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YOU MAY HAVE HEARD of how electrodes have been inserted into the brain to control prosthetics, or restore hearing. You might also have had a magnetic resonance imaging (MRI) scan done to help diagnose a medical condition. However, these technologies – brain computer interfaces, or BCIs – have much further-reaching implications than you'd likely expect. Moreover, these huge changes will likely start happening in the near future – yet currently, there is little or no government involvement in the businesses driving forward BCI technology.
PEOPLE COULD CONTROL AND SENSE THROUGH MACHINES AND ROBOTS AS IF THEY WERE ADDITIONAL LIMBS
THE ULTIMATE AIM of BCIs is to enable detailed information to pass seamlessly between the brain and computers. Given the incredible complexity of the brain, this is a huge challenge, and today's BCIs really aren't all that advanced. Some are used externally, and read the activity of general areas of the brain – but even a cubic millimetre of the brain can contain 40,000 neurons, each with potentially thousands of connections1§3. Others are implanted through surgery, and capture (or manipulate) the signals of a number of individual neurons – but don't provide the bigger picture.
It may seem like the development of BCIs only pays off in the long term, however BCIs available today are already used in medicine and business. Invasive BCIs are used for controlling prosthetic limbs, and restoring hearing and even some level of sight2. Non-invasive techniques are used to diagnose and investigate various conditions, from epilepsy to brain tumours to dyslexia. Beyond this, they're used to research the brain's response to difference stimuli, such as advertisements, and to train the brain away from certain patterns of activity, through simple games2. Given that these comparatively simple technologies are advancing rapidly, what new applications could we expect in the near future?
INVASIVE BCIS HAVE BEEN USED TO RESTORE SOME LEVEL OF VISION
IN THE MORE DISTANT future, BCIs could become advanced enough to transfer large quantities of information to and from the brain, which could revolutionise almost every aspect of daily life. People could communicate almost instantly, and easily transfer images, emotions and concepts, rather than just words1§5 3. With the ability to override and read different senses, people could save and share experiences with others, and entertainment would change drastically1§5 3. Working with computers would be far faster and easier, with no need for typing or physical inputs, and people could control and sense through household devices, machinery and robots, as if they were additional limbs1§5 3.
You might think that these sorts of changes could lead to a sort of 'hive mind' situation, and to people becoming less individual. Historically though, improved technologies, like language, art, trade & shopping, and social media, have made it easier for people to express their individuality and customise their lives – so there's no reason to expect this to be any different1.
Additionally, the internet has already allowed us to have some form of a hive mind – just indirectly – through social media, forums, Q&A sites, and so on. It makes sense, then, to upgrade the way in which we communicate and perform this collective thinking.
So long as BCIs are developed safely, brain-to-brain communication would always still be voluntary1 — just as thinking about speaking doesn't automatically make you speak, your thoughts would have to be deliberately sent before anything could read them.
GIVEN THAT BCI TECHNOLOGIES ARE ADVANCING RAPIDLY, WHAT NEW APPLICATIONS COULD WE EXPECT IN THE NEAR FUTURE?
THERE IS ONE MAJOR CONCERN with BCIs though: hacking. Almost all internet-connected technology can be hacked, so connecting your brain to the internet could be very dangerous. Hackers could read information as it is transferred between people, and potentially directly from the brain.
Worse still, they could potentially manipulate people's brains to change their opinions and ideals, or make them do things against their prior will. Imagine what corrupt governments, terrorist organisations, and powerful businesses could do with this – and how current forms of persuasion, such as advertising, could become far more damaging.
ONE WAY TO AVOID this is to not develop BCIs in the first place, which would mean missing out on all the opportunities it provides (as well as failing to reduce the existential risk caused by artificial intelligence, as discussed in [1]). It also might be more than a little difficult to stop the development of BCIs, given that they're already being used commercially.
WORSE STILL, THEY COULD POTENTIALLY MODIFY PEOPLE'S OPINIONS AND IDEALS
Alternatively, businesses and governments could make sure that BCIs are developed with caution, and used only for ethical purposes. Governments could achieve this by regulating advertising, funding and guiding businesses that are doing the right thing, hosting competitions, and raising awareness.
Undertaking these tasks would be a long-term commitment, so the best approach would be to set up a new government body. This might seem like something that only needs to be done later, but when we're talking about things like hacking into the brain, we really don't want governments lagging behind, as they have been with things like the internet.
OVERALL, BCIS ARE a hugely beneficial technology, both in the short and long term. They may be vulnerable to attacks though, unless we develop them safely. To ensure that they are safe, we should set up a government body, in order to guide the industry, and prevent problems before they occur.

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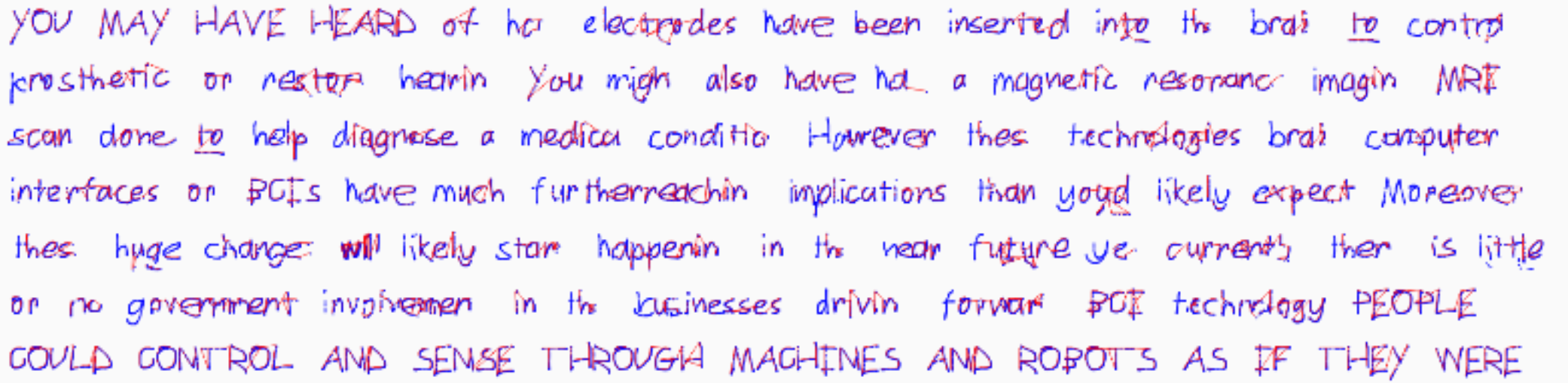

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