Learning by keystrokes

A system that tracks your every mouse click may sound a bit too much like Big Brother – but this personalised software could revolutionise education, writes

Richard Vaughan

Priya Lakhani (left) hopes her team's personalised education software will ease teachers' workload CENTURY TECH

Learning software: Priya Lakhani, founder and CEO of Century Tech

"The machine will track where your mouse moves, how long you take to read something, if you ignore something. It will track if you fast-forward, if you rewind," says Priya Lakhani, staring into a computer screen. "It tracks everything you do."

Lakhani is chief executive of Century Tech, a small start-up based in central London. Speaking from her loft-style office space, squirreled away behind a furniture store, the 35-year-old explains how her software works out how you learn by monitoring everything the user does when interacting with it.

If it sounds a little like Big Brother, that's because it is. But Lakhani believes the machine she and her team have developed will be a gamechanger in education.

The software allows teachers to set assignments or supplement lessons by having pupils work on any topic within a subject of their choosing.

The clever part is that the system adjusts or "adapts" to the level and proficiency of the pupil as they work, setting tougher or easier questions depending on how they answer them.

"Century's entire purpose is to learn how your brain learns," Lakhani says. "If you have been spending a certain amount of time on it, your difficulty levels in terms of what you are learning and all of these different variables, we measure.

"So everything on Century, absolutely everything, is being tracked, and it will change accordingly and personalise to you."

The technology is based on something called "adaptive learning", which has gained a foothold in schools in the US and is quietly, but steadily, creeping into the UK.

The use of machine learning – a type of artificial intelligence – has been growing in the car and financial industries, and even in the health sector, but this is its first real outing in education.

At the heart of the system is an algorithm that records every mouse click, keystroke and moment's delay to better understand if a pupil has grasped a certain concept in any given subject, be it algebra, fractions or the respiratory system.

Century is currently being used in around two dozen schools. At the moment, pupils work on a multiple choice-style set-up; however, in the coming weeks, the machine will be able to read essays
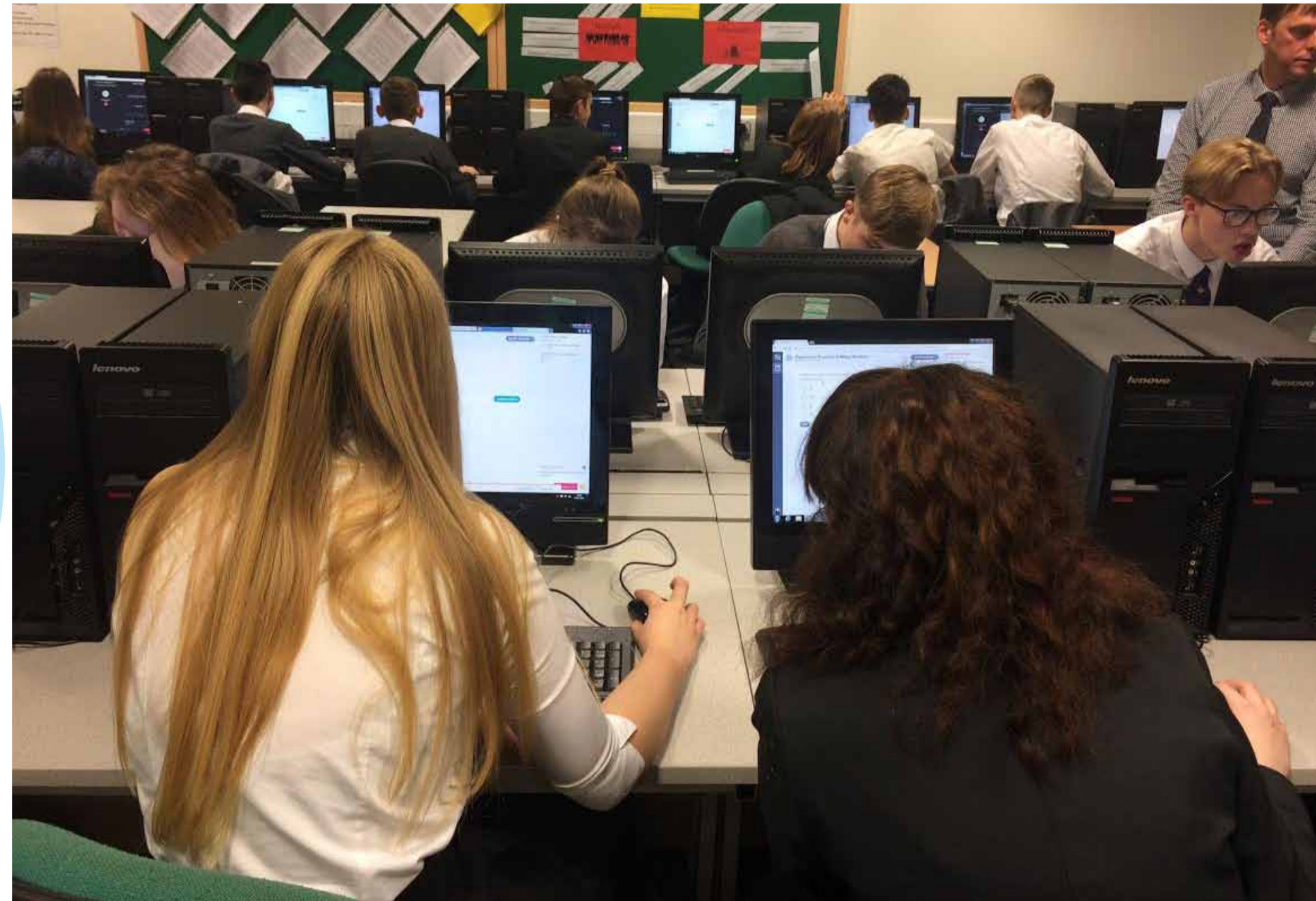
and other longer-form answers. But what makes this software a potential "gamechanger" is that the data is not only used to inform the algorithm, but all of the information is crunched, processed and fed back to the teacher in real time, to let them know which pupils are struggling and which are racing ahead.

"We can show all the data from their students – shortest and longest study time, highest and lowest rank," Lakhani says. "We found that if some teachers want more data than that, we can show how many questions each pupil answered, how many attempts did they make to get it right, how long did it take them.

"You can then see what the students' strengths are, their weaknesses, what the teacher wants to challenge the student on and what their focus should be."

According to Lakhani, Century's aim is to "supercharge" teachers – to give them powers that previously would have been entirely beyond their capacity without the technology. Such powers can often be a real eye-opener for them, however.

"We can show a student's effort level," Lakhani says. "We had one

teacher gasp when then they saw that a pupil of theirs had made more effort than anyone else out of the entire school of more than 1,400 children.

"The teacher had been calling them lazy for three years."

The pupil was bottom of the maths set and had been repeatedly taking the same questions in an effort to get to grips with a topic.

"This student was, on average, trying every question four-and-a-half times," Lakhani adds. "That shows a huge amount of determination."

One of the biggest challenges facing any teacher in a class of 30 or more children is trying to cater for each of their different learning needs – what teachers call "differentiation". How to stretch the brighter children, while making sure those who are struggling to grasp something are not left behind, is a fundamental problem facing every educator.

But with technology like Century, students can be set tasks on the computer and the machine will adjust to be more challenging for those that need it, while setting simpler assignments for those who take longer to understand certain concepts.

Thomas Harrison, head of maths at The North School, an academy in Kent, has been trialling the system and is already seeing how adaptive learning

software could seriously lighten teachers' workload.

He has been seeing the greatest benefits when using the program to set homework – although his students might not be quite so embracing of the new technological dawn.

"It instantly cuts out marking homework – I can just log on to the system and see how the students have done. It then helps me with planning my next lesson – where to go with the topic and who to focus my efforts on," he says.

"It also means there can be no more excuses. I can see if a student has just flicked it on for a minute, then turned it off again, or if they've not tried to answer any questions. They can't say their dog has eaten it, either."

There are legitimate concerns about software tracking and storing data on young people on a daily basis. But Harrison says that, although he understands the fears around data protection, the information captured is no more sensitive than what he would have gleaned from his teaching.

And could he one day see such systems taking over from teachers? Harrison dismisses the idea out of hand.

"The teacher will always be the most important person in the classroom, so software like this is not going to replace us – it just supplements us," he says.

The data not only informs the algorithm but is fed back to teachers in real time

The adaptive market

The market for adaptive learning is already one that is growing. Perhaps the biggest player in the industry is Knewton, a Silicon Valley-backed company that now has offices all over the world.

For Knewton, the application of adaptive learning goes a great deal further than the classroom. The US company believes that the data captured by the software and the profile it creates of each individual can be used as a CV or passport of their achievements to avoid them having to repeat something they have already learnt.

"Our aim now is to build complex learner profiles that will show if you have completed a certain course," says Lucas Moffitt, Knewton's director of education solutions. "It means schools, colleges – even employers – can instantly see and understand what they know and don't know. That's what we hope to achieve."

What is machine learning?

Machine learning is a type of artificial intelligence. It involves enabling a computer to learn by itself, without the need to program its decisions.

Just how intelligent the machine will be depends on the sophistication of the algorithm that has been created. The recent proliferation in self-driving cars is heavily reliant on the ability of machines to be fed new data and to learn

from it, without having to be explicitly reprogrammed.

Artificial intelligence is now in everyday use. According to Stanford University, artificial intelligence is so prevalent in modern life that people will interact with it a dozen or more times a day without even realising – from every search entry on Google to each time you interact with Siri on your iPhone.