The Alan Turing Institute

An Introduction to AI

Background material for the Children's AI Summit

What is artificial intelligence?

Artificial intelligence, commonly known as AI, are computer programmes that are used to do lots of different things and they are already a part of many of the technologies we use every day. You might have heard people talking about AI and how AI systems could be useful for doing some tasks that usually only humans would have done.

For instance, translating languages was a task that was once thought to only be possible for humans. In the past, this task required highly skilled people who were fluent in multiple languages and could also understand unique words or accents used by some cultures and groups of people. Now, AI models like Google Translate or DeepL can provide translation in real time. Even though it is not always accurate, it can work pretty well for basic translation if you find yourself in another country!

The term 'intelligence' is slightly misleading, as the system is not thinking for itself, but rather mapping patterns found in data to suggest an answer.

AI technologies need data to work. Data is information that is stored digitally and can include many different types of things such as images, social media posts, or online shopping history. Some data can also be personal. Personal data is data that can be used to identify an individual, like your name, date of birth, health records, phone number, or street address.

Some of the things that AI can do:

Prediction

By processing huge amounts of information (or data) AI programmes are good at finding patterns in data and making predictions about what might happen in the future. For example, AI programmes can be trained to find patterns in data about how many people visit particular shops each month, and could predict which areas will be busy.

Classification

AI systems can be trained to find groups in information and to label things as belonging to different categories. For example, AI systems have been trained to recognise different animals in pictures, so if you showed it an image of cats and dogs it could tell you which ones are cats and which are dogs.

Generation

A form of AI, these types of AI models can be used to generate new content. Generative AI, sometimes known as GenAI, is a type of AI that uses past data to create new outputs. You might have heard of ChatGPT, DALL-E, or Midjourney – these are all examples of GenAI. You can give these tools some form of prompt, or instruction, like 'Tell me a story about a tiger who plays piano' or 'Show me an image of a duck balancing on a tightrope' and the tool will use data it has been trained on to create what you have asked for.

Where can you find AI systems?

AI is present in a lot of the devices you might use, but it might not always be obvious you are interacting with AI. AI can be found in smart speakers, like Alexa and in search engines like Google. AI is also present in platforms like YouTube, where content is recommended to us based on past videos we may have watched.

AI can also be found in computer games, like Roblox, smart toys, social media, and autocorrect programmes on your computer and phone. We are interacting with AI tools more and more on a daily basis.

0-5 years

- Smart toys use AI to adapt and become more personalised while children play with them (for example, interactive teddy bears that remember a child's name and what they like)
- AI is used in apps to create personalised bedtime stories
- Some baby monitors use AI to monitor babies' movements and activity

5-8 years

- AI is used to create interactive elements in games and apps that children play with on devices
- Smart devices in the home (like Alexa) use AI to respond to questions, play music or give information
- Some smart watches use AI to track and monitor children's physical activity

8-12 years

- AI is used on platforms like YouTube to personalise and recommend content for children to watch
- Smartphone apps use AI to personalise games and services and to target adverts based on users' interests
- In school AI may be used to track children's learning
- At home some children might have a virtual tutor which is an AI system that can help with learning by setting tasks, providing feedback and giving encouragement

13-18 years

- AI is used on social media to personalise content and filter the posts people see
- Chatbots (like SnapChat MyAI) use AI to have conversations with users
- AI on platforms like Netflix recommend shows to watch based on previous activity

Examples of AI

AI systems can be used in many different ways and across various parts of our society, from education to medicine to environmental research. For example, AI translation tools can help to expand access to education for students across the globe. Some AI systems can help to provide increased accessibility for individuals with visual or hearing impairments. AI systems can also be used to help students with different ways of learning by developing lessons that are more understandable. In medicine, AI systems are being used to find new medicines to fight diseases.

At Home

- AI is used in smart devices like Alexa, or Google Home
- Streaming services like Netflix use AI to predict what you might be interested in watching and recommend shows or films

At School

- AI can be used to track students' learning – this could help to find out if a child needs extra support, or if they need more challenging work
- Some teachers might use AI to help them come up with new ideas for lesson plans
- AI is used in search engines like Google to answer questions and find information you search for
- AI can be used to turn written text into a spoken voice, which can be really helpful for students who are visually impaired

Online

- On social media platforms AI is used to predict what posts users will be most interested in and to place these posts at the top of their feeds
- Facial recognition technology is a type of AI that is sometimes used for security to access a phone or app
- Chatbots use AI to have conversations with people, sometimes these might be very personalised
- In video games AI is used to make realistic characters and backgrounds

In your care

- AI systems are used to look at medical scans to identify cancer
- AI is used to look at lots of information about different illnesses and find patterns that might improve our understanding of why some people become unwell, or even help researchers find new cures or treatments
- Hospitals and doctor surgeries use AI to arrange appointments and keep track of all the information on their systems

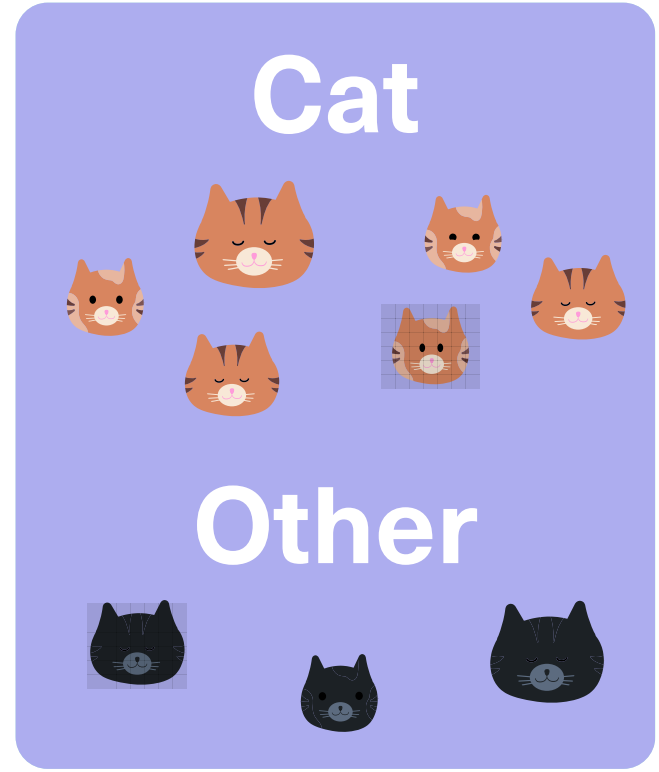
In the environment

- AI is being used to monitor endangered species, for example by recognising different animals or plants in images
- AI can be used to monitor the environment for signs of drought or to predict extreme weather events and flooding

If these systems are not developed with children's needs and interests in mind, they can have negative impacts.

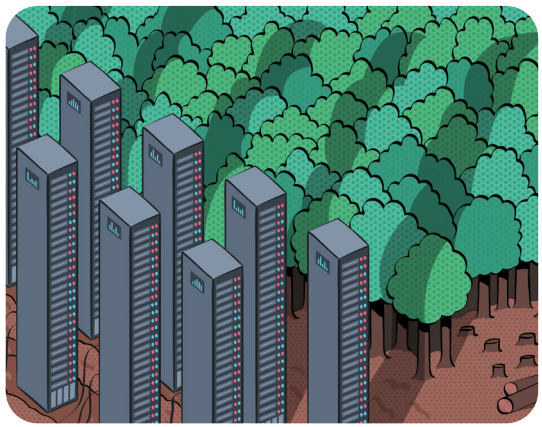
What can go wrong with AI?

While there are many benefits to the use of AI systems, they also have limitations. AI tools are created by humans and they don't always get things right.



Bias

One big problem with some AI systems is bias. Bias means that the systems and their decisions are unfair and work better for some groups compared to others. AI systems can lead to biased or unfair decisions if they are trained on biased data. For example, imagine if we trained an AI tool to recognise images of cats, but we trained it only on images of ginger cats, it might not recognise a black cat as being a cat. Similarly, if a generative AI model was only trained with images of ginger cats whenever you asked it to make an image of a cat they would always be ginger. When AI systems are used in ways that have impacts in our lives, it's really important that they do not contain bias as this could lead to unfair outcomes for different groups of people.



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Environmental Impacts

Depending on the size of the AI system, there can also be harm to the environment. While you don't see it when you interact with an AI system the technology produces carbon emissions. It has been estimated that for every image made using a generative AI model it creates the same carbon emissions as fully charging a mobile phone.

AI systems also use significant amounts of water. That's because the AI models are powered by data centres, which are huge industrial buildings (a bit like a factory). In these data centres big computers are processing the data that makes the AI model work and these get very hot when they are being used so a lot of water is used to cool things down. It has been estimated that for every typical conversation with ChatGPT (a popular generative AI model) the equivalent of a 500ml bottle of water is used.

Transparency

Transparency means that people can have information about what is happening and that nothing is hidden or concealed. This is really important with AI. AI is used in many ways that might impact your life, for example in decisions about your education or healthcare, but it's not always clear how these systems are used or why a particular decision is being made. Sometimes AI systems are using such huge amounts of data that people find it very hard to understand how they make the decisions that they do. That can be a problem when we want an explanation for decisions that affect our lives.

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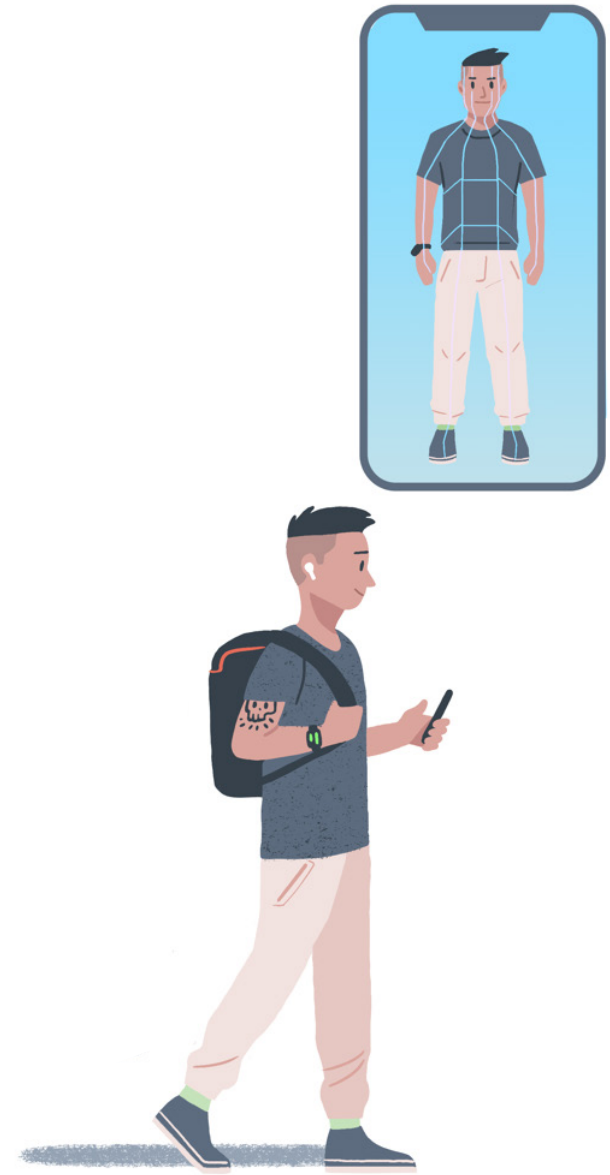
Privacy

When you interact with AI the systems often collect information about you, or about the things you are doing online. It's important to be careful about what information you share online, but because AI needs lots of data to work sometimes these tools might collect more than is necessary, and you might not always know what data about you is being collected or how it is being used.



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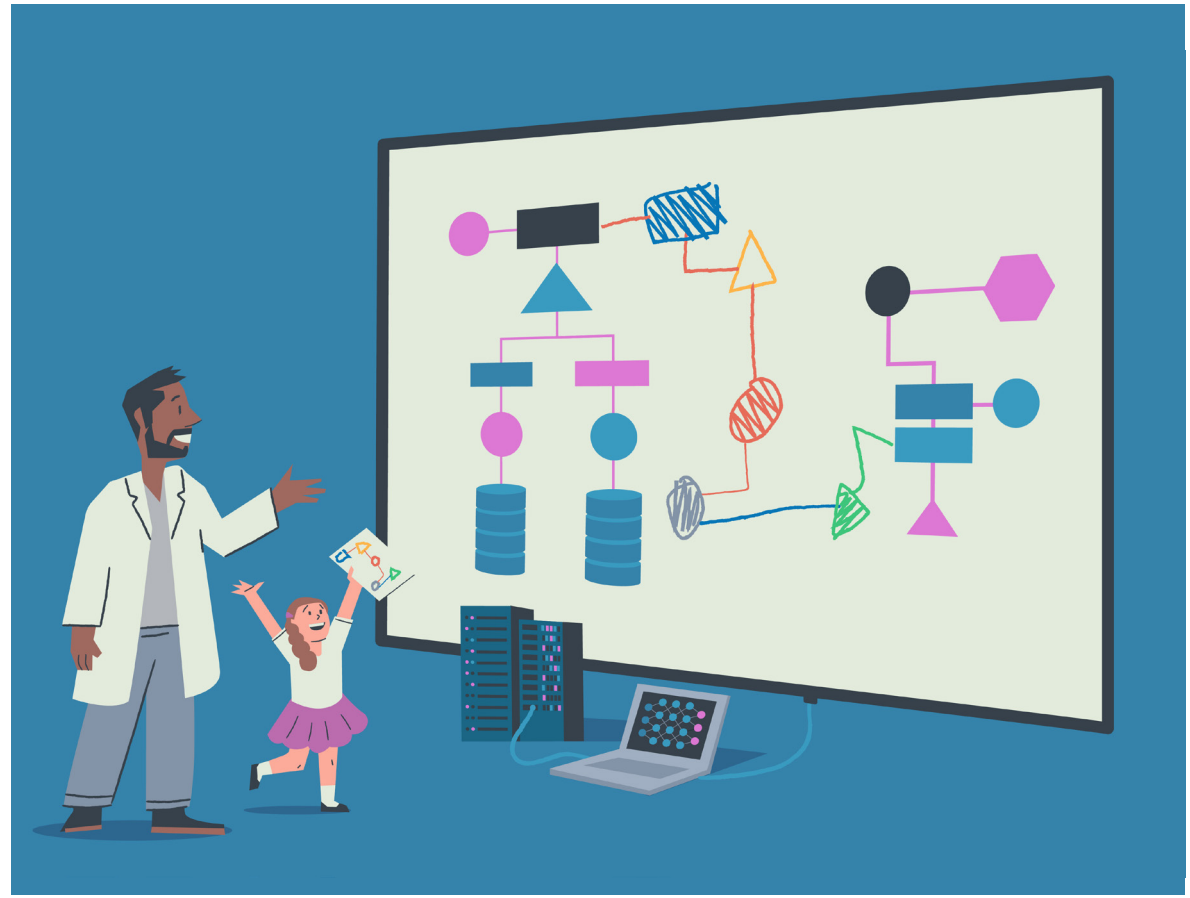
Why your voice matters

Your voice matters because you bring unique and important perspectives that should be not only taken seriously but reflected in the ways that AI is developed in the future. Until now children have mostly not been included in decision-making processes around the ways that AI is developed and used, or around policies and laws about AI. That has to change!

We know that AI is being used in lots of ways that affect children, and that many children are already using AI in their daily lives. Children have particular experiences, as well as particular rights that need to be taken on board in deciding how AI is developed and what policies or laws should be created to make sure AI is safe. That's why we believe children should be involved in discussions about how AI is used now and in the future, and should be included in processes to create policies and laws about AI. So, we want to hear from you! Through the Children's AI Summit we want to put your voices at the heart of AI innovation and policy!



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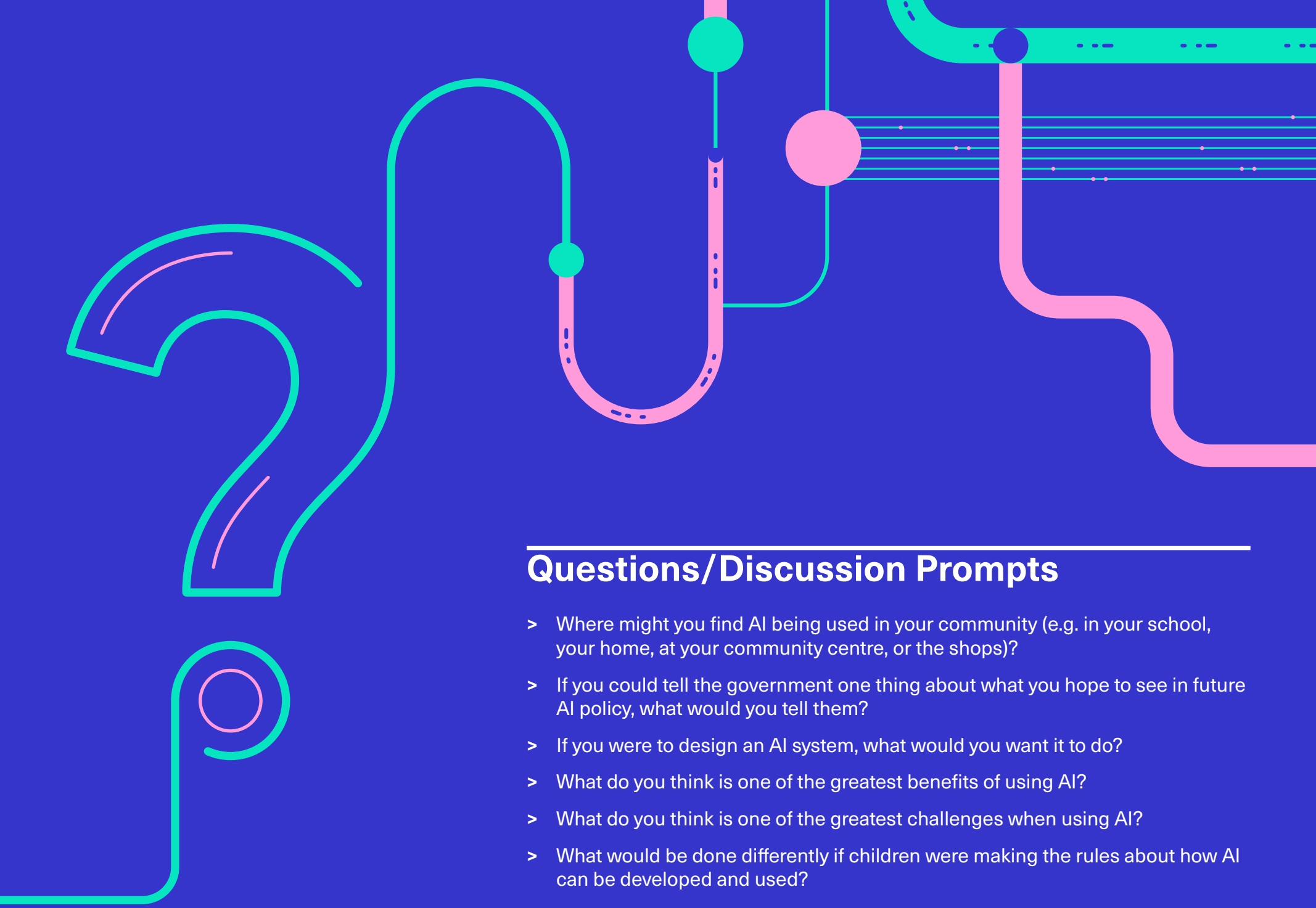

Questions/Discussion Prompts

- Where might you find AI being used in your community (e.g. in your school, your home, at your community centre, or the shops)?
- If you could tell the government one thing about what you hope to see in future AI policy, what would you tell them?
- If you were to design an AI system, what would you want it to do?
- What do you think is one of the greatest benefits of using AI?
- What do you think is one of the greatest challenges when using AI?
- What would be done differently if children were making the rules about how AI can be developed and used?

Additional Resources

For children

- Learn more about how AI systems are trained and have a go at playing **"AI for Oceans"** by Code.org
- Check out UNICEF's **AI Guide for Teens**
- Learn more about the impact of AI on society by watching **this video** by Code.org
- Learn to code at **Code.org**
- Learn with short and easy to understand **videos and lessons** on AI Literacy for Years 7-13 by Common Sense Education

For teachers and parents

- For an introduction to some of the ways you might define the term "Artificial Intelligence", read **this overview** from the Scottish AI Alliance
- For a deep dive introduction to generative AI, with guidance for teaching on this topic, see **this resource** by Better Internet for Kids
- Take a look at UNICEF's **Policy Guidance on AI for Children**
- Explore the Raspberry Pi Foundation's Experience AI **lesson plans and resources** for teachers which introduce key concepts around AI
- Watch TEDx Talk **'AI and Ethics'**, by Toby Walsh
- Explore **practical advice** at Internet Matters, for parents and children of all age groups and an ABC Online Safety Checklist

The Alan Turing Institute

Public Policy Programme
The Alan Turing Institute

Children and AI project

The Alan Turing Institute is headquartered at
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