

Architectural and Technological Issues in The Field of Multiple Monitor Display Technologies

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The work is partly supported by a European Social Fund Project
No. 2009/0216/1DP/1.1.1.2.0/09 /APIA/VIAA/044

Actuality I

- Aim to maximize the efficiency and ease of work
- General goals of multiple monitor/display environments:
 - Creating large sized displays with high resolution
 - Representation/layout of large data structures e.g. Graphs etc.
 - Collaboration
 - Increasing efficiency in multitasked environment
 - Distributed rendering

Actuality II

- Multiple displays as an alternative to a single large sized display:
 - Price per pixel
 - High cumulative resolution of a tiled wall vs resolution of a single panel
 - Ease of repair and transportation

Actuality III

- Previous studies have proven the increase of efficiency for one man environments:
 - Importance of pixel size – previous studies show that people interact better with medium/large sized objects
 - Bezels help to segregate work

Actuality III

- Well known display wall projects such as SGE and SAGE exist and are being analyzed and advanced
- Technological limitations/complexity create obstacles in leveraging this research into a wider scale

Approaches

- Physical:
 - One large display
 - Video splitter
 - Multiple video cards with multiple displays
- Mixed:
 - Video wall system with multiple clients and tiles



Limitations

- Limitations in physical approaches:
 - Wiring
 - Scalability
 - Awareness
 - Total resolution
- Limitations in mixed approaches:
 - Bandwidth
 - Overall cost

Solutions I

- Single large sized display:
 - Low total resolution
 - Vulnerable
 - Price of pixel raises very sharply
 - Works out-of-the-box
- Video splitter with multiple displays:
 - Advances in terms of price and scalability
 - Lacks awareness

Solutions II

- Multiple video cards with multiple displays:
 - Hardware limitations on the number of displays attached
 - Gives awareness
- Dedicated video wall system:
 - Advances in scalability, collaboration, resolution
 - Increased deployment complexity

Different approaches to the distributed display system

- Best existing practices:
 - SGE – based on X windowing system, shared frame buffer, only areas affected by user interaction are sent to the display wall system to reduce bandwidth, 12 megapixels
 - SAGE – advanced version of SGE, tiles do not have to match physical monitors, advanced transport media, 100 megapixels, no central management
 - Garuda – distributed rendering using OSG API

Future work

- VidPN, Windows 8 technology for display networks, monitor emulation etc.
 - Create a set of virtual monitor instances, collect image data and send it out to dedicated monitors
 - Investigate bandwidth limitations in different media, compression efficiency, etc.



Thank You for the attention!