

A Sensor-based Home Rehabilitation of the Stroke Paralysed Hand

Imperial College, London
and
Christian Medical College, Vellore

Outline

- Background of the two groups
- Objectives of the project
- Funding and Budget
- Activities and Achievements
- Future Plans for Collaborative Research
- Conclusions

Imperial College, London

- Human Robotics Group, Department of Bioengineering, Imperial
 - Dr Etienne Burdet
- Human motor control
- Assistive devices and virtual reality based neuro-rehabilitation

Christian Medical College, Vellore

- (i) Rehabilitation Institute, (ii) Bioengineering Department, (iii) Neurophysiology
 - Dr Suresh Devasahayam, Dr George Tharion, Dr Srinivasa Babu, Mr Sam Kamalesh, Mr Sanjeev Padankatty
- 150 bed Rehab Institute in a large tertiary care hospital (2500 beds)
- Electrophysiological Instrumentation and Assistive Devices

Objectives of the Project

- Sensor system for quantification of upper-extremity movement
- Instrumented objects for quantifying hand grasp
- A biofeedback system to guide performance
- A control system with adaptive algorithms therapy tasks and socially interacting with the patient

Sensory based system for Independent Task oriented Assessment & Rehabilitation

- LCD display with position sensor
- Data collected about position of hand on the screen



SITAR

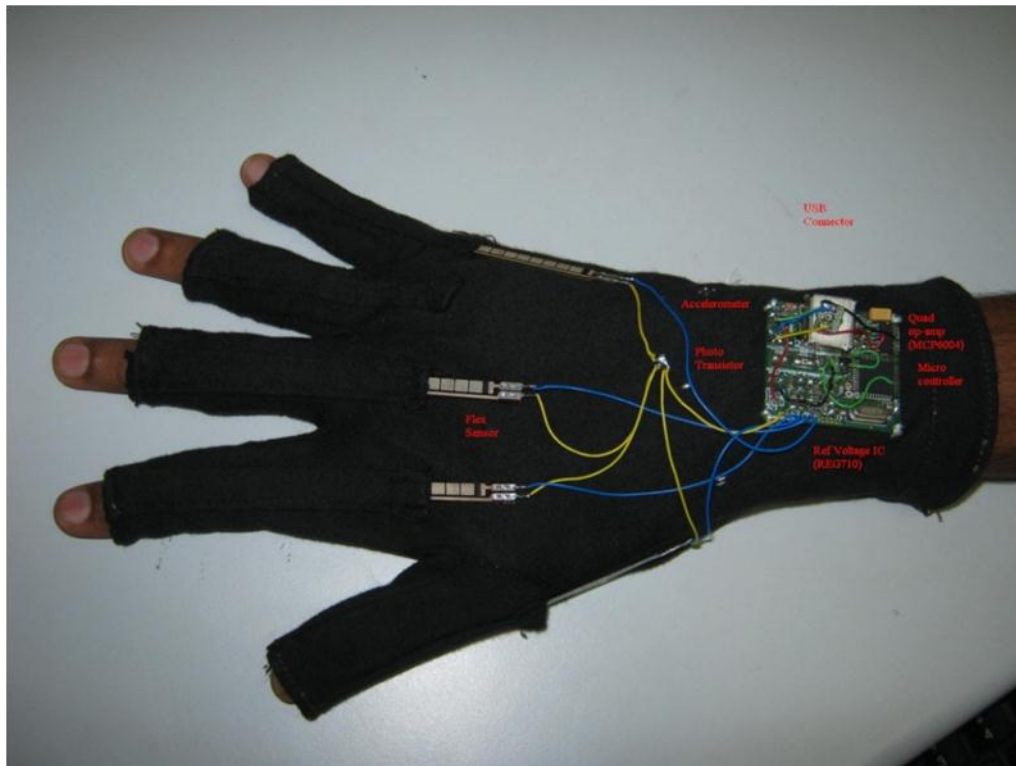
from Imperial installed at CMC-Vellore

Using SITAR



- Intelligent objects (iObjects) handled by subject
- Interactive Tasks given to subject using the display

Instrumented glove and Instrumented ball developed at CMC-Vellore



Clinical Trials at CMC

- Trial of the SITAR system is planned to begin soon at CMC-Vellore.
- IRB approval was obtained in June 2013

Exchange Visits

1. Akhil Mohan and Sam Kamalesh visited Imperial College, London, June 2012 – to see the use of SITAR and other rehab work
2. Wayne Dailey visited CMC-Vellore, December 2012 to begin installation of SITAR
3. Wayne, Sarah Guy, Sivakumar visited CMC-Vellore, March 2013 – to draft clinical trials and complete installation

Future activities planned

- The Clinical Trial of SITAR will be done in the next 6 months
- One visit by researchers from CMC to Imperial
- Development of Home Rehabilitation suitable for use in low-resource areas around Vellore

Sustainability of the project after UKIERI funding

- The Human Robotics Group at Imperial, and the Clinical and Rehabilitation Engineering group at CMC will continue to collaborate
- Other interested groups in both institutions have also begun to work together
- Two visits by Dr Ravi Vaidyanathan, Mech Engg, Imperial to CMC, in Dec 2012, and July 2013
- One visit by Dr Rajdeep Ojha from CMC to Imperial College, London

Best practices for working on joint bilateral projects

- Frequent communication by email and video conferencing (Skype)
- Student exchanges
- Complementary skills as well as significant overlap in interests to ensure good communication

Conclusions

- UKIERI has been quick, unbureaucratic and responsive in helping to establish collaboration
- Differences in sizes of groups in UK and India, means better synchronization of activities is required (groups in India tend to be smaller and more isolated in research activities)
- The CMC-Vellore group in India has benefitted significantly in enabling student exchanges and exchange of ideas

Thank You

- A big Thank You to UKIERI from all of us