House of Commons

Science and Technology Committee

Robotics and artificial intelligence: Government Response to the Committee's Fifth Report of Session 2016–17

Fifth Special Report of Session 2016–17

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Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Government Office for Science and associated public bodies.

Current membership

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The following were also members of the committee during the parliament:

Nicola Blackwood MP (*Conservative, Oxford West and Abingdon*)

(Chair of the Committee until 19 July 2016)

Liz McInnes MP (*Labour, Heywood and Middleton*)

Valerie Vaz MP (*Labour, Walsall South*)

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Powers

The Committee is one of the departmental select committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No 152. These are available on the internet via www.parliament.uk.

Publication

Committee reports are published on the Committee's website at www.parliament.uk/science and in print by Order of the House.

Evidence relating to this report is published on the relevant inquiry page of the Committee's website.

Committee staff

The current staff of the Committee are: Simon Fiander (Clerk); Marsha David (Second Clerk); Sean Kinsey (Second Clerk); Dr Elizabeth Rough (Committee Specialist); Martin Smith (Committee Specialist); Amy Vistuer (Senior Committee Assistant); Julie Storey (Committee Assistant); and Nick Davies (Media Officer).

Fifth Special Report

On 12 October 2016 we published our Fifth Report of Session 2016–17, Robotics and artificial intelligence [HC 145]. On 20 December 2016 we received the Government's response to the Report, which is appended below.

Appendix: Government response

Introduction

The Government welcomes the Committee's continued interest in robotics and artificial intelligence (AI).

Recommendations

Recommendation 1

The Government should, without further delay, establish a RAS Leadership Council, with membership drawn from across academia, industry and, crucially, the Government. The Leadership Council should work with the Government and the Research Councils to produce a Government-backed 'National RAS Strategy'; one that clearly sets out the Government's ambitions, and financial support, for this 'great technology'. Founding a 'National RAS Institute', or Catapult, should be part of the strategy.

Response:

The Government agrees that Robotics and Autonomous Systems (RAS) is an area that requires improved strategic co-ordination and leadership given its complexity and diversity; and to capitalise on the significant economic opportunities presented by RAS will require close working between government, industry and academia.

The Government acknowledges that there is more that can be done to support the development of RAS in the future. This includes taking a leading role in high growth areas, such as service robotics and robotics in hazardous environments, and supporting greater integration across hardware, software and cross cutting technologies. Furthermore, it will be important to increase the deployment of industrial robots in existing sectors to drive productivity and capture value in new markets and supply chains. To support this activity, the Government is continuing to invest in the Catapult network, including on areas such as autonomous vehicles at the Transport Systems Catapult and manufacturing line technology at the High Value Manufacturing Catapult.

The Prime Minister said in her speech to the CBI on 21 November that at the heart of our Industrial Strategy is the need to build on the UK's world class research base to develop new technologies that have the potential to transform existing industries and create entirely new ones. As part of this, the PM announced that Government will invest an extra £2 billion a year in R&D by the end of this Parliament and that there will be a new Industrial

Strategy Challenge Fund (ISCF) to back priority technologies—such as robotics and AI—where the UK has the potential to turn strengths in research into a global industrial and commercial lead.

As we develop the Industrial Strategy, we will consider the best model of leadership for RAS going forward, working closely with industry and the research base to ensure that we meet emerging needs and requirements. The Government will also review whether a new physical centre, bolstering of existing centres and/or a programme of grant funding is needed to support RAS technologies above and beyond those that already exist.

Recommendation 2

We recommend that a standing Commission on Artificial Intelligence be established, based at the Alan Turing Institute, to examine the social, ethical and legal implications of recent and potential developments in AI. It should focus on establishing principles to govern the development and application of AI techniques, as well as advising the Government of any regulation required on limits to its progression. It will need to be closely coordinated with the work of the Council of Data Ethics which the Government is currently setting up following the recommendation made in our Big Data Dilemma report.

Membership of the Commission should be broad and include those with expertise in law, social science and philosophy, as well as computer scientists, natural scientists, mathematicians and engineers. Members drawn from industry, NGOs and the public, should also be included and a programme of wide ranging public dialogue instituted.

Response:

Government recognises the significant potential implications of Artificial Intelligence for society and the economy. It will be important to address the social, ethical and legal questions, to ensure the development of these technologies fully benefit society and to build confidence in UK developments in the sector.

We note the Committee's recommendation to set up a commission to examine the implications of Artificial Intelligence. The Royal Society is currently examining the implications of Machine Learning, alongside the Royal Society and British Academy work on Data Governance. These projects aim to develop recommendations for data governance arrangements, including ensuring the UK remains a world leader in the use and governance of artificial intelligence. These projects will involve experts from across disciplines, and will look at current and historical case studies of data governance, and of broader technology governance, from a range of countries and sectors. Initial recommendations are expected in early 2017. The Alan Turing Institute is expected to play a key role in this work, together with other leading academics and industries.

Recommendation 3

Digital exclusion has no place in 21st century Britain. As we recommended in our Big Data Dilemma, Digital Skills Crisis, and Satellites and Space reports, the Government must commit to addressing the digital skills crisis through a Digital Strategy, published without delay.

Response:

We are already among the most digitally connected countries in the world with a globally successful digital economy. We engage closely with the digital industries to understand their concerns and priorities, and will continue to do so. We will also continue to work with industry to ensure that our digital and industrial strategies help boost growth and productivity across the country and across the economy, and deliver appropriate protections for the public.

The Government recognises the economic and social value of successful, significant participation in the digital economy for individuals, businesses, and wider society and recognises that this must be achieved through the acquisition of appropriate digital skills. As new technologies emerge and the demands for digital skills change and adapt in response, our workforce needs to keep pace. Government is not complacent and we are working closely with the industry, education and training bodies and charity organisations to reduce key skills gaps and address urgent shortages.

We are taking steps to grow the development of digital skills in schools and throughout the education system—from primary education to Further and Higher Education. In September 2014, we launched the new computing curriculum with a greater emphasis on the computational thinking skills needed by all young people to support the future digital economy. This was supported by £4.5m investment over the last three years to prepare teachers to teach the new curriculum. Bursaries of up to £25,000 are also available to encourage the brightest and best graduates to become computer science teachers.

In November 2015, the Chancellor confirmed funding for the Ada National College for Digital Skills. The College, which welcomed its first cohort of students in September 2016, will have a key role to play in raising teaching excellence and an ambition to reach 5,000 students within five years (with 40% of students being female).

Universities and employers are also collaborating to provide the innovative digital degree apprenticeship, enabling young people to get the mix of technical and professional skills required by the industry. Building on this, we will be taking forward recommendations made in May 2016 within Sir Nigel Shadbolt's report on Computer Science degree courses and graduate employability issues in this area.

The computer science landscape is fast changing and demand for graduates with the right skills is high. We are addressing shortages in some specialist technical IT skills through our £20 million capital funding towards the establishment of the Institute for Coding. The Institute will stimulate innovative collaboration between universities and businesses to drive excellence in the design and delivery of higher level computer science provision. We are also providing funding to support innovative pilots of industry-designed computing science degree conversion courses, predominantly at postgraduate level. A new stream of skilled graduates with high demand skills such as data analytics and cyber security will be available to industry from summer 2017 onwards.

The Government is introducing legislation through the Digital Economy Bill that will create a duty on the Secretary of State for Education to ensure that, where specified digital skills qualifications are made available by providers as part of the publicly-funded adult education offer, they are free of charge to people aged 19 and over who need them, and do not already have a relevant qualification.

The training of industry ready digitally skilled graduates is also provided through support from the Research Council's PhD training programmes, such as the Centres for Doctoral Training (CDTs), Doctoral Training Partnership and collaborative PhD training partnerships with Industry. The Engineering and Physical Science Research Council's centres alone will train over 7,000 students between now and 2020, with many these students equipped with the right skills to tackle industrial challenges through applying novel digital approaches and technologies.

The Government will continue to seek the views of industry experts, specialists and leading organisations to help shape action on digital skills. This approach helped shape the reform of Apprenticeship Standards—ensuring that employers are able to design standards that reflect their needs and those of the wider industry. There are currently 26 sets of standards being developed for digital roles, 13 of which are ready for delivery.

In July 2016 the Government published its post-16 Skills Plan, which sets out our intention that digital will be one of the 15 routes across technical education, and that relevant digital skills will be included in all 15 technical education routes.