Sceptre a Pervasive, Non-invasive, and Programmable Gesture Recognition Technology

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Technology description

Background

Readily accessible healthcare is an essential component of social functioning for the deaf and hard-of-hearing population in the United States. Frequently, health care is not easily accessible by this population. The consequences of this are most serious in emergency medical scenarios where information must be conveyed quickly and accurately to provide care in situations where time is critical. In most emergency rooms and urgent care facilities, the current primary method of communication between a deaf patient and the medical provider is through gestures represented by an American Sign Language (ASL) interpreter. However, ASL interpreters are not consistently and immediately available in hospitals, and their availability is further decreased in emergency rooms. Alternatives to an in-person interpreter are hand written notes which may be compromised due to medical conditions, or video remote interpretation systems. Further, although speech is a very natural way to communicate with other people and computers, it can be inappropriate in certain circumstances that require silence, or impossible in the case of people who are unable to speak.

This lack of a common protocol for gesture based communication and translation into meaningful information ostracizes a specific group of people. Therefore, there is a need for a gesture based communication protocol that is capable of translating communication into meaningful information in real-time.

Invention Description

Researchers at Arizona State University have developed SCEPTRE. This technology is a non-invasive wrist-worn device that deciphers gesture-based communication, for example between a hearing person agnostic of ASL, communicating with a deaf person with ASL knowledge. SCEPTRE uses a multi tiered, template-based comparison system for classification. It inputs data from an accelerometer, gyroscope, and electromyography (EMG) sensors. SCEPTRE can be easily and quickly ytrained and be used for any gesture-based communication, for example sign language or various action-based communication. The unique qualities of this system are that it is non-invasive for a user, programmable, and operates efficiently in real-time to rapidly facilitate communication.

Application area

• Translation applications
• Human-computer interaction
• Gesture control systems

Advantages

• Real-time –Translates American Sign Language to a hearing user with an estimated total timing delay of 0.32 seconds.
• Non-invasive – Operates with two wrist worn devices that measures the speed, direction, and skeletal movements of a user.
• Pervasive – Translates gesture based to an audio output and can be paired with a system that converts voice input into gesture models using a display.

Institution

Arizona State University

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