Gigapixel Image Viewer for a Multi-Display Array Controlled by a Wii Remote

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Motivation

High resolution images are becoming more and more common because of high definition technologies. Much more information could be shown in a high resolution image. On the other hand, evolving controlling devices like Wiimote have highly enhanced human-computer interaction. In this high resolution world, people are seeking a rich information image viewer with a user-friendly control.

Goal

Our goal is to design an image viewer which can utilize multi-display array to form a single high resolution display unit. Users can use Wiimote for controlling the viewer and the viewer can response to the user with a smooth motion on images.

Overview

The display wall consists of 12 display units. Each of them connects to a computer. The 12 computers are connected with a server computer through a Local Area Network (LAN). A Bluetooth adapter and infrared device are installed for communicating with a Wiimote.
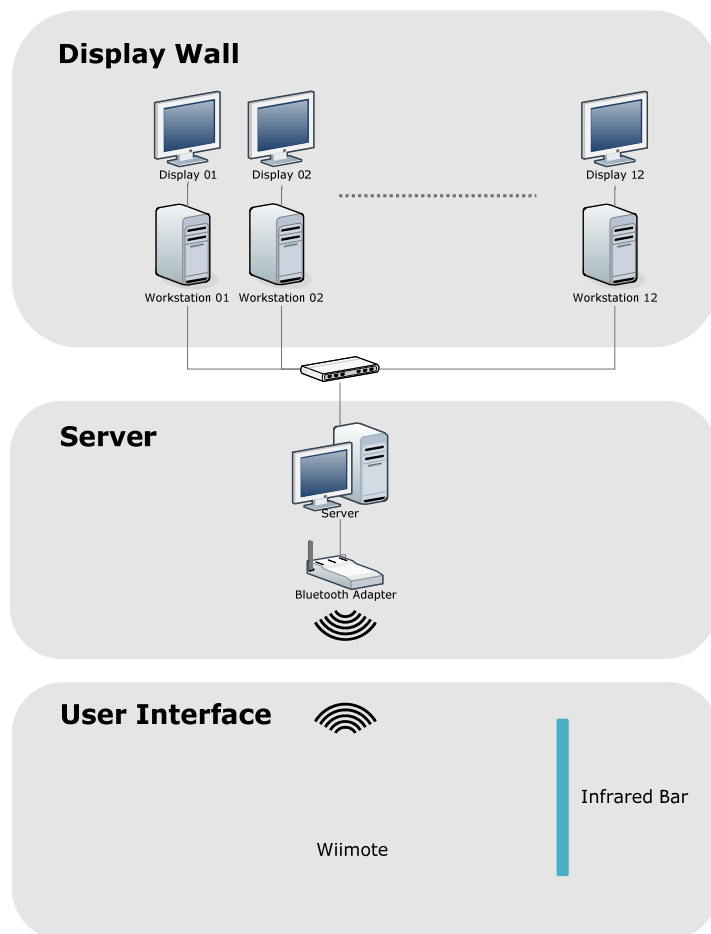

Figure 1 System overview

Implementation

We chose the C/C++ programming language, because C/C++ is highly efficient. We used a modular approach and divided the project into 5 phases, making sure all modules – networking, graphics, and user interface were working properly before integrating them together.

A special Bluetooth adapter with a Bluetooth driver – Bluesoleil is needed. Bluesoleil can connect devices that do not have a personal identification number (PIN).
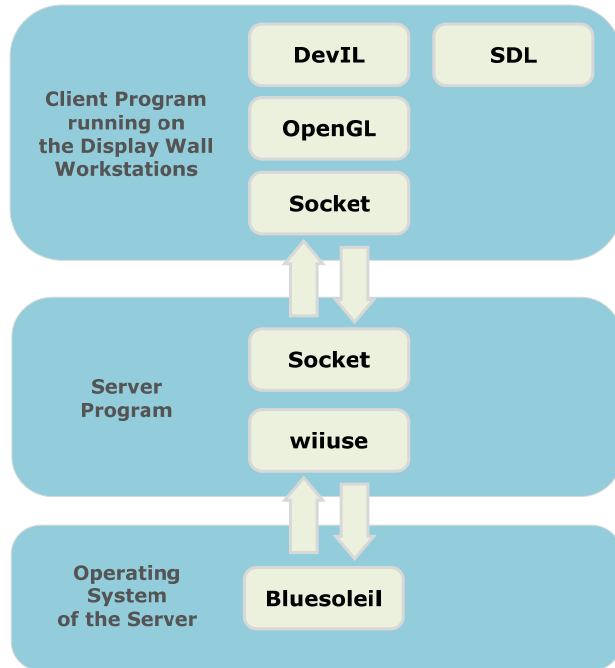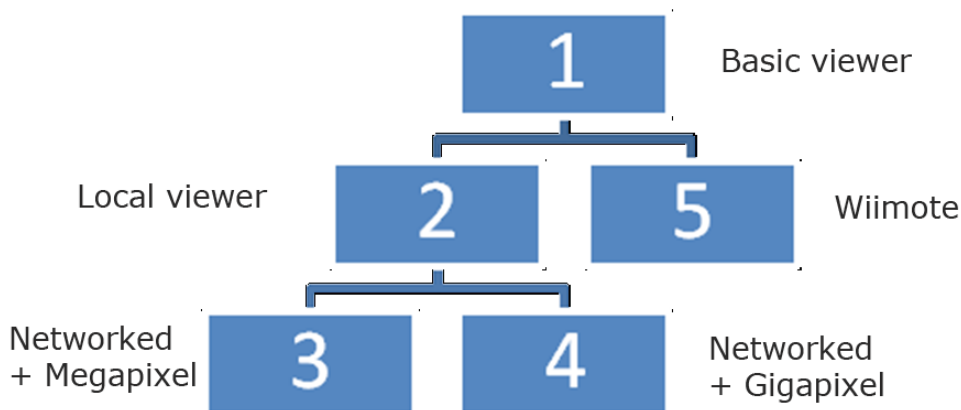

Figure 2 Software Architecture

Figure 3 Modular approach

Result

The system can work properly with basic functions. A large image can be preprocessed into tiles. They can be loaded on multiple monitors to form one single image. The server can send packets to the clients with a minimized synchronization delay. The Wiimote can be used to replace traditional input device. It provides more functionality than the mouse and keyboard.
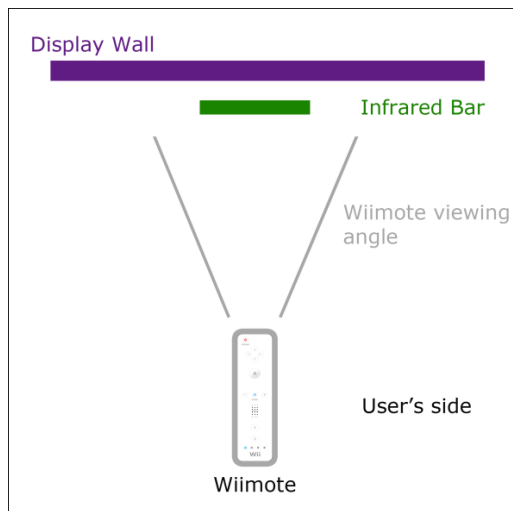
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Figure 4 Wiimote control

Figure 5 Display Wall

Figure 6 Panning an image

Figure 7 Zooming an image