Anglais

Semestre 1

Année universitaire 2012-2013
Semestre ☒ 1 ☐ 2
Session ☒ 1 ☐ 2

UNIVERSITÉ DE NANTES

U.F.R. des Sciences et des Techniques

S.E.V.E. Bureau des Examens

Nom de l'U.E. :	**Anglais**
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Durée :	1h30
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eading comprehension:

cyber-fighter: does it feel human, punk?

6 September 2012 by Celeste Biever

A software bot designed to act human by mimicking consciousness is poised to go into battle in the Unreal Tournament arena

THE warrior dashes through one dark corridor after another, as laser shots crackle past his body. He crouches, jumps, swivels... does he detect the source? He fires at a potential enemy, barely visible in the shadows, then decides to flee.

Though the character inhabits the first-person shoot 'em up video game, Unreal Tournament, there's no human player in the driving seat. This warrior, called Neurobot, is a character controlled entirely by a biologically inspired model of consciousness. The feat could help us to build more human-like machines, and even shed light on the workings of consciousness itself, one of the biggest mysteries in science.

The thrilling run I watched was just a practice, but next week the neuroscience-inspired warrior will compete in the fight of his life: the annual BotPrize contest. It is a video-game alternative to the Turing test, the most famous test of machine intelligence.

In the Turing test, programs called bots try to convince human judges that they are human via text-based conversation. In the BotPrize contest, multiple humans and bots play Unreal Tournament simultaneously, all-against-all and anonymous in the same arena of battle. At the end of the match, the human players judge the "humanness" of all of their opponents.

The winning bot will be announced at the IEEE Conference on Computational Intelligence and Games in Granada, Spain, on 13 September. The prize is $7000 shared between all the bots that receive as many "human" votes as the average human player. If none reaches that threshold, the bot with the highest humanness score wins $2000. So far, bots have only won the smaller prize. An earlier version of Neurobot finished second last year, after technical difficulties hampered it in the final round, says its creator, Zafeirios Fountas at Imperial College London. He expects to go one better this year.

It's difficult to unpick exactly what gives a bot the human touch in Unreal Tournament, but Philip Hingston of Edith Cowan University in Perth, Western Australia, who has run the contest since 2008, has some ideas. "Some of the judges have reported the feeling that one of the players is determined to get them - some kind of sense of purpose," he says. By contrast, bots seem less likely to focus their attention.

The idea behind BotPrize is to foster software capable of navigating physical space in a human-like way. This could be used to create more realistic video-game characters, better simulate crowd behaviour in emergency situations or control robots in the real world.

Neurobot's performance, in particular, will provide an indication of whether the theory of consciousness that it is based on - global workspace theory (GWT) - can really produce human-like behaviour.

According to GWT, unconscious processing such as the gathering and processing of sights and sounds is carried out by various autonomous brain regions working in parallel. Only when information is deemed important enough can it enter the global workspace - or "consciousness" - and be broadcast to other regions of the brain.

Though a program that mimicked a simple version of GWT in software - without virtual neurons - won BotPrize in 2010, Neurobot is the first to implement it from the bottom up. It simulates 20,000 individual neurons and the electrical currents that flow between them, creating 1.5 million connections. This is a far cry from simulating a whole brain - made of about 120 billion neurons - but it is an important step if such bots are to inform theories of consciousness, says Murray Shanahan, Fountas's supervisor at Imperial.

To implement GWT, Neurobot's simulated neurons are divided into different populations, each responsible for controlling and reacting to different actions and perceptions. One set is responsible for sensory information, for example, so produces spikes in electrical activity in response to objects moving into Neurobot's field of view, or incoming shots from enemies. Another set is responsible for Neurobot's behaviours, and includes subsets such as movement, navigation, exploration and gun-firing.

These populations work simultaneously as Neurobot goes about its business, but at any one moment, only one can broadcast from the bot's global workspace. Like actors on a stage vying for the spotlight, which process ends up in the global workspace depends on which neurons have the highest prominence at any given moment. Winning access means those neurons can communicate with others. For example, if the bot is to approach an object, information must be shared

...ne set of neurons that perceive the object and behavioural neurons that move its body. This can only happen if ...nese sets makes it into the workspace.

...t the same time as this focused behaviour is going on, there are other actions that don't require Neurobot's attention. These can be likened to the way that people in conversation walking down the street avoid obstacles effortlessly.

It is this mixture of conscious and unconscious processes that Fountas hopes will make Neurobot's behaviour seem human. "I have no idea why he chooses to shoot when he does," Fountas says. "The decision is completely his."

Neurobot's main rival, ICE-CIG2012, created in the Intelligent Computer Entertainment Lab at Ritsumeikan University in Kyoto, Japan, approaches it differently. That bot comes preprogrammed with tactics it has learned from previous human players. Last year, that strategy allowed ICE-CIG to beat Neurobot to the prize. Five other teams will also be competing this year.

Whether it wins or not, the most intriguing question of all remains unanswered: is Neurobot actually conscious?

"It's a dangerous word," says Fountas. "I hope he is."

whether the following statements are true or false, and justify your answer by quoting from the text. ...te the reference AND copy the relevant passage (3 pts)

1. This article discusses how the researchers working in the field of A.I. have been using human consciousness as a model for their robots for many decades.	T	F
2. The BotPrize Contest is a duel in which the two opponents rate how human they think the other is at the end of the fight.	T	F
3. The $7,000 prize has never been awarded.	T	F
4. The reason why the bots have been less successful at passing off as humans is because they seem too concentrated on winning.	T	F
5. In order to access the global workspace, Neurobot's "neurons" must communicate with other "neurons" in different regions.	T	F
6. Fountas, Neurobot's creator, thinks that Neurobot might be dangerous if it is conscious.	T	F

n the following table with words from the text that correspond to the definitions (5 pts)

Line	*Synonyms/definitions*	*Words from the text*
	To imitate	
	An accomplishment, an exploit, something impressive	
	To clarify, to explain, to illuminate	
	Extremely exciting	
	To promote, to support	
	To judge, to consider	
	To apply, to put into use	
	A sudden increase in something	
	To compete for, to fight for	
	To compare	

*wer the following questions on the text **in your own words** (8 pts)*

1. Explain how Global Workspace Theory has been used by the team that created Neurobot. (2 pts)

2. What are the possible applications of this kind of research into Artificial Intelligence? (2 pts)

3. Do you think that artificial intelligence will ever be able to imitate human intelligence? Why or why not? (4 pts)

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II. Translate the following sentences: (4 pts)

1. Ce logiciel a été développé il y a deux ans mais n'a pas encore été commercialisé.

2. Si le signal avait été correctement traité, les données n'auraient pas été perdues.

3. Ce projet de recherche ambitieux devrait permettre de répondre à une question qui reste un mystère depuis des années : un robot peut-il apprendre à cuisiner ?

4. Conserver plusieurs copies de sauvegarde de vos fichiers importants peut vous aider à récupérer une partie de, sinon toutes, vos informations si les originaux sont endommagés.

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How to solve range anxiety

19 October 2012 by Andrew Czyzewski

While there are plenty of benefits to new technology, our growing reliance on smartphones, computers, Wi-Fi and the like is having unforeseen consequences. When gadgets go wrong at critical moments, for instance, some people are struck down by a malady unique to the digital age: call it techno-rage, or IT stress. And now the vehicle industry is unintentionally giving us another form of modern angst. This time it's called range anxiety.

In case you haven't heard of it, range anxiety is the fear felt by drivers of electric vehicles that they will run out of juice somewhere and be left stranded. Under everyday driving conditions, few all-electric production models can travel further than 160 kilometres or so without a recharge.

The most obvious solution is a better battery. The latest electric vehicles use lithium-ion (Li-ion) batteries, which were essentially borrowed from consumer electronics and scaled up, but there are new materials and improved designs in development that promise much better performance.

The lithium-air system, in particular, is touted by some as the ultimate design. In fact, lithium-air batteries have a theoretical energy density of 9 kilowatt-hours per kilogram, about the same as gasoline – and some 10 times higher than the best Li-ion batteries. So far research teams have built small prototypes in the lab but there are so many practical challenges still to be overcome that it is hard to predict when we will see them in vehicles. The main hurdle is to ensure that the battery's chemical processes occur in a reversible fashion, so it can be recharged many times.

While we wait for Li-air technology to mature, there are other ways to improve the range of electric vehicles. They can be made lighter, for a start, so they will go further on a single charge. Another way to do it is to add regenerative braking systems that recover energy from motion when the brakes are applied. This energy can be sent to the car's electric motor during acceleration. Regenerative braking systems can extend range by more than 10 per cent.

The problem is conventional batteries are not suited to the rapid charging and discharging cycle that occurs with regenerative braking. So engineers have tried taking this burden away from the main battery by adding special high-energy capacitors. Rather than storing electricity in chemical form, as in a conventional battery, these "supercapacitors" accumulate charge on electrodes, positive charge on one and negative on the other, with an insulating layer between. They can be charged and discharged rapidly and can survive thousands of cycles with no degradation.

Research has shown that regenerative braking systems based on supercapacitors can increase the range of an electric car by up to 25 per cent without degrading the main battery.

Supercapacitors could even end up integrated into the structure of an electric vehicle, doing double duty as both load-bearing components and electricity store. This will help make the vehicle significantly lighter so it can travel further on each charge of the main battery.

The key to making "structural" supercapacitors is to build them out of carbon-fibre composites. These materials are tough but lightweight, and are increasingly used by motor manufacturers to replace steel bodywork. And it turns out that carbon fibres are also good electrical conductors, says Emile Greenhalgh of Imperial College London. Greenhalgh has used them to construct tough, lightweight panels that store 1 watt-hour per kilogram of electricity and which can be used as the bodywork in a car. Such materials will never replace the main battery, says Greenhalgh, but by reducing weight and making electricity recovery and storage more effective, these materials could extend an electric vehicle's range by as much as 50 per cent.

What of the final prescription to cure range anxiety? For the foreseeable future, he says, it will be a small dose of traditional liquid fuel, taken with every journey.

...nether the following statements are true or false, and justify your answer by quoting from the text. ...e the reference AND copy the relevant passage (3 pts)

1. Even with time and recharging stations available, most electric cars wouldn't be able to go from Nantes to Paris.	T	F
2. All scientists worldwide hail the lithium-air system as nearly perfect.	T	F
3. The Li-air system is unlikely to be mass-implemented very soon.	T	F
4. High-energy capacitators use a chemical means of storing energy.	T	F
5. An electric car can go more than 25 % further thanks to supercapacitators	T	F
6. Thanks to a composite framework, an electric car could cover 240 km instead of 160.	T	F

ne following table with words from the text that correspond to the definitions (5 pts)

Line	*Synonyms/definitions*	*Words from the text*
	fear	
	stuck	
	publicized	
	surmounted	
	problem, obstacle	
	problem, obstacle (*find another word!)*	
	task	
	resilient	
	happen, occur	
	heal	