Interactive wall displays: Interaction techniques and commercial applications.

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Interactive Whiteboards

- An electronic version of a traditional dry erase marker whiteboard
- Used for remote education, distance collaboration, training, whiteboard capture, etc.
- SMART Technologies Inc. is the largest player in interactive whiteboard market.
- Building Interactive Whiteboards for over 15 years.
- We have lot’s of experience in what works and what the customer wants.
The Blackboard as Technology

“… in the winter of 1813 & '14, during my first College vacations, I attended a mathematical school kept in Boston by the Rev. Francis Xavier Brosius . . . On entering his room, we were struck at the appearance of an ample Black Board suspended on the wall, with lumps of chalk on a ledge below, and cloths hanging at either side. I had never heard of such a thing before. There it was—forty-two years ago—that I first saw what now I trust is considered indispensable in every school—the Black Board—and there that I first witnessed the process of analytical and inductive teaching.” [May 1855]

Introduction of the Blackboard

- James Pillans, Headmaster of the Old High School of Edinburgh, Scotland, is widely credited for inventing the blackboard but there is some uncertainty as to who really created it (and colored chalk).
- An instructor at West Point Military Academy named George Baron, is considered to be the first American instructor to incorporate the use of a large black chalk board into the presentation of his math lessons in 1801. However, it's probable that a few other schools had access to it, also.
- By 1856, 72% of schools in Canada were using Blackboards. Five years later (1861), 83% of schools had them and in another five years, over 90% of schools were using them.
Before the Blackboard

- Prior to the introduction of the blackboard, students and teachers used handheld slates.
- Teachers would then have to go from student to student copying, for example, a math problem onto each student’s individual slate.
- When they could not afford slates, teachers would write on the back of students hands.
- The blackboard changed the way people were educated and it became the single most important educational tool in the 1800’s and for most of the 1900’s.
- More than 200 years after its introduction, it is still in use!

Large Area Displays

- The Blackboard is a large area interactive information display.
- A lifespan of over two centuries speaks to the enduring need for this technology.
- Information has significantly changed and we are now in the “digital” age where information is easily, shared, stored, transmitted, disseminated, etc.
- But the need for large area interactive displays goes on …
What it Was Like Then…

And Where We Want to Go …
Many Interactive Displays are Available Today

- Electronic White/Black Boards.
- Tablet PC’s.
- Touch overlays for flat panel displays.
- Portable and desktop systems.
- etc.
A Quick Side Tour on a Specific Touch Technology

- **Machine Vision Touch** – use CMOS cameras to look across the display to detect the presence of a pen or finger.

Integration of low cost CMOS sensors and powerful DSP’s allow for Smart Camera construction.

Plasma Display with a Machine Vision Interface

Smart Cameras analyze the scene and send pointer information to a master controller that reports the pointer position to a computer.
What the Camera Sees

Image processing is done on the Smart Cameras. A real-time image is captured and then analyzed for important information. Below is an example of a finger approaching the display surface.

After processing, characteristics such as finger tip position, can be identified. The image below shows an example.
Collaboration with Academic Research

Touch Wall – University of Toronto

• Movie
Touch Wall Projector Matrix (3x6)

- Movie

Georgia Tech BigBoard

The BigBoard is a touch sensitive SmartBoard measuring 17.5 wide and 4.5 high. Using Virtual Room Projection technology for computer output, we are able to provide a large interactive surface without using rear projection.
Georgia Tech Project

- June 2003 - December 2003
- Research project to adapt DViT to touch enable a 4.8’ x 17.11’ front projection touch surface for Georgia Tech
- Display: “Virtual Rear Projection”, 6 projectors but effectively 3
- Each at approx. 1024 x 768

Movie

Touch Table – University of Calgary

- Movie
Other Touch Walls

- Several other systems in both academia and industry are either under construction or being proposed.
- More to follow …