

Robotic Arms Write Dreams for Disabled Children

Having seen the pain and hardship of disabled children, the Robotica team created robotic arms that allow them to continue writing their dreams. After much research, the Robotica group at the Duy Tan University Center for Electricity and Electronics (CEE) successfully implemented their project to construct robotic arms for the disabled, with two versions.

Robotic Arms Developed by 3D Printing Technology

Ms. Le Thi Thanh Thao pioneered the concept of robotic arms for the disabled on an exchange program in the USA, when she came across an article about a Quang Nam student who had lost the use of both arms handling an unexploded bomb.

His name was Phan Trong Hieu, an eighth-grader at the Nguyen Trai primary school in Quang Nam. His disability made her think about creating prostheses for the disabled. She enthusiastically brought back her idea to DTU and discussed it with experts at the CEE, where she teamed up with Ms. Dang Ngoc Sy and Mr. Dinh Huu Quang to design the arms. The development was not easy because of the strict material, technical and equipment requirements.

"The team had to design all components with absolute accuracy and build robotic arms that could be used just like a human arm," explained Ms. Dang Ngoc Sy, Director of the CEE. "After the design phase, the fingers, hands, elbows, joints and muscles were simulated in 3D, using Solidworks software, before being sent to a 3D printer.

"On average, the 3D printing took six hours for each component, with some taking up to fifteen hours. Then, for accuracy, they had to be reprinted many times." Meanwhile, the team visited Quang Nam to take exact measurements and compute the structural forces related to the length of the child's arms.

"Our group went to Quang Nam three times to take measurements and to fit prototypes on Hieu," adds Ms. Sy. "On the second visit we tried the first version with only 50% success but on the third visit we were successful. After being fitted with the robotic arms, Hieu could pick up, drink and pour water and even ride a bicycle!"

Continuing to Write their Dreams

These days, Hieu and his family are happy again, after suffering so much due to the explosion.



Hieu can serve himself water with his robotic arm

“The day that bomb took off both of Hieu’s arms, we were devastated,” said Hieu’s mother, Mrs. Nguyen Thi Ngoc Dao. “Seeing our boy with his maimed arms, I could do nothing but cry.” To allow him to be more active, in the interim Mrs. Dao used a butter cup punched with holes for pens so that he could write. However, Hieu’s life and demeanor were miserable, he was always depressed and ashamed of his disability. “It was only when he received his amazing prostheses that Hieu could smile again,” Mrs. Dao said.

Initially, as he was not yet used to his new arms, Hieu felt a little awkward. However, the day after having them fitted and, with his family’s encouragement, he took well to them and has started considering them as his new friends. *“Hieu can now play comfortably, do many more personal things, go to school and do whatever he wants,”* Ms. Thao concludes.

According to Ms. Thao, the team will now create third generation robotic arms to offer more special functionality to the disabled. The team’s objective is to design improved smart arms, fitted with smart sensors that can identify signals from the central nervous system, which will instruct muscles to execute specific actions, to help the disabled to overcome many more of the difficulties they face in their lives.

(Media Center)