



# TOYOHASHI UNIVERSITY of TECHNOLOGY

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## PRESS RELEASE

Source: Toyohashi University of Technology, Japan, Committee for Public Relations

Subject line: Virtual handshake: Electronic gadget for shaking hands over the Internet

Summary: Toyohashi Tech's researcher has developed an innovative virtual-communication system that enables people to 'shake hands' over the Internet using inexpensive commercial devices. It is accomplished by implementing the howling-preventing tele-control algorithm developed by his laboratory.

Takanori Miyoshi at Department of Mechanical Engineering, Toyohashi University of Technology has developed an innovative gadget that enables people to 'shake hands' over the Internet, irrespective of their location (Figure 1 and Figure 2).

Miyoshi recently displayed his handshake gadget in April 2014 at the 2014 Niconico Chokaigi, Tokyo. "We connected people located in Japan and Taiwan," says Miyoshi. The participants in Tokyo included Japan's Prime Minister.

Notably, approximately 96% of the participants showed 'excitement for the device' and more than 65% could feel 'mutual force and motion'.

The handshake gadget developed by Miyoshi is simple, and constructed using components readily available on markets. The main parts include the well-known Falcon haptic device, a force sensor, and tele-control algorithm.

However, the development of the handshake system demanded the resolution of a problem related to 'howling' in the control electronics that led to instability in the 'virtual handshake'. This problem can be understood as being similar to the loud howling noise that is sometimes generated when a microphone comes too close to a loudspeaker in an auditorium.

"I solved the problem of howling by constructing a unique low pass filter," explains Miyoshi. This is the triangular component shown as  $W(s)$  in Figure 2. "The filter keeps the gain at less than unity, and thereby prevents instabilities in the circuit."

Miyoshi intended to develop the handshake system for applications including Internet games, remote surgery to give doctors greater feeling during surgical procedures, and hand operated robotic arms used in nuclear power stations managing radioactive materials.



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## About Toyohashi University of Technology:

Founded in 1976 as a National University of Japan, Toyohashi University of Technology is a vibrant modern institute with research activities reflecting the modern era of advanced electronics, engineering, and life sciences.

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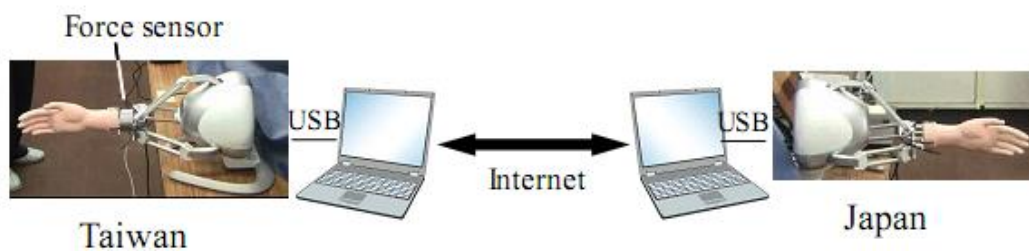


Figure 1: The main parts of the Internet based handshaking system.

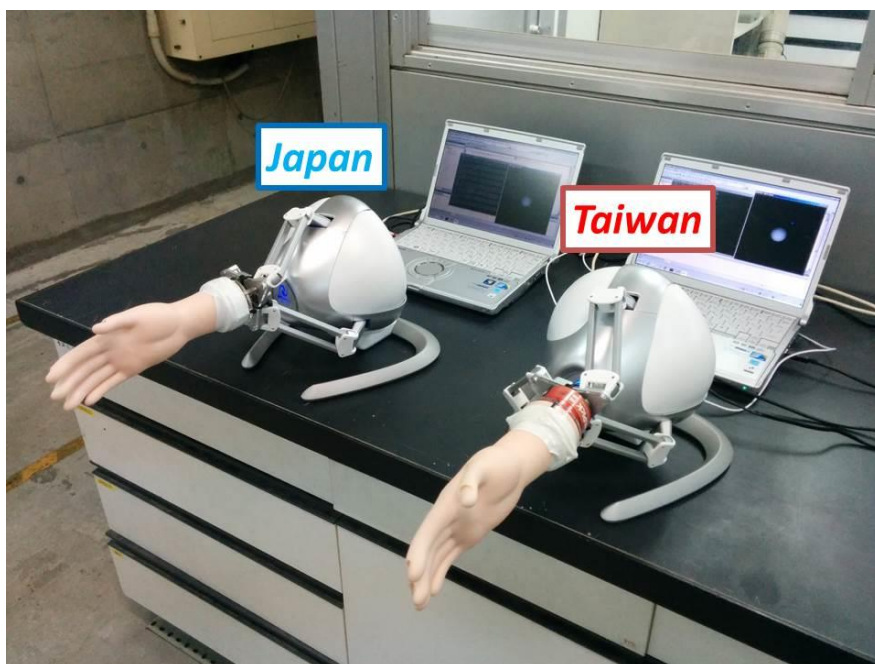


Figure 2: The Internet based handshake system connecting Japan and Taiwan.



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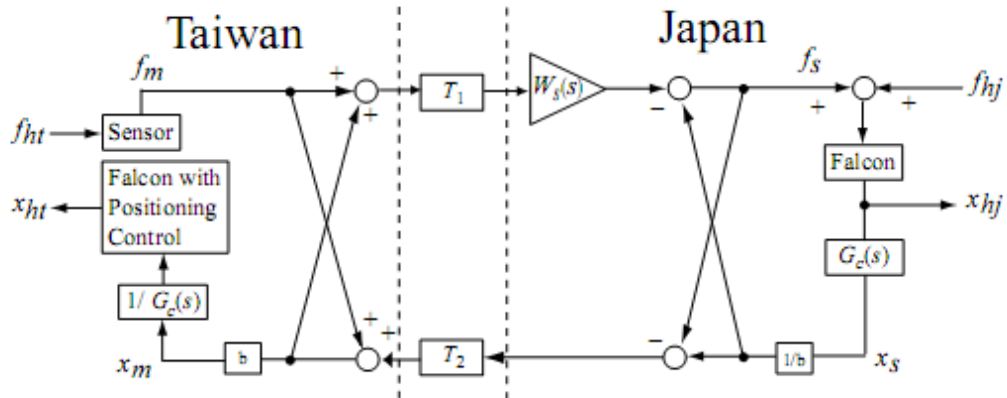


Figure 3: showing the low pass filter developed by Takanori Miyoshi to prevent 'howling' in the handshake system.

Keywords: Technology/ Engineering/ Computer Science, Computer Science, Multimedia/  
Networking/ Interface Design, Electrical Engineering/ Electronics, Telecommunications, Internet.