

Robot that helps the disabled

ALTHOUGH many think of engineers as just being science geeks, the reality is that they are creative innovators.

As British inventor James Dyson once said in an interview with *The Guardian*, "People think engineers fix washing machines. It's not at all. It's about using your imagination to solve the world's problems. It's exciting!"

The James Dyson Award was established, by the James Dyson Foundation in 2007, to encourage this sort of creativity among young design engineers.

The annual award, open to current and recently-graduated design engineering students, accepts entries from some 20 countries around the world, including Malaysia, the United Kingdom, the United States, Germany, France, Taiwan, Russia, Belgium and Singapore.

The brief for participants is to design something that solves a problem – this means that the products or prototypes submitted should be practical, viable, sustainable and have commercial potential.

As an example, last year's international award winner was a prototype inflatable incubator for prematurely-born babies called MOM.

Created by Loughborough University graduate James Roberts, MOM was designed to run on minimal power so that it can even be powered by a car battery.

The winning Malaysian entry in 2014, submitted by UCSI University student Desmond Tan Mun Yung, was a full-body "exoskeleton" which aims to help disabled patients with movement.

The exoskeleton comes with a software system which allows

users to control the structure by using a mouse, or even by blinking their eyes.

Desmond said his project was inspired by a discussion with his family about the late

actor Christopher Reeve, who became a quadriplegic after a horse-riding accident.

"I also watched a documentary where Stephen Hawking spoke about astronomical occurrences. It occurred to me that the smartest person in our time has problem with movements.

"That was when I first aspired to build an exoskeleton that would help someone regain his movements.

"The closest design that matched with my idea was Iron Man, where the robot suit is made to fit one's body.

"Besides that, I also gained inspiration from the (pop culture characters) Terminator, RoboCop and Transformers," he said.

The 21-year-old's passion for electrical and electronics engineering began with visits to his father's mechanical fabrication workshop as a child.

"One day, my father bought two robot dogs that moved around like real animals, and that was when I developed an interest for the robotics field.

"I learnt that in order for a robot to perform something, it requires a combination of electrical and mechanical parts to operate," he said.

As Desmond described his team's work process for the exoskeleton, it was clear that having big ideas is one thing, but bringing them to life requires much more work.

His first prototype for instance, took almost two years

to complete.

"We're on our fifth prototype, where the size of the exoskeleton is smaller.

"At every stage of the prototype, we modified the exoskeleton by giving it more functions, such as adding a new axis for movements.

"We also removed unnecessary parts, in order to reduce the weight and overall size," explained Desmond.

Among the new features

Desmond hopes to add to his project is electroencephalography (EEG) to help simplify control of the exoskeleton.

As EEG measures electrical currents within the brain, such technology would enable users to "perform an action on the exoskeleton by just thinking".

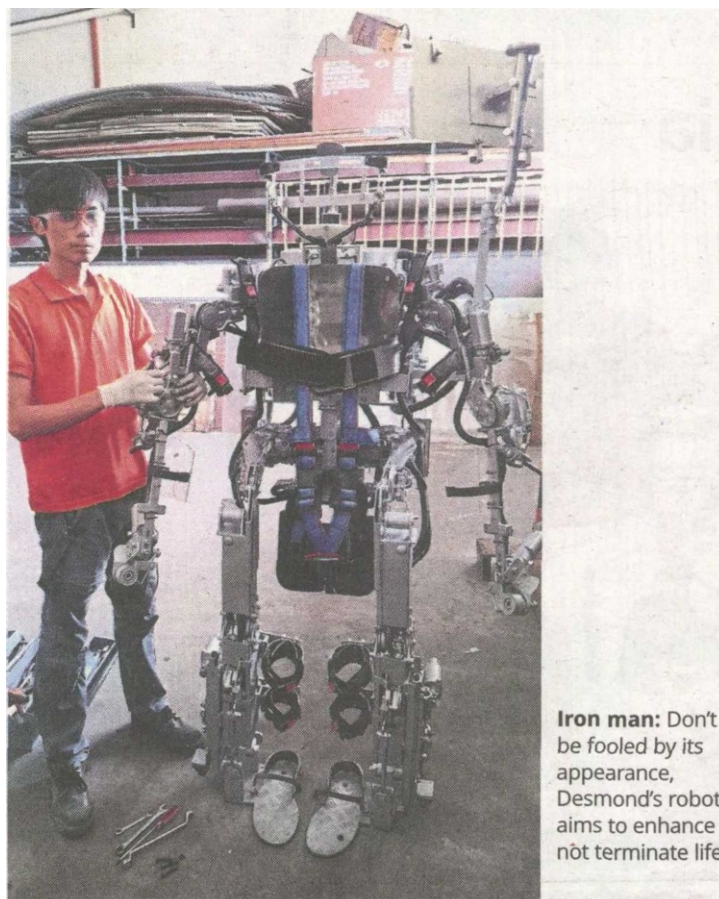
For now, Desmond's main concern is to refine the basics of the current prototype, for example to improve its stability and power-consumption, and reduce the weight of the exoskeleton itself by using lighter material such as aluminium or carbon fibre.

"We also need to have a more aesthetically pleasing design for the exoskeleton to attract users, as the current one looks like Terminator without the skin.

"We are targeting hospitals and rehabilitation centres globally (with this project), and an investment would not only provide us with funding but also help us set up a larger team dedicated to project development. "

"I believe our project will be an important part of the robotic revolution, and for now, we would like to focus on helping patients who hope to stand up and walk again," added Desmond.

The James Dyson Award 2015 will be accepting entries from Feb 5 to July 2. For more information, go to <http://www.jamesdysonaward.org>.



Iron man: Don't be fooled by its appearance, Desmond's robot aims to enhance not terminate life.