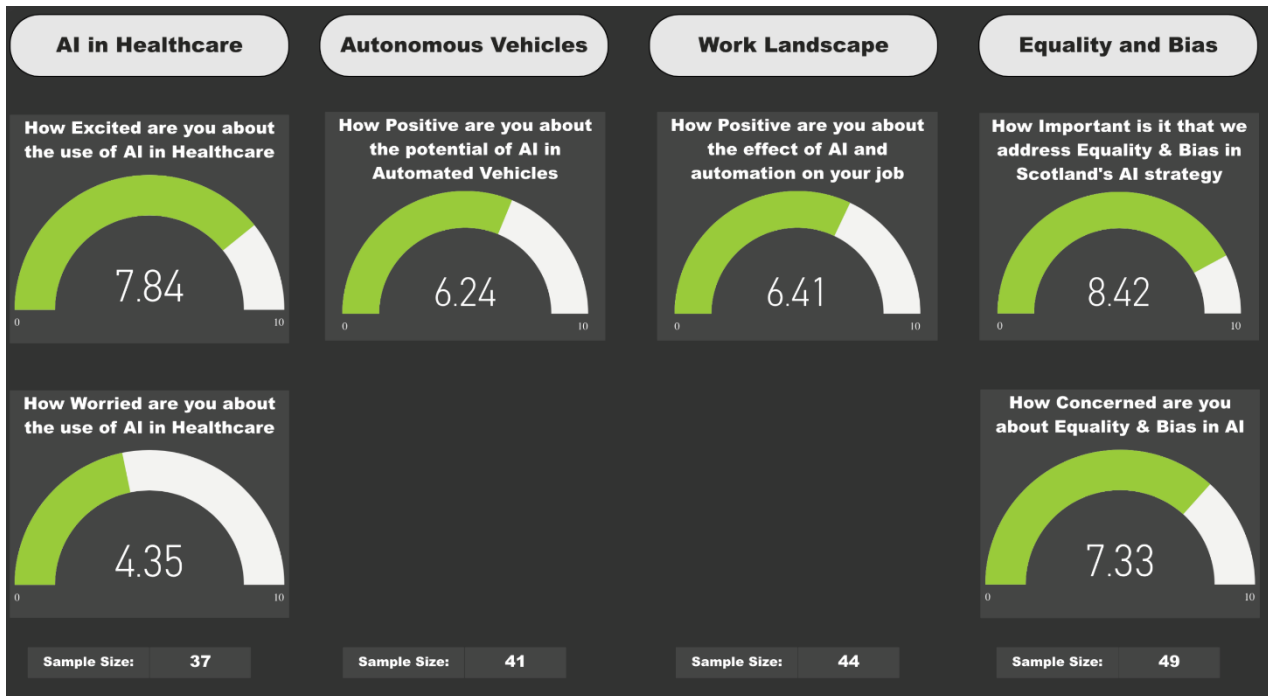
Fig. 9: Analysis of quiz responses on AI in Healthcare, Autonomous vehicles, Work landscape, and Equality and bias
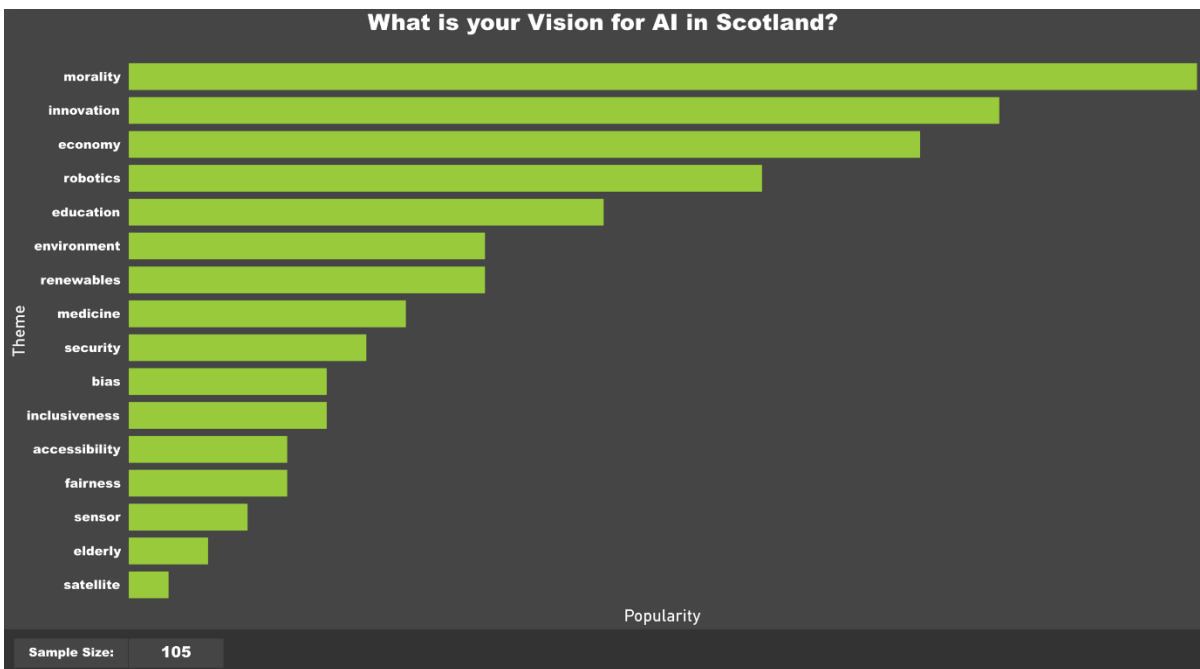

Fig. 10: Analysis of quiz response to question of vision for AI in Scotland
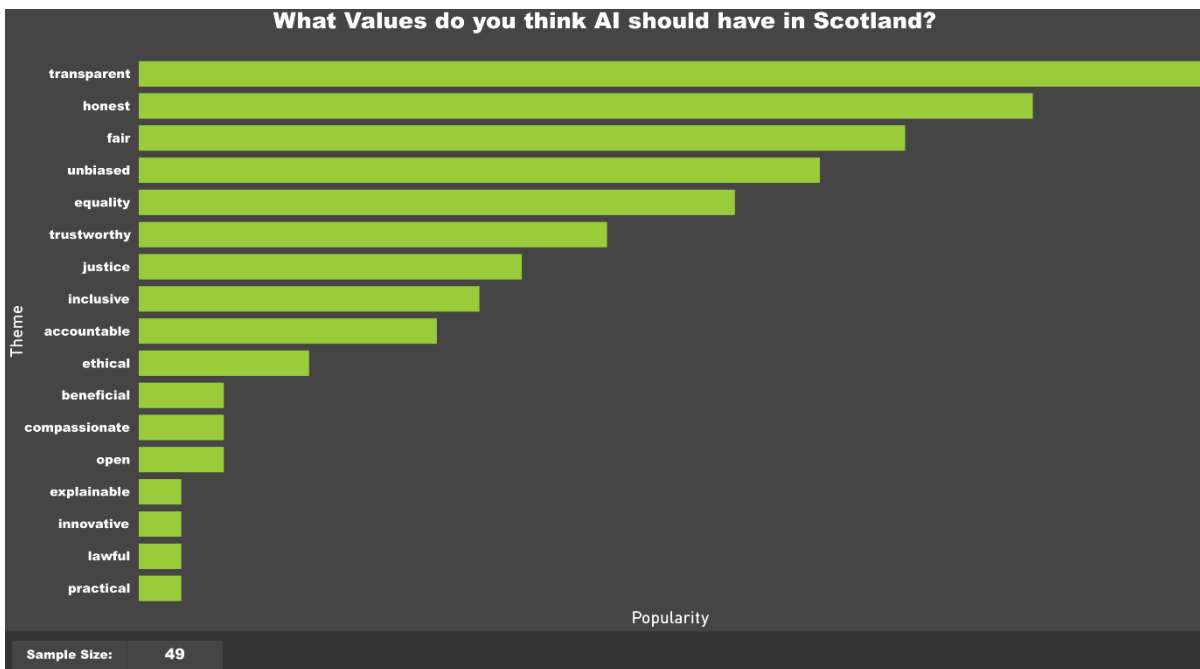
Fig. 11: Analysis of quiz response to question of vision for AI in Scotland

Conversation packs

We also developed conversation packs based on AI, where people could host their own discussions in a time and place that suits them. After an initial review, these were re-shaped and streamlined into one larger information pack with links to the quizzes available on the website[6]

Fig. 12: Conversation packs

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[6] See:
https://static1.squarespace.com/static/5dc00e9e32cd095744be7634/t/5ece99764fbe8b32ae064e55/159059 8008617/AI+and+life+in+Scotland+-+youth+activity+pack+V4.pdf

Video Series

We also developed a series of YouTube videos to provide more information on AI, help answer some key anticipated questions about AI and its role in Scotland[7]. These included interviews with:

- Kate Forbes MSP, Cabinet Secretary for Finance, on why AI in Scotland is important and what the AI Strategy is and some of the myths and challenges that AI brings with it.
- Talat Yaqoob, Director, Equate Scotland on inclusive AI and tech development and becoming a leader in ethical AI.
- Dr David Lowe, Consultant Emergency Medicine, Co-Director EmQuire & Joint Clinical Lead Innovation West of Scotland on AI in community healthcare and AI in hospital care.
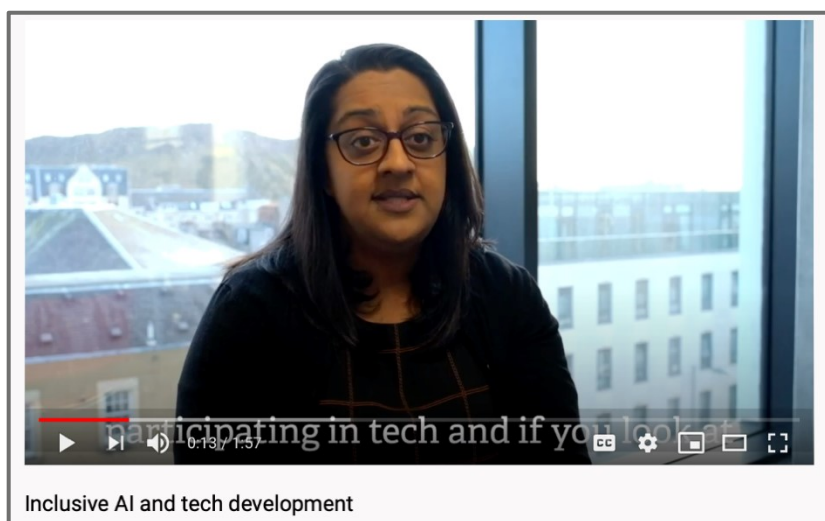

Fig. 13: Talat Yaqoob on inclusive AI and tech development

Workshop packs

For our family workshops, we prepared a 'workshop pack' which included some pre-reading on AI basics, our privacy policy, and information about Scotland's AI Strategy. These were sent in advance to participants' address or addresses if family units lived separately. In addition to the reading material, we also sent challenge and opportunity cards and post-its – to be used during the workshop – together with some sweets. For individual workshops, we sent the same information by email and we also used Google Jamboards as an optional ideas board, where participants could "post" virtual post-its ideas to questions as we went through the workshop. This proved a useful space for generating thoughts and ideas, particularly when some participants wanted extra time to think and write down ideas before expressing themselves. Our approach was guided by the fact that not everyone will have the same understanding of AI. However, in order to ensure that everyone had access to the same information, the same materials were made available to all participants so that everyone could start off on an equal footing.

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[7] See: : https://www.youtube.com/channel/UC2yx61DdsmsRNcshIJ1v_x

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