

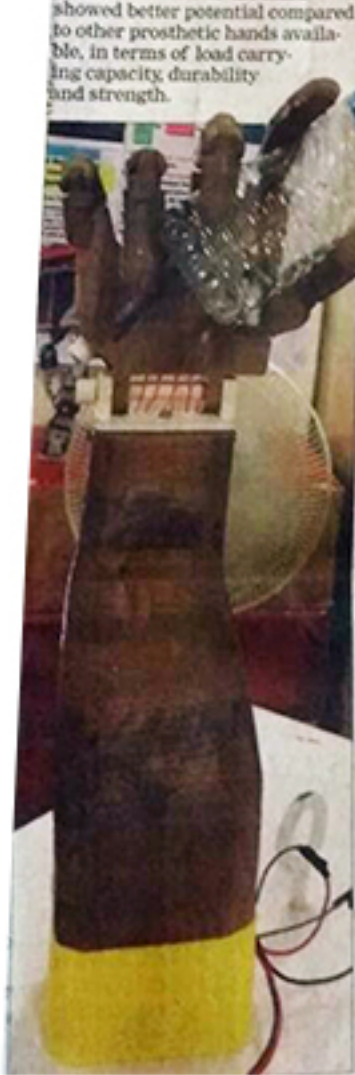
Indian engineers create robotic 3D printed hand

The prototype was unveiled at a conference on automation for humanitarian application

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Kerala: Indian engineers have developed a 3D printed robotic prosthetic prototype that could function almost as well as a human hand. The detachable robotic hand can lift objects weighing up to 400 grams, and perform activities ranging from writing to using a mobile phone. The innovation was unveiled on Sunday, at the on-going three-day conference on the use of robotics and automation for humanitarian applications, at Kollam, Kerala.

"It's a novel underactuated hand, made using rubber and nickel. Lab tests of the hand showed better potential compared to other prosthetic hands available, in terms of load carrying capacity, durability and strength.



The technology has the potential for a wider application besides being used for prosthetic limbs," said Dr Ganesha Udapa, Professor, Department of Mechanical Engineering, Amrita University, Kollam, Kerala.

Currently, the robotic hand is controlled by a software installed on a cell phone or a computer, via a bluetooth. Research is underway to enable it to be fully controlled by the brain.

Artificial hands currently in use are complicated in design and control structure. Essentially based on hydraulic and pneumatic elements such as wires, cables and chains, belts, artificial muscles etc, they

are quite expensive. However, the prosthetic developed by engineers at the Amrita University is simple to manufacture, and a low cost alternative as it is 3D-printed.

"About 50 per cent handi-caps do not use their prosthetics regularly, due to its heavy weight and low functionality," Dr Udapa said. Cost is another deterring factor in case of most advanced robotic hands.

The prosthetic made by engineers at Amrita University features human-like fingers along with moving thumb, which is driven by low weight servo motors. The hand is controlled by myoelectric sensors, and runs on a 12V rechargeable battery. It is activated by myoelectric or electromyogram (EMG) signals acquired using suitable sensors from the human body, a technology already widely used in actuating prosthetic devices. Servomotors coupled with pulleys and strings are used for actuation of fingers, making it possible to execute functions of a human hand.

"There are about 10,00,000 amputees worldwide. The main factors for a loss of upper or lower limbs are accidents, besides diseases and injuries. For diseases and tumors, amputation is a way of stopping the spread of the disease to the rest of the body," said Pramod Sreedharan, Professor, Amrita University.

A patent for the technology is under process. Once registered, it can be commercialised for use.