Artificial intelligence (AI) is probably the defining technology of the last decade, and perhaps also the next. This report provides an accessible review of how it works, why it matters and what we can do in response to the challenges it raises.

Since the earliest days of AI, its definition has focused on the ability to behave with the appearance of intelligence. Various forms of 'Turing test' declare machines as intelligent when humans cannot differentiate their actions from those of a human. Today's definitions of AI often include other requirements such as autonomy, and allow intelligence to be limited to specific domains. Rather than contributing to the proliferation of definitions, [1] this report adopts that of the 2018 European Commission Communication, [2]which is both accessible and typical of contemporary definitions:

AI refers to systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals.

This definition places no restrictions on the methods that are used to achieve intelligence. Indeed, AI is an umbrella term including a wide range of technologies and applicationsthat have little more in common than their apparent intelligence, a quality which remains very much open to interpretation. Further, we regularly talk about AI that is

already in widespread use alongside AI that is under development, and even AI that is speculated to possibly exist in the future. Consequently, the term 'AI' is regularly used to refer to any technique, used in any context – real or imagined – as long as it is somehow claimed to display features that some describe as intelligent. This inclusivity presents difficulties for assessing the impacts of AI development because, depending on which corner of the vast AI space is being considered, very different benefits and risks can be identified. As a result, AI is simultaneously high risk, low risk and everything in-between.

Since AI refers to so many technologies, applications and contexts, greater precision is required in order to hold a meaningful and constructive debate. For example, arguments about simple 'expert systems' used in advisory roles need to be distinguished those from those concerning complex data driven algorithms that automatically implement decisions about individuals. Similarly, it is important to distinguish arguments about speculative future developments that may never occur from those about current AI that already affects society today.

The aim of this report is to support meaningful reflection and productive debate about AI by providing an accessible review of AI technology, impacts and options. The following chapter aims at demystifying AI, explaining its key approaches, how they

work, their powers and limitations. The
subsequent chapter examines the key opportunities and challenges presented by the application of
these technologies. The penultimate chapter presents a range of options to respond to these
opportunities and challenges via regulatory, technological and societal measures, and a concluding
chapter presents some key messages.