FROM ABSTRACT DATA MAPPING TO 3D PHOTOREALISM: UNDERSTANDING EMERGING INTERSECTIONS IN VISUALISATION PRACTICES AND TECHNIQUES

Visualization Research Unit, Birmingham Institute of Art and Design, 19 June 2007

Real-Time Data Acquisition

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The VRU has begun developing a computer-based system called CODA that facilitates collaborative performances between artists from different disciplines without the usual laborious preparations when normally associated with newer technologies.

Recent VRU projects that have involved real-time data acquisition processes

CODA is based around the concept of the node. A node could be a computer, dancer, MIDI faders or a sensor interface. Nodes stream real-time performance information to a data pool which all nodes have simoultaneous access to.

Various custom-made devices can act as nodes (see *Various Sensors Used as Input Nodes*). So far, the VRU has experimented with industrial sensors that detect many environmental properties such as magnitic field, acceleration, rate of turn and vibration, as well as some non-contact sensors that detect movement, such as infrared and ultrasonic sensors.

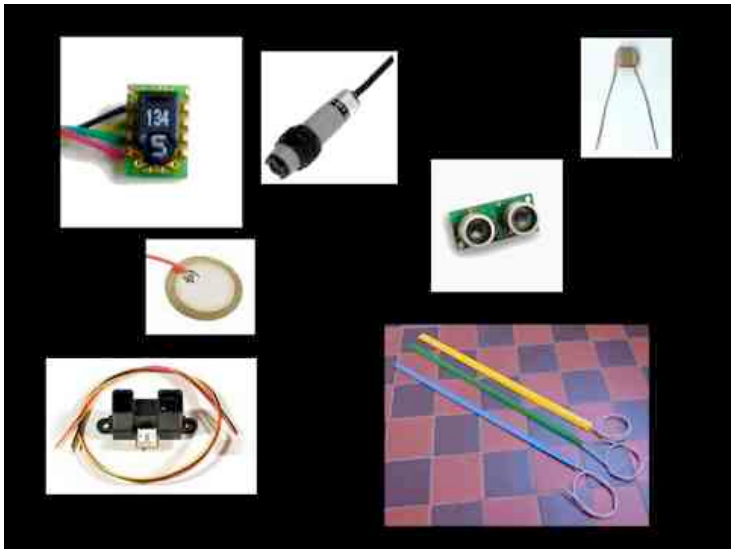
Currently, a wired local area network provides the physical layer which all nodes use to communicate data. All nodes use MIDI as the data protocol since most multimedia software and hardware control surfaces supports it. However, MIDI is not a networked protocol, so we wrap the MIDI packets into UDP packets which are broad cast onto the network. This immediately makes all MIDI data available to all nodes on the network. A simple MIDI to UDP and UDP to MIDI programme interfaces the network to MIDI supporting applications and hardware.

In the first instance, a networked system provides us with much improved computing power. For example, video analysis, video synthesis and audio processing can be shared between three computers. The system is also more robust and reliable the running everything on single machine - if one node fails, the others do not automatically crash with it.

Despite the very wide variety of data formats, we found that using sterile performance data, that is, data extracted from different media and formatted in a specified manner, enables a new user to create a new node somewhere else on the network and begin collaborating immediately, without needing to understand how the other nodes work. It is the interface to the other nodes rather than how they function that is important to the user.

As well as computing power, the participents themselves are also distributed. Unlike a traditional multi-disciplinary set up where a central computer does all the processing, CODA enables users to be distributed in location, using hardware and software tools that

are specific to their craft which they feel comfortable with. Such a networked system enables a sort of communication that greatly improves the prospects of true collaboration.



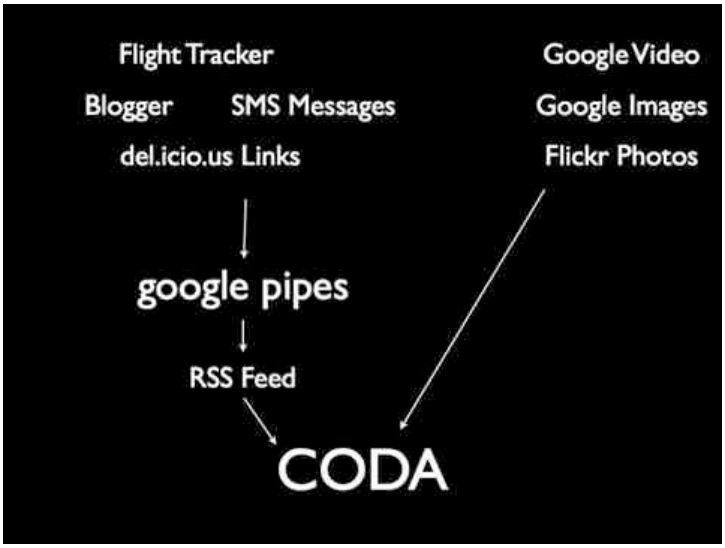
Various sensors used as input nodes.

After using the system for several different projects, we decided to scale it up to the Internet. The Internet is, after all, basically a huge network. When expanded to the Internet, performance data such as values from sensors, video analysis and audio triggers, for example, is distinguished from network data, such as RSS feeds. In other words, communication, and information. The network can be used as the content for collaborative art works.

Web 2.0 technologies such as RSS feeds, blogs and community portals seem to suggest a new pattern of communication. In traditional peer-to-peer communication, a user must first 'handshake' another user before sharing data. The data flow is linear and sequential. However, Web 2.0 users communicate not by knowing who to share data with but by making it, and its metadata, available to all users and then other users can simply find data they are interested in by filtering using tags.

In a basic way, our system already follows this pattern, however we would like to further integrate it into the Internet by using widgets. Widgets are small boxes of dynamic information that any blogger can easily incorporate into their blog. Each node will eventually be represented by a widget which can then be viewed and controlled through the Internet. Widgets can also be downloaded and incorporated into the Windows and Mac OS operating systems. Users can then share widgets and thus nodes and artists from around the world should be able to access all kinds of data and devices relevant to collaborative art making.

The VRU has so far demonstrated a prototype system for streaming data across the Internet and accessing content from it. We have found that there are many obsticles blocking successful real-time data streaming including reliability of the Internet service provider, proxy servers and firewalls. We have developed a system that has so far shown that it is possible to avoid such problems by working with the everyday Internet protocol, HTTP.
In terms of using live Internet data, the VRU has chosen to use the standard RSS XML data protocol.



Integrating Web 2.0 into CODA.

This has numerous advantages including immunity to firewalls, and access to useful services such as Yahoo! Pipes, which aggregates data from numerous sources into a single stream. We have begun implementing the Flickr API into CODA because we recognise the usefulness of such ‘social’ as opposed to corporate sites. Future projects will include real-time flight tracking, weather data and SMS messaging. SMS messaging is an interesting case since, on the one hand, it would be extremely difficult to implement from scratch, but on the other hand, SMS messaging is already implemented on other systems such as Tumblr. And since we can access Tumblr blogs using RSS, we can in fact now use SMS messaging.

We have found that most things have already been done. Therefore, we have seen it as our task not to reprogramme what already exists, but to try to find innovate uses for software and Internet services that already exist. We are, after all, artists and not programmers. Candidates that the VRU are currently working to exploit include Google Images and Google Video, YouTube, PhotoBucket, NASA images, Internet radio stations, atomic clocks, celestial movements and Digg.