# Future technology in government: glossary of key technical terms

An evolving, nonexhaustive glossary to accompany the IfG's new project on 'future technology in government'.

For the time being, terms are grouped thematically...which may prove unworkable as the list grows. But we'll roll with it for now.

Please do comment and let us know:

- what you think of these definitions (are they clear and accurate? are they missing vital details?)
- what other terms we should be including (a handful of proposed next additions appear at the end, but we're very much open to suggestions)
- if you've encountered any other useful resources that explain technology for a non-technical audience that we should be looking at / linking to (again, a selection that we've found most useful appear at the bottom)
- anything else that occurs to you :)

Here goes...

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*Artificial intelligence (AI)*

A range of approaches to developing computer systems that can perform tasks normally requiring human intelligence

*Machine learning (ML)*

A popular subdiscipline of AI which involves computers learning how to perform a task from examples and experience, without being explicitly programmed

*Neural network*

A simplified model of the human brain used in some types of machine learning, composed of layers of artificial 'neurons'. Each layer receives an input, its 'neurons' perform computations on that input and pass the results onto the next layer, and the last layer produces a final output (e.g. whether the system believes an image contains a cat or not).

*Deep learning*

A form of machine learning which uses neural networks with many layers to solve particularly complex problems. Each layer becomes sensitive to progressively more abstract

patterns, so early layers may learn to identify the edges of objects in a photo, then the paws of a cat, with later layers building on these lower-level features to identify the cat itself.

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*Data science*

The manipulation and analysis of data to extract information, identify patterns and make predictions, combining elements of statistics and computer science

*Big data*

Data sets that are too large and complex for traditional approaches to handling data, reflecting the increasing availability of data covering almost every aspect of life, but that can be hugely informative if analysed using contemporary data science techniques

*Predictive analytics*

The analysis of data to make predictions about future events, drawing on advances in data science and machine learning. Applications are wide ranging, from forecasting the weather to identifying when and where crimes are likely to be committed (‘predictive policing’).

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*Algorithm*

A set of explicitly stated or learned instructions for performing a task, usually followed by a computer

*Automation*

The application of machines, guided by algorithms, to tasks that would otherwise be performed by a human

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*Drones*

Usually, aircraft without a human pilot onboard that can be controlled remotely by a human or operate autonomously; also known as unmanned aerial vehicles (UAVs)

*Wearables*

Wearable devices such as smartwatches and fitness trackers that typically collect data on the wearer’s activity, as well as providing other functionality

*Internet of Things (IoT)*

The network of physical objects connected to the Internet using embedded electronics, allowing them to collect data, communicate with each other and, in some cases, interact with users

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*Distributed Ledger Technology (DLT)*

An approach to recording transactions (such as exchanges of money or data, or the agreement of contracts) in which the database is shared across, added to and verified by a network of users rather than being controlled centrally

*Blockchain*

A distributed ledger that groups the most recent transactions into a ‘block’ before adding them to the database. Each new block is linked to the ‘chain’ of existing blocks in a way that means a block cannot be altered without having to change every subsequent block in the chain.

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*Virtual Reality*

The use of technology to create simulated, immersive environments for users to experience. These can be general purpose, such as new worlds to explore in gaming, or adapted to specific contexts, such as simulators for training surgeons or pilots

*Augmented Reality*

The addition of digital elements to a user’s experience of the real world, for instance by superimposing images over objects a user can see through their phone camera

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*Cloud*

Computing resources such as data storage that can be accessed remotely and on demand over the Internet, meaning users do not need to maintain their own IT infrastructure

*5G*

The ‘fifth generation’ of mobile networks, yet to be launched in the UK, that will be faster and more reliable than previous networks such as 4G and 3G

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*Proposed next additions*: application programming interface (API), data sharing, cryptocurrency, model, human-computer interaction (HCI)...

Other useful resources:
AI Glossary: Artificial intelligence, in so many words, Matthew Hutson, *Science*

AI in the UK: ready, willing and able?, House of Lords Select Committee on Artificial Intelligence (p.14)
Machine Learning Glossary, Google Developers