Small Computings in the Operating Theatre

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Small Computing Ex 1: Endoscopy Processor
Ex 1: Stereo Endoscope Processor

1920

1080i
Small Computing Ex 2: Endo-Echo Overlay

- Overlay echo on endoscope
- Checker pattern tracking

(courtesy: Prof. Sakuma, Univ. of Tokyo)
Ex 2 : Endo-Echo Overlay

Ultrasound - in - Endoscope System
Turn-Key Box
Small Computing in Healthcare

To quickly deliver new ideas to clinical innovators
2. Small Computing

= Computation Enjoying Advantages of Downsizing
Small Computing in OR

More than computing power required...
An Active OR is a ... battlefield
Active OR is a battlefield

- Time is money.
- Space is money.
- System expected to work like a TV.
And Research Tools are not OR Friendly
3. Small Computings for Clinicals

Our definition
1. Be small
2. Image there’s no keyboard nor mouse
3. Focus a purpose
4. Affordable

SAVE 90%
Small Computings for Clinicals

Small
Affordable

No UI
Fast CPU/GPU

Single Purpose
Fast I/O
SCC Apps

- **Case 1: Endoscope Processor**
  (with Shinko Optical Ltd)

- **Case 2: 24h Recorder**
  (with Prof T. Suzuki, H. Iseki, Tokyo Women’s Medical Univ.)

- **Case 3: Echo + Endo Integration**
  (with Prof E. Kobayashi, I. Sakuma, Univ. of Tokyo)
SCCToolKit

Library to help building SCC Apps
SCCToolKit

- C++ library to build your SCC Apps
- Free Open Source
  - OpenCV extension
  - Qt extension
OpenCV Extension

- Hot plug in/out of devices.
- HDTV capture support. Decklink devices
- Multi-thread friendly
4. Examples
Small Computing Ex 1: Endoscope Processor
Latency Matters

< 0.2 sec

As fast as custom (expensive) H/W.
5. SCC & SCCToolKit

Impacts
SCC as *Disruptive Innovation*

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| Camera + Microphones x 8  
4ch Capture board x 2  
Soundblaster board x 8  
PC (Core i7 3.2GHz/12GB RAM) x 2 | USB Camera x 4  
PC (Mac Mini) x 1 |

Total: **10,000 $**  
Total: **1,000 $**

[Reference: J. JSCAS 14(3) 414-5, 2012]
SCC: Your Merits

- For Clinical Staff
  - Touch new tech

- For Clinical Innovators
  - Be first user of new tech

- For Patients
  - Quiet, small, clean
  - Less experimental feel

- For Companies
  - Faster and better clinical entry

- For Tech Innovators
  - Acquire the early adapters

- For Taxpayers
  - Earlier R&D to user reach
  - Faster innovation cycle

- For All Innovators - Join R&D Community
Small Computings for Clinicals

http://scc.pj.aist.go.jp