BarCamp6

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New ways of interaction

Inspirational information about e.g. augmented reality

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2 Introduction

This document lists information from a 6 hours intensive web surfing session on 27th March 2009, when I was wondering about the future…

Will Gadgets (small smart devices) and Widgets (small single-purpose web-based programs) invade our daily lives? Will we expect our widgets to be scattered across all kinds of devices, platforms, and media?

Will we expect them to be connected continuously (also underground and globally abroad), silently, wireless and free of (extra) charge via Wi-Fi (Wireless Fidelity via radio waves), RFID (Radio-frequency identification), Bluetooth, Infrared, etc. to the internet, GPS (Global Positioning System), and to all kinds of other devices?

Which devices will we use and connect to? I can already think of these:

1. Interactive sound systems:
   earphones, speakers, fun speakers like the rabbit Nabaztag or Kysoh's Linux pinguin Droid, etc.
2. Interactive displays:
   video glasses (goggles), smart watches, mobile phones (e.g. after content transfer through FuturLink's Wimob software), PDAs (personal digital assistant), e-books (like Amazone's Kindle or Ricavision's eReader), scribble devices (like Ricavision's eChatter or Scribbler Fridge Magnet), laptops, desktop computers, TVs, billboards and shop displays (on mobile phone after content transfer through e.g. FuturLink's Wilico software), cash machines, tills, club entrances, lighting systems, restaurant menus, projectors/projections (of interactive screen content, keyboards or other controls, avatars, etc.), etc.
3. Specific input devices:
   Interactive gloves, jackets, floor pads, light beams, stylus, tablet, mouse, keyboard, etc.
4. Artificial intelligence robots:
   humanoid robots like Sony's QRIO (Quest for cuRIOsity) and Honda's Asimo; dogs like Sony's AIBO (Artificial Intelligence roBOt) and Silverlit's i-Cybie; Hasbro's toy Furby; Ugobe's dinosaur Pleo; etc.

Which interactions will we use? I can already think of these:

1. Touch (hard keys, soft keys, touch screens, device housing haptics)
2. Motion (using the position, rotation and distance of the device itself or of related devices/users, or using wind motion while blowing into a microphone)
3. Camera tracking (using the motion, gesture, shape, colour, etc. of the target; or using content recognition via data comparison)
4. Sound (speech – into text with SpinVox software- and noise)
5. Bio language (brain waves, heart beat, body temperature, recognition of iris or finger print, etc.)
6. Received values (GPS position, RFID identity, light intensity, metadata, tags, etc.)

As a Flash(Lite) developer, I am interested in the advantages of Adobe's Flash, Flex and Air in these issues. Will they allow the easy build of a single small and smart SWF file that can be used in a widget with several different input methods, which can be used on e.g. mobile phones, websites and the desktop computer? That's why I included a chapter about Mobile Flash(Lite) widgets in this document.

Augmented reality also interests me greatly. This technology combines many of the aspects that are listed above (new smart devices and new interactions), and once the size and cost of its accessories are reduced, this great technology will hopefully become available to the mass market, implemented in intuitive, engaging, and very useful mobile (phone) applications.

Augmented reality is e.g. what a mobile phone user can experience when he sees virtual-reality images (manufactured 3D graphics) superposed in real-time on his real 3D world (either on his mobile screen or in his video goggles). Motion sensors (in his mobile device, video goggles, earphones and/or interactive gloves) transfer rotation and gesture information, while his GPS transfers positioning information, and his internet connection establishes the transfer of all appropriately media (3D sound and vision) that will be adapted in real-time to the user's positioning, rotations and gestures.

How much will we want/allow such interactions (the triggering of devices and media through our position in space) and other interactions to be guided by our (manually set up and automatically expanded) user profile?

Will our identity become more real (genuine) because we expose ourselves more to others and feel the need to be consistent and authentic, or will our identity become more fictive (fake) because we can (and will) hide our real personality more behind nicknames, avatars, and/or (more impressive than our own) fantasy personalities?

Will the pressure to (constantly) publish impressive data for others lead us to behave differently than we would otherwise have done (according to our initial personality), so that we actually force ourselves to play a certain role (e.g. the one of ueber cool geek) and therefore (subconsciously) distort our initial identity?

How much input and output data will we want to share with others through our own (explicit) actions (via e.g. Facebook, YouTube, Flickr, Twitter, Fire Eagle, etc.) as well as through the existing and expanding (implicit) data gathering systems (such as CCTV recording, mobile phone localization tracking, transport swipe card tracking, bank card tracking, customer card tracking, etc.)?

Will individuals and communities gather, save and publish data to counter abuse/misuse of data (and power!) by larger organizations like the government, police, medical system, broadcasters, service providers, retailers, etc., or will they surrender to and collaborate with these systems (e.g. in public screening of live CCTV footage to report suspicious behaviour to the authorities)?

Will data collecting organizations be forced to publish their data online, to avoid any abuse/misuse?

Will data become more public, or will each person only be allowed to access his own data through login?

Will login take place through bio identification like iris scanning?

How safe is bio identification?

Will the (huge and growing) data storage be safe?

How permanent is data storage?

What will happen with all the data when e.g. fossil fuel runs out?

On this happy note…

I wish you much fun visiting the websites I passed surfing, and hope your surf gives you the same huge wave of growing curiosity and optimism about the future as it gave me.

Surfs up!

:-)

Carin.

3 Gadgets

3.1 eReader

The Home E-Reader for Windows Vista (Prototype stage): http://www.ricavision.com

The Home E-Reader is a small handheld portable Windows SideShow device that connects wirelessly to a Windows Vista PC. It combines the convenience of electronic documents with wireless access to Windows Vista. It has a reflective eInk type display that is optimized for reading documents so that reading with the Home E-Reader is as comfortable as it is on paper. It can cache a large number of pages on the device so that it can also be used offline. It also includes stylus capability.

As small and lightweight as a single book, the Home E-Reader allows users to download and take along newspapers, books, and documents, or upload them to share with family, friends, or co-workers. In addition, the stylus capability enables the user to make notes that can be easily transferred to a PC. As electronics become more integrated into our contemporary lifestyle, a device like the Home E-Reader may become essential to access the computers with the ease of ordinary pen and paper. For personal or professional use, the Home E-Reader can add significant value to Windows Vista experience.

The Home E-Reader uses the SideShow as the primary GUI and Windows Vista as the means by which pages are actually rendered for display on the device.

3.2 eChatter

The MK140 eChatter for Windows Vista (Prototype stage): http://www.ricavision.com

The MK140 eChatter is a small handheld portable Windows SideShow device that connects wirelessly to a Windows Vista PC. With the MK140 eChatter, a user can compose emails and instant messages on the 5.0" WQVGA LCD display with a QWERTY-layout thumb keyboard. The device can also be used as an audio headset for voice communication.

The MK140 eChatter comes with an internal battery with a 16-hour minimum lifetime in normal use as well as an external AC adapter/charger through a mini-USB.
Small and lightweight, sleek and handsome, the MK140 eChatter is designed to provide Windows Vista users with enhanced wireless email/chatting experience and significant value.

3.3 Scribbler Fridge Magnet

Windows Vista SideShow Fridge Magnet (Wednesday, 16 May 2007)
http://www.automatedhome.co.uk/New-Products/Windows-Vista-SideShow-Fridge-Magnet.html

The Home Scribbler Fridge Magnet from Ricavision is a small handheld portable device wirelessly connected to a PC running Windows Vista that functions as a normal enhanced device for Windows SideShow. The scribbler enables the user to create handwritten notes on the device's 3.5" QVGA LCD display using a stylus, and these notes may then be retained on the device or sent to the Windows Vista-based PC for further processing.

The MK 140 FM Fridge Magnet/Scribbler Device for Windows Vista (Prototype stage): http://www.ricavision.com

The MK140 FM Magnet/Scribbler is a portable device that functions like an electronic note pad with Windows SideShow capability. It combines the convenience of sticky notes with wireless access to Windows Vista. It can be easily attached to a refrigerator or wherever it is needed for maximum convenience.

The MK140 FM Fridge Magnet/Scribbler is a portable enhanced Windows SideShow device wirelessly connected to a Windows Vista PC. It enables a user to create handwritten notes on the 3.5" QVGA LCD display using a stylus, which may be retained on the device or sent to a Windows Vista PC for further processing.

The MK140 FM Fridge Magnet/Scribbler is powered by an internal battery with a 16-hour minimum lifetime in normal use and an external AC adapter and charger.

With close coordination with Microsoft, the MK140 FM Fridge Magnet/Scribbler can provide users with a convenient wireless communication capability to Windows Vista and significant value.

3.4 BambooTablet

The BambooTablet (http://www.wacom.com/BambooTablet/bamboo.php) works with any software. Many software applications have special features and tools that are designed to be used with a pen.

Touch the pen tip to the tablet to handwrite notes and emails (to enter text by hand anywhere typed text is accepted), to mark up digital documents, sign your name, navigate your desktop with a flick of the pen, and make quick sketches in a simple, easy, and more natural way than with a mouse or keyboard. Alternating among input devices such as a mouse, a keyboard, and a pen is an effective way to reduce strain on delicate muscles, tendons, and nerves.

The pressure sensitivity of such a pen would be nice to have on mobile screens.

4 Mobile Flash(Lite) widgets

4.1 Widget advantage (compared to native apps)

Widgets are mostly light weight wrapper applications for up-to-date internet content, which are easy to:

- build (with standard web development tools and languages)
- install (to be retrieved among the other mobile applications)
- use (since they are mostly single-purpose)
- monetise (ads, banners, sponsors, click-through to paid content or websites, etc.)
- track (where, when, how long and how it's used)
- update (new versions can be detected and installed automatically, with user's consent).

4.2 Flash(Lite) advantage (multi-platform & high performance in rich media)

Widgets can contain Flash(Lite) applications, which can embed, load, manipulate and/or animate interactive and optimized video, audio, bitmaps and vector graphics very well on mobile devices. A SWF file can be used in many ways, e.g.:

- embedded in an S60 widget, with Miniview enabled on the N97
- embedded in a SIS package, to become a native Symbian file
- embedded in an AIR package, to become a desktop application that resembles a customized widget or (Vista) gadget
- embedded in a web page, on the Internet, Extranet, Intranet
- embedded in web pages for digital TV (depends on set top box)
- as standalone or embedded applications and presentations on PC, CD-Rom and DVD (http://www.flash-on-tv.com/flash-to-dvd.html, http://www.armchair-travel.com/first/index.htm)

This allows giving the users a similar (familiar) and good experience on different platforms.
The application(s) should be optimized for each platform use.

4.3 Device services in FlashLite widgets

The Flash Lite Developer's Library 1.3 on forum.nokia now supports Service APIs which allow Flash Lite 3.0 applications to use powerful platform services on S60 5th Edition devices:

- Access and launch applications on a device using the AppManager Service API
- Access and manage calendar information using the Calendar Service API
- Access and manage information about contacts using the Contacts Service API
- Access and manage information about landmarks using the Landmarks Service API
- Access device logging events using the Logging Service API
- Access device location information and perform location-based calculations using the Location Service API
- Access information about media files stored on a device using the Media Management Service API
- Send, retrieve, and manage messages such as SMS and MMS using the Messaging Service API
- Access data from the physical sensors of a device using the Sensor Service API
- Access and modify system information on a device using the SystemInfo Service API

forum.nokia: http://library.forum.nokia.com/index.jsp?topic=/Flash_Lite_Developers_Library/GUID-46EABDC1-37CB-412A-ACAD-1A1A9466BB68.html

4.4 Widget launch buttons on N97 homescreen

The N97 allows the user to add Miniview buttons for widgets on the device's home screen, which offer widget previews (from the internet or static) and shortcuts (1 click to launch it), making widget use more appealing.

Flash Lite applications can also be wrapped in SIS files (native Symbian applications), but considerable time and money is then needed for SIS licensing for new each application version.

5 New Mobile Interactions

5.1 Touchscreen

Interesting exchange on MOMOLO mailing list (February/March 2009):
Touchscreens - a herd mentality?
(http://tech.groups.yahoo.com/group/momolondon/msearch?query=Touchscreens+-+a+herd+mentality%3F&submit=Search&charset=UTF-8)

HAPI (haptic interaction for mobile devices):
Haptic research: http://www.hapi-project.com/
Blog: http://www.partly-cloudy.com/

When digital objects can be manipulated directly by hand, the interaction principles of conventional mouse-keyboard-interfaces are not valid any longer. In order to be able to develop applications for sensitive surfaces, it's therefore necessary to first create adequate interaction principles for these novel computer interfaces. Tangent (http://www.hapi-project.com/posts/view/21), an interactive multitouch surface, enables us to transfer interactions with physical objects known from everyday life to the digital medium.

Multitouch Jazzmutant Instruments:
Video: http://www.jazzmutant.com/videos/lemurlight.mov
Site: http://www.jazzmutant.com/

Scribbler mobile application (http://www.mobiletipstricks.com/scrible-on-your-windows-mobile-with-scribbler/) is designed specially for Symbian UIQ (user interface quartz) 3 phones. What good about UIQ series phones is the inherent support for touch screen functionality and Scribbler makes full use of this technology by enabling you to create or write what ever you want to on the screen of your mobile phone. From: Scrible On Your Windows Mobile with Scribbler (Nov 28, 2008).

5.2 Speech to voice

Spinvox (http://www.spinvox.com/) captures spoken messages, converts them into written text and delivers these to destinations of choice (e.g. inbox, blog, wall, space…).

SpinVox will be opening up access to its Voice Message Conversion System (VMCS™) via SpinVox Create (https://www.spinvox.com/developer), a simple interface to quickly build and monetise server based or mobile speech applications.

5.3 Mobile TV

Gadget show video (Korean mobile TV after 50 sec):
http://www.youtube.com/watch?v=clcFUKL9r-g&feature=PlayList&p=D49A28DCA1CFC60F&playnext=1&playnext_from=PL&index=3

5.4 Live video streaming from mobile to mobile

LTE (http://www.dailynet.de/Fusion-Akquisation-Uebernahmen/12122.php) is a next generation wireless technology that delivers seamless mobile broadband connectivity making applications like streaming HD Video, interactive gaming, and video conferencing as accessible on mobile devices as they are at home or the office.

Floobs (http://www.floobs.com) is a Finish startup, which develops a live streaming platform that enables live streaming from mobile phones, web cams, and dv-cams to other mobile phones and web.

Live video from mobile to mobile could enable great use experiences, e.g.:

- one user could see where the other is going and guide him in the right direction
- one user could give a virtual tour to another mobile user at home (and check out what the second one requests)

5.5 Camera values

Camera software values for distance, light, shake, etc. could be used as interaction inputs in mobile applications. The user could e.g. zoom in/out on elements on his screen by raising/lowering his mobile, using the distance measure feature of his phone's camera.

5.6 Camera target motion

Emma Persky (www.travellerwithatale.com) , Grant Skinner and others developed applications that allow a web cam to focus on ('grab') one or several targets, trace their movements, and use these movements as interaction inputs.

Such software could allow the user to point his phone camera to specific targets (e.g. on billboards, in shops, at events, or throughout the city), interact with these targets (by moving the targets or the camera), and trigger specific reactions on his phone's screen in real time.

5.7 Camera capture challenge

To make the user more aware of his surroundings, a mobile application could challenge him to look out for certain things, and capture these on camera (as 'proof'). On capturing something, the application should instantaneously check the input (against images in the database) and give feedback (reward, punish, or other reaction).

The required input could be basic ("something red"), or specific ("a front view of the 7th century Sutton Hoo helmet in the British museum"). The input could be automatically deleted when the application closes, or saved, uploaded, and/or shared with others (friends, teachers, game leaders, etc.).

5.8 Device motion

Nokia's accelerometer sensor values for e.g. shake (double tapping) and x, y and z axis and rotation can be used as interaction inputs in mobile applications. Such inputs demand much less precision, concentration and dexterity than conventional mobile interaction with soft and hard keys (buttons).

The Flash Lite Developer's Library 1.3 on forum.nokia now supports Service APIs (like the Sensor Service API) which allow Flash Lite 3.0 applications to use the S60 5th Edition device sensor values: http://library.forum.nokia.com/index.jsp?topic=/Flash_Lite_Developers_Library/GUID-46EABDC1-37CB-412A-ACAD-1A1A9466BB68.html

The user could e.g.
- lift the right/left side of the device upwards for the next/previous screen
- lift the top/bottom side of a device upwards for a view-mode toggle (e.g. text/image)
- rotate the device clockwise/anti-clockwise to steer a screen object, pull a virtual lever (switch), move a slider up/down, etc.
- shake the device to reset the application or return to the home screen

Reuters Slideshow widget (in progress):http://clients.tui.co.uk/reuters_slideshow
iPhone demo with sensor apps: http://www.apple.com/uk/ipodtouch/gallery/ads/index.html

6 Augmented and Virtual Reality

6.1 Virtual Reality (VR)

Jonathan Strickland wrote “How Virtual Reality Works” (http://electronics.howstuffworks.com/gadgets/other-gadgets/virtual-reality.htm/printable)

Kevin Bonsor mentions following in “How Augmented Reality Will Work” (http://www.howstuffworks.com/augmented-reality.htm): << On the spectrum between virtual reality, which creates immersible, computer-generated environments, and the real world, augmented reality is closer to the real world. Augmented reality adds graphics, sounds, haptics and smell to the natural world as it exists. >>

Virtual Reality (http://dictionary.zdnet.com/definition/virtual+reality.html) is an artificial reality that projects the user into a 3D space generated by the computer. A virtual reality system uses stereoscopic goggles that provide the 3D imagery and some sort of tracking device, which may be the goggles themselves for tracking head and body movement, or a "data glove" that tracks hand movements. The glove lets you point to and manipulate computer-generated objects displayed on tiny monitors inside the goggles.

Serious Work or Entertainment

Virtual reality (VR) can be used to create an illusion of reality or imagined reality and is used both for amusement as well as serious training. Flight simulators for training airplane pilots and astronauts were the first form of this technology, which provided a very realistic and very expensive simulation.

Spatially Immersive Environments

Virtual reality has other variants. Spatially immersive displays use multi-sided rooms that you walk into, and an "immersive theater" or "immersive wall" uses a large flat or curved screen (8-24' long) that completely fills your peripheral vision. Desktop virtual reality (desktop VR) uses a computer to play games and view environments that you move around in, although they lack the 3D reality of true VR systems. See head mounted display, 6DOF, cyberspace, VRML, mixed reality, virtual world and Second Life.

Virtual Reality at the Dentist

In this application, the child is looking through the goggles and manipulating the scenes that he sees with a game controller. (Image courtesy of I-O Display Systems, www.i-glasses.com)

Fakespace Systems' CAVE products simulate a VR environment for various purposes, such as testing the design of a new building (train station above) or learning how to operate a Caterpillar bulldozer (below). In the latter, the steering wheel on the left meets the real steering wheel on the right in virtual space. CAVE was developed by the Electronic Visualization Laboratory at the University of Illinois in the early 1990s. (Images courtesy of Fakespace Systems Inc., a subsidiary of Mechdyne Corporation, www.mechdyne.com)

The 6 Degrees Of Freedom or 6DOF (http://dictionary.zdnet.com/definition/6DOF.html) are the amount of motion supported in a robotics or virtual reality system. Six degrees provides X, Y and Z (horizontal, vertical and depth) and pitch, yaw and roll. Three degrees of freedom (3DOF) provides X, Y and Z only. See pitch-yaw-roll.

Virtual Reality Modeling Language or VRML (http://dictionary.zdnet.com/definition/VRML.html) is a 3D graphics language used on the Web. After downloading a VRML page, its contents can be viewed, rotated and manipulated. Simulated rooms can be "walked into." The VRML viewer is launched from within the Web browser. The first VRML viewer was WebSpace from SGI, whose Open Inventor graphics library was the basis for developing VRML. Cosmo Player, WorldView and Cortona are other popular Windows viewers, and SimVRML and Virtus Voyager are well known Mac viewers.

See also: http://en.wikipedia.org/wiki/Virtual_reality

VR products: http://www.vrealities.com/
Head mounted displays: http://www.vrealities.com/hmd.html
Displays: http://www.vrealities.com/stereoscopicdisplays.html
Gloves: http://www.vrealities.com/5dtglove14.html

6.2 Augmented Reality (AR)

Kevin Bonsor mentions following in "How Augmented Reality Will Work": << Augmented-reality displays overlay computer-generated graphics onto the real world and adds graphics, sounds, haptics and smell to the natural world as it exists. >>
article: http://www.howstuffworks.com/augmented-reality.htm
other links: http://computer.howstuffworks.com/augmented-reality6.htm
printable: http://www.howstuffworks.com/augmented-reality.htm/printable

Mixed Reality (http://dictionary.zdnet.com/definition/mixed+reality.html) is a type of virtual reality that combines real and imagined images. In "augmented reality," most of the images are real. For example, using transparent headsets, you could see how that new sofa would look in your own living room, or view the 3D schematic of a jet engine while you work on the engine itself. With "augmented virtuality," most of the imagery is computer-generated. For example, you might see something real, perhaps even yourself, projected into an imaginary environment. See virtual reality.

Game idea:
Augmented reality software could allow a group of mobile users to film each other, while each of them manipulates a specific 2D graphic. This could be just fun or educational as well. If only the others can see (on their mobile screens) what your card represents in the application, then they could explain what the object is (for) and you could guess its name, so that each person in the group trains his knowledge on the related subject (e.g. medieval times). The films (with the users and their interactive 3D video objects) could be shared, reviewed and commented afterwards.

6.3 Mediascapes

The free Mscape Suite (http://www.mscapers.com) enables the creation of Mediascapes, which are applications with mobile, location–based interactive media (video, audio, images and text) that can be games, stories, experiences, tours, guides, tools, and more.

Demo: http://www.youtube.com/watch?v=BUOHfVXkUaI
Demo: http://www.mscapers.com/what-is-a-mediascape
Mediascapes: http://www.mscapers.com/browse

With more than 436 million mobile phones with GPS capabilities, Mscape has a vast potential audience. While most of today's mediascapes work with GPS (on specific Windows devices: http://wiki.mscapers.com/bin/view/Main/SupportedDevices), the Mscape plug-in architecture allows for expansion to other sensors such as infrared, Bluetooth™ wireless technology, and bio sensors, which enable even more user options (http://www.mscapers.com/about-mscapers/).

Mscape demo (after 5:48 min):
http://h30418.www3.hp.com/?rf=sitemap&fr_story=9bab5d9298338617c81e7b85fc0491de0826a439&jumpid=reg_R1002_USEN

6.4 Wikitude

Wikitude (http://www.mobilizy.com/wikitude.php) is a mobile travel guide for the Android platform based on location-based Wikipedia and Qype content. It is a handy application for planning a trip or to find out about landmarks in your surroundings.

Video demos:
http://www.youtube.com/watch?v=8EA8xlicmT8
http://www.youtube.com/watch?v=tpaJBu4BEuA&feature=related

Search 350,000 world-wide points of interests based on your current GPS location and address and display them in a list view, map view or cam view. To get started as easily as possible, two search options have been provided:
- Simple Search allows users to initiate a search just by pressing "Start Search"
- Advanced Search offers users additional search options (category, distance, and search term)

Search results are displayed on a map (normal or satellite mode) as orange dots. There is a text bubble containing a short description next to the selected point of interest.

The truly compelling feature is the augmented reality cam view, users may hold the phone's camera against a spectacular mountain range and see the names and heights displayed as overlay mapped with the mountains in the camera. Users may look out of an airplane window to see what is down there. Users may walk through a city like Seville, Spain, holding the phone's camera against a building and Wikitude tells what it is.

Wikitude AR is a Top-50 finalist in Google's Android Developer Challenge . Wikitude has been launched along with the G1 phone in October 2008 and is now available in the Android Market. Available menu languages are currently English, German, and Dutch. Content is available in English, German, Dutch, Czech and Polish.

Nokia had a similar research project with augmented reality:
http://www.youtube.com/watch?v=0HOO80RitVI&feature=related

When the user takes a mobile picture in the Nokia AR project, it is compared against the pictures in a database, so that its point of interest will be recognized, so that the POI name and details (like active telephone link) can be displayed on the mobile screen.

6.5 AR - Game

Mediamatic (http://www.mediamatic.net/) organizes exhibitions, presentations, workshops and much more (related to New Media, Art and Society). Its site freely mixes news, theory and people:
http://www.mediamatic.net/index.php?lang=en

Mediamatic organizes workshops in Amsterdam (http://www.mediamatic.net/page/9832) on new developments in interactive (media) technologies, with a cultural approach. The courses offer effective hands-on training along with sharp conceptual exploration and are about experimenting, playing, testing and having fun! Recent courses included focus on hybridity, the integration of digital components in material objects, workshops around the Fablab machinery, the (Lilypad) Arduino, game based technologies & Machinima, PureData, RFID & the Internet of Things, location based media, mobtagging, radio experiences, Interactive film & Korsakow and anyMedia documentaries.

In workshop "Augmented Reality Games" in 2, 3 and 4 June 2008 (http://www.mediamatic.net/page/36632 and http://www.mediamatic.net/page/37778/en) participants conceptualize and construct a prototype of their own Augmented Reality Game in 3 days.

6.6 AR - Training

The Virtual Reality Lab (VRlab), EPFL in Lausanne (http://vrlab.epfl.ch/About/about_index.html) was founded in July 1988 by its director, Professor Daniel Thalmann. The laboratory is mainly involved in the modelling and animation of Three-Dimensional Inhabited Virtual Worlds. VRlab is a world leader laboratory in real-time Virtual Humans and a key player in the area of multimodal interaction, immersive Virtual Environments, and Augmented Reality.

One of Vrlab's Project European project is STAR (http://vrlab.epfl.ch/Projects/projects_index.html), which covers various aspects of augmented reality applied to enhance animations concerning virtual actors manipulating objects for the purpose of training operability of industrial equipments.

6.7 AR - Work

The ARTHUR (Augmented Round Table for Architecture and Urban Planning) project (http://www.vr.ucl.ac.uk/projects/arthur/) has developed an augmented reality interface for round table design meetings. Using see through augmented reality glasses developed by Ericsson Saab Avionics the ARTHUR round table generates virtual models of the design scheme being discussed. Twin cameras fitted to the glasses and computer vision techniques provide head tracking for the users, as well as tracking real world placeholder objects on the table that allow the users to interact with the virtual model.

The virtual model is manipulated by moving the placeholders. This manipulation may entail movement of components or building blocks tied to the placeholders, or the placeholders may be linked to control points in a more complex parametric building object. In this way moving placeholders can alter the complex curves of a three dimensional surface or adjust the series of parametric construction components that would make that surface constructible. The see through glasses and the real world placeholders mean that all members of the round table have equal access to the design user interface.

ARTHUR will also develop a series of simulations and visualisations of aspects of building performance, so that the consequences of design changes can be evaluated while the design is being manipulated. In this way, the effects of moving building blocks relative to each other on patterns of pedestrian movement could be visualised through a real time simulation of pedestrians flows on the ARTHUR tabletop.

Dates: 2001-2004
Value: £405,000 (total value £2.23m)
Principal Investigator: Professor AR Penn
Other Investigators:
Recognised Researchers: Chiron Mottram, Ava Fatah gen. Schieck, Stefan Kueppers
Project Partners: Fraunhofer-FIT, Foster and Partners, Ericsson Saab Avionics, Linie 4, Aalborg University
Department: Bartlett
Organisation: University College London

6.8 MagicSymbol

MagicSymbol™ (demo: http://www.magicsymbol.com/) is the next generation of 'reveal' technology, providing a unique experience. On filming themselves with a (2D) card, participants will see themselves on screen and on their cards will appear a (3D) video animation (with sound and interaction). Move and spin the card around, and the (3D) video clip stays magically glued to the surface.

You can create such augmented reality (also) with (F)LARToolkit and Papervision. Demos:

Smart Grid: http://ge.ecomagination.com/smartgrid/?c_id=Huff#/augmented_reality

John Lindquist: http://pv3d.org/2009/03/12/augmented-reality-flartoolkit-demo-reel/

Seb Lee-Delisle: http://www.sebleedelisle.com/?p=383

6.9 Holotronica

Holotronica (from holographic and electronica) describes all artistic holotronic works.

6.10 ARToolKit

ARToolKit (http://artoolkit.sourceforge.net/ and http://www.hitl.washington.edu/artoolkit/) is a software library for building Augmented Reality (AR) applications. These are applications that involve the overlay of virtual imagery on the real world. For example, in the image to the right a three-dimensional virtual character appears standing on a real card. It can be seen by the user in the head set display they are wearing. When the user moves the card, the virtual character moves with it and appears attached to the real object.

One of the key difficulties in developing Augmented Reality applications is the problem of tracking the users viewpoint. In order to know from what viewpoint to draw the virtual imagery, the application needs to know where the user is looking in the real world.

ARToolKit uses computer vision algorithms to solve this problem. The ARToolKit video tracking libraries calculate the real camera position and orientation relative to physical markers in real time. This enables the easy development of a wide range of Augmented Reality applications.

Some of the features of ARToolKit include:

* Single camera position/orientation tracking.
* Tracking code that uses simple black squares.
* The ability to use any square marker patterns.
* Easy camera calibration code.
* Fast enough for real time AR applications.
* SGI IRIX, Linux, MacOS and Windows OS distributions.
* Distributed with complete source code.

ARToolKit was originally developed by Dr. Hirokazu Kato, and its ongoing development is being supported by the Human Interface Technology Laboratory (HIT Lab) at the University of Washington, HIT Lab NZ at the University of Canterbury, New Zealand, and ARToolworks, Inc, Seattle.

ARToolKit is made available freely for non-commercial use under the GNU General Public License. Commercial licenses to a professional implementation of ARToolKit are available for users for whom the GPL is not suitable, or who require a higher level of support, or who require customization or other specialist modifictions. Commercial licenses are administered by ARToolworks, Inc., Seattle, WA, USA.

6.11 FLARToolkit

FLARToolkit (http://www.libspark.org/wiki/saqoosha/FLARToolKit/en) detects the marker from an input image and calculates the camera position in the three-dimension space.
libspark (FLARToolKit) site: http://www.libspark.org/wiki/WikiStart/en

6.12 Papervision (3D and X)

PapervisionX (http://blog.papervision3d.org/) is the next version of Papervision3D, based on Flash10's new 3D API. Papervision3D (http://code.google.com/p/papervision3d/) is an open source 3D engine for the Flash platform. Flash allows animation and interaction in the 3D augmented reality. The user could e.g. blow or speak into the microphone to trigger actions (blow out candles, blow on wind turbines, speak-command objects, etc.).

6.13 Pure Data (Pd)

Pure Data or Pd (http://en.wikipedia.org/wiki/Pure_Data) is a graphical programming language developed for the creation of interactive computer music and multimedia works. Pd is an open source project and has a large developer base working on new extensions to the program.

Pure Data or Pd (http://puredata.info/) is a real-time graphical programming environment for audio, video, and graphical processing, which is easy to extend by writing object classes ("externals") or patches ("abstractions"). The work of many developers is already available as part of the standard Pd packages and the Pd developer community is growing rapidly. Recent developments include a system of abstractions for building performance environments; a library of objects for physical modeling; and a library of objects for generating and processing video in realtime.

Pd is free software and can be downloaded either as an OS-specific package, source package, or directly from CVS. Pd was written to be multi-platform and therefore is quite portable; versions exist for Win32, IRIX, GNU/Linux, BSD, and MacOS X running on anything from a PocketPC to an old Mac to a brand new PC. It is possible to write externals and patches that work with Max/MSP and Pd using flext and cyclone.

Example: http://doboxrecordings.com/db/index.php/2007/05/10/maker-faire-2007-pd-osc-processing-quartz-composer/

6.14 Stereovision

Stereovision is actually the normal way almost everyone sees in the real world. We all have two eyes and perceive depth by a mental interpretation of the world we view through those two eyes. Each eye gives a slightly different perspective on the objects viewed and this slight difference provides depth cues to our brain. Objects which are relatively close will shift a larger distance horizontally when viewed from one eye and then switching eyes. Objects which are relatively far away shift a smaller amount. Hold your finger up about 6 inches in front of your nose. Close one eye, then switch back and forth quickly. See the image shift? That left and right slightly shifted perspective is what creates the depth perception that your brain interprets. That's why you have 2 eyes!

The E-D software and drivers automatically convert the images on your monitor into a left and right perspective. Each image flickers back and forth so fast on your monitor that it is not noticeable to the human eye.

Working synergistically with our advanced active glasses, the flickering of each image is precisely timed with flickering of the left and right lens of the glasses, again faster than can be perceived. Thus, stereovision as it pertains to viewing a virtual world means that you have the capability to produce two separate images and that each eye sees only one of the two images. If this is done correctly, your mind will combine the two images in such a way that you actually have the perception of being "in" the virtual world rather than just viewing a picture of the virtual world. This adds a level of realism and immersion to games and other images that is otherwise unattainable. In addition to perceiving depth "into" the monitor it is also possible to make objects appear to come "out of" the monitor. Almost all fairly recent computers and games come pre-equipped with the necessary tools for proper viewing.

It's important to note that eDimensional 3D images are in full color and do not use the old fashioned red/blue effect. The colors below are just to emphasize the difference in perspective.

Info: http://www.edimensional.com/category_info.php?cPath=21

Products:
http://www.edimensional.com/index.php?cPath=21&osCsid=bc3398d46fd89e2313262f316ade7b3d&ref=73&gclid=COD62Zadw5kCFRCdnAod7W-Dtg

E-D Wireless 3D Glasses for the PC $99.95
Set yourself free of wires and view amazing 3D gaming action through our wireless 3D glasses.

* Works on virtually all PC games
* Supports virtually any PC
* Supports both CRT and LCD monitors
* Comfortable and adjustable

E-D Wired 3D Glasses for the PC $69.95
Works just like our critically acclaimed wireless glasses and comes with everything you need to play all of your favorite games in stunning 3D. Sleek and stylish -- you won't believe your eyes!

Vuzix - VR920 Head Mounted Display $399.95
If you're looking for a head mounted display with built-in screens, we now offer the Vuzix VR920. Features 3D, head tracking, audio, mic and more in a compact and portable display device.

3D Combine 2D to 3D Photo Software $39.95

Convert your own pictures into real 3D instantly. 3DCombine gives you a new and fun way to take your digital photos and images and view them in amazing 3D with our wired or wireless 3D glasses.

3D Glasses for Samsung and Mitsubishi Televisions $149.95
Did you know that the latest DLP and Plasma TVs from Samsung and Mitsubishi now offer high resolution 3D as a standard option? If you've got one of these televisions, you'll need our new viewing systems to unleash the full 3D potential.

Long Range Viewing Equipment for Stereo Projection $295.00
Specially designed stereoscopic viewing equipment for use in conjunction with stereoscopic projection, our powerful custom emitter and shutter glasses view 3D images up to 20' away. Laboratory tested for exceptional performance at a fraction of the price.

6.15 Video glasses

Head Mounted Display (http://dictionary.zdnet.com/definition/head+mounted+display.html) is a display system built and worn like goggles that gives the illusion of a floating monitor in front of the user's face. The head mounted display (HMD) is a critical component of a body-worn computer (wearable computer). Single-eye units are used to display hands-free instructional material, and dual-eye, stereoscopic units are used for virtual reality applications. See heads-up display, body-worn computer and CAVE.

EEYE (http://www.eeye.hk/product.asp) has 3 types of video glasses:
- TV viewing
- Film viewing
- Film viewing & capturing

Vuzix (http://www.vuzix.co.uk/) has many types of video glasses:

Vuzix Wrap 920AV (January 2009: http://www.vuzix.com/UKSITE/iwear/reviews.html)
The Wrap 920AV is the world's "first in class" Video Eyewear that takes the form of a standard pair of fashionable sunglasses with revolutionary 'see-thru' Quantum optics technology that doesn't block out the world around you. Its unique 'see-thru' lens design allows you to stay grounded in the real world while watching your private video display or experiencing augmented or mixed reality on mobile devices such as the iPhone. A revolutionary patent pending electronic IPD system enables adjustment for virtually all facial structures and optional prescription lens inserts provide the ultimate solution for eyeglass wearers.The Wrap 920AV provides a 60-inch monitor as seen from 9 feet and has available expansion options – all in a lightweight package that is less than 3 ounces.
Coming Autumn of 2009

Vuzix AV230 XL

The AV230 XL is a wearable display that transforms your small portable video player screen into a personal home cinema with a virtual 44-inch screen as viewed from nine feet. Dual displays provide crisp images and vivid colours through optics aligned to military specifications. Worn like regular glasses, the AV230 XL includes separate focus adjustments for each eye and removable high-quality stereo earphones. A single removable AA battery affords up to 17 hours of viewing enjoyment.Price: £149.99 / €169.99 (Including VAT at 15%)

Vuzix iWear VR920

Step inside with the Vuzix iWear VR920, the world's most popular virtual reality and gaming solution that incorporates immersive big-screen 3D video, head tracking, microphone and audio. You can move, look around, listen, and communicate with others - almost like being in the 'real' world. The iWear VR920 opens amazing new doors to the World Wide Web. Price: £299.99 / €349.99 (Including VAT at 15%)

YouTube videos:

Vuzix mobile TV:
http://www.youtube.com/watch?v=907Z__2ohKw

Vuzix augmented reality:
Lego - http://www.youtube.com/watch?v=SYbUJJDpcs8
Virtual Reality Fishing - http://www.youtube.com/watch?v=k3l5YD_FOfQ&feature=related

Vuzix widescreen video glasses:
http://www.youtube.com/watch?v=jyjOG39jsDc
http://www.youtube.com/watch?v=-uxqO2AkfAc

Vuzix full review (mentioning 3D stereoscopic option, pros + cons):
http://www.youtube.com/watch?v=4MR3AxwpZsI&feature=related

6.16 3D without glasses

Wazabee (http://wazabee.net/) is a registered brand of Spatial View Inc.

3DeeShell

Wazabee 3DeeShell is the world's first protective case designed for viewing glasses-free 3D content on the Apple iPhone and iPod Touch. Create and share relevant stereo 3D images with friends, family or anyone using an iPhone. Enjoy the visual excitement of truly vibrant 3D content and access content from online sources or upload your own 3D imagery. Watch clips and play games in 3D in the palm of your hand without the need for special glasses or an external display. Easily removable for enjoying both regular 2D and vivid 3D content. 49.99 EUR / 49.99 USD Excluding VAT and shipping,.

3DeeCamera

3DeeCamera enables you to create 3D images using your built-in iPhone camera. Take two side-by-side photographs or choose two stereo-pairs from storage to easily generate stunning 3D images by shifting, rotating and scaling the image pairs. Immediately create and share 3D images with friends, family or anyone using an iPhone.

3DeeVUsion

The ultimate 3D viewing application for the iPod Touch. 3DeeVUsion allows you to select a pair of images from the Photo Library for 3D viewing. Experience and view any stereo 3D content including images generated with your iPhone or any other stereo 3D Camera.

3Dee!oadr

An easy and simple way to connect with your Yahoo Flickr! account. The 3Dee!oadr is available to search and view over 500,000 pre-existing stereoscopic 3D images. Furthermore, it allows you to upload your own content to a Flickr! Account.

3DeeFlector (Available Spring 2009)

Introducing the Wazabee 3DeeFlector - A removable overlay screen designed for viewing glasses-free 3D content on all 13.3 inch notebooks! Enjoy the excitement of truly vibrant content by turning your notebook into 3D. Watch clips, play games in 3D and experience a perfect 3D impression without loss of image quality. Build your professional 3D business presentation without the need for special glasses or an external display. Create and share relevant stereo 3D images with friends, family or anyone using a 13.3 inch notebook.

6.17 VR Gloves

The 5DT Data Glove 14 Ultra (http://www.vrealities.com/5dtglove14.html) has been designed to satisfy the stringent requirements of modern Motion Capture and Animation Professionals. It offers comfort, ease of use, a small form factor and multiple application drivers. The high data quality, low cross-correlation and high data rate make it ideal for realistic realtime animation. The 5DT Data Glove 14 Ultra measures finger flexure (2 sensors per finger) as well as the abduction between fingers. The system interfaces with the computer via a cable to the USB Port (Platform Independent). It features an autocalibration function, 8-bit flexure and abduction resolution, extreme comfort, low drift and an open architecture. The optional Wireless Kit interfaces with the computer via Bluetooth technology (up to 20m distance) for high speed connectivity for up to 8 hours on a single battery. Right- and left-handed models are available. One size fits many (stretch lycra).

SPECIFICATIONS

Bend Sensing Method: Fully enclosed fiber optic bend sensors

Number of Sensors: (two per finger) as well as abduction between fingers

Resolution: 8-bits (256 positions/finger)

Output Interface: USB 1.1, Minimum 75hz sampling rate, 200hz per finger Tracking, Integrated pitch and roll sensor
Glove fitting: RH & LH versions; "One size fits many"
Calibration Routine: Open & close hand; each user

5DT Data Glove 5 Ultra (NOT 14 Ultra):
5DT Data Glove 5 Ultra, Right Handed - $895.00
5DT Data Glove 5 Ultra, Left Handed - $895.00
Wireless Glove Kit - $1495.00

6.18 Arduino

The LilyPad Arduino (http://www.arduino.cc/en/Main/ArduinoBoardLilyPad) is a microcontroller board designed for wearables and e-textiles. It can be sewn to fabric and similarly mounted power supplies, sensors and actuators with conductive thread.

Tutorials, etc: http://www.arduino.cc/playground/

Pguino is e.g. a real world application based on the Arduino, which measures the MPG (miles/gal) of a driver to provide feedback to the driver so they may change their driving habits and conserve on gas. This application encompasses the use of an LCD, button menu, and data input and manipulation.

6.19 Collective Emotions in Cyberspace

The CyberEmotions consortium (http://www.cyberemotions.eu/) began in February 2009 for a period of four years. The project focuses on the role of collective emotions in creating, forming and breaking-up e-communities. The project involves nine partners in six different countries in Europe, including experts in the psychology of emotions, complexity, web data collection, artificial intelligence and virtual reality.

The main aims of the project are:

- To understand the role of collective emotions in creating, forming and breaking-up ICT mediated communities as a spontaneous emergent behaviour occurring in complex techno-social networks
- To understand the relationship between emotions of individuals as revealed by subjective experience, behaviour, physiological responses, and expressions with online emotional behaviours of ICT mediated dyads and groups in an integrative multi-level approach
- To create decentralized adaptive tools which allow the amplification of positive or the suppression of negative collective emotions in e-societies and will take into account the heterogeneity of interacting humans
- To prepare the theoretical background for the development of the next generation emotionally-intelligent ICT services using models of self-organized active agents and sociophysics methods.

Understanding these phenomena is important in view of the growing role of ICT-mediated social interactions and some specific features of e-communities. The challenge of this interdisciplinary project is to combine psychological models of emotional interactions and algorithmic methods for detection and classification of human emotions in the Internet with probabilistic models of complex systems and data driven simulations based on heterogeneous emotionally-reacting agents. The theoretical foundations will be mainly based on statistical physics applied to the study of the emergent properties of many-object systems interacting in self-organized evolving networks.

Empirically, we concentrate on the issue of how to support and maintain the emotional climates of security, trust, hope, and freedom in future techno-social communities and how to prevent or resolve conflicts within them. Data on human emotions and their influence on the structure of sustainable cooperative communities will be collected from the Blogosphere, newsgroups and Internet discussion forums and compared to computer simulations based on active agent models. Finally, we plan to develop artificial agents that can help to assess the emotional states of the members of e-communities and can act as cyberadvisers in e-communities. The results of the project will build the foundations for the next generation of socially- and emotionally-intelligent ICT services.

Partners (http://www.cyberemotions.eu/partners.html) :

- Poland: Warsaw University of Technology (WUT), Centre of Excellence for Complex Systems Research [Project leader]
- Poland: Gemius SA, online research agency
- Switzerland: EPFL, Virtual Reality Lab
- UK: University of Wolverhampton, School of Computing and IT, Statistical Cybermetrics Research Group
- Austria: Österreichische Studiengesellschaft für Kybernetik (The Austrian Research Institute for Artificial Intelligence - OFAI)
- Switzerland: ETH Zurich, Chair of Systems Design
- Slovenia: Jozef Stefan Institute (JSI) Ljubljana, Department of Theoretical Physics
- Germany: Jacobs University, Bremen
- Germany: TU Berlin, Faculty of Computer Science, IKM Research Group

7 Connection

7.1 Content transfer - web/location -> mobile (easy & free)

FuturLink (http://www.futurlink.com/) establishes communication from specific locations (Wilico Access Points) or websites (with content published in the Wimob Suite) to the mobile (through Bluetooth, Infrared, USB or Wi-Fi, depending on the case), enabling the mobile to receive content for free, or to send information to Wilico APs (with or without special client applications, depending on the case).

Wimob -> web to mobile: http://www.wimob.com/overview.html
The glossy and customizable Wimob web button invites the user to click and explore it. A friendly interface then opens, allowing him to receive the web content on his mobile phone easily and for free. This is a great way to promote content and brand, to familiarize users with (the download of) mobile content and mobile applications (from the web), and to establish a multi platform reach.

Wilico -> location to mobile: http://www.futurlink.com/en/location_to_mobile.php
To promote the new BBC America series “Robin Hood”, a 15 second video was sent via Bluetooth from 2 outdoor billboards in LA and NYC to customers and bystanders mobile phones during 4 weeks. The ones that had their Bluetooth device switched on could receive the video spot in a matter of seconds, after accepting an invitation on their mobile phones via Bluetooth. Results: Huge success for BBC America, with over 6,100 downloads and a 39.7% acceptance rate with a positive engagement rate of 87.3%

7.2 Bluetooth

Ian Volans wrote an interesting article:
Bluetooth - accentuating the generation gap (http://vodafone.com/flash/receiver/05/articles/index08.html)

7.3 Radio-frequency identification (RFID)

Radio-frequency identification (according to Wikipedia) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal.

There are generally two types of RFID tags: active RFID tags, which contain a battery and thus can transmit its signal autonomously, and passive RFID tags, which have no battery and require an external source to initiate signal transmission.

Current uses:

Race Timing, Passports, Transportation payments, RFID and asset management, Product tracking, Transportation and logistics, Lap scoring, Animal identification,Inventory systems, Human implants, Libraries, Schools and universities, Museums, Social retailing,Miscellaneous

Potential uses:
Replacing barcodes, Telemetry, Identification of patients and hospital staff

Human implants

Implantable RFID chips designed for animal tagging are now being used in humans. An early experiment with RFID implants was conducted by British professor of cybernetics Kevin Warwick, who implanted a chip in his arm in 1998. In 2004 Conrad Chase offered implanted chips in his night clubs in Barcelona, Spain and in Rotterdam, The Netherlands, to identify their VIP customers, who in turn use it to pay for drinks.

In 2004, the Mexican Attorney General's office implanted 18 of its staff members with the Verichip to control access to a secure data room.

Security experts have warned against using RFID for authenticating people due to the risk of identity theft. For instance a man-in-the-middle attack would make it possible for an attacker to steal the identity of a person in real-time. Due to the resource constraints of RFIDs it is virtually impossible to protect against such attack models as this would require complex distance-binding protocols.

The Food and Drug Administration in the US has approved the use of RFID chips in humans. Some business establishments have also started to chip customers, such as the Baja Beach nightclub in Barcelona.This has provoked concerns into privacy of individuals as they can potentially be tracked wherever they go by an identifier unique to them. There are concerns this could lead to abuse by an authoritarian government or lead to removal of freedoms.

On July 22, 2006, Reuters reported that two hackers, Newitz and Westhues, at a conference in New York City showed that they could clone the RFID signal from a human implanted RFID chip, showing that the chip is not hack-proof as was previously told.

Privacy

The two main privacy concerns regarding RFID are:
1. Since the owner of an item will not necessarily be aware of the presence of an RFID tag and the tag can be read at a distance without the knowledge of the individual, it becomes possible to gather sensitive data about an individual without consent.

2. If a tagged item is paid for by credit card or in conjunction with use of a loyalty card, then it would be possible to indirectly deduce the identity of the purchaser by reading the globally unique ID of that item (contained in the RFID tag).

Most concerns revolve around the fact that RFID tags affixed to products remain functional even after the products have been purchased and taken home and thus can be used for surveillance and other purposes unrelated to their supply chain inventory functions. The concerns raised by the above may be addressed in part by use of the Clipped Tag.

The Clipped Tag is an RFID tag designed to increase consumer privacy. The Clipped Tag has been suggested by IBM researchers Paul Moskowitz and Guenter Karjoth. After the point of sale, a consumer may tear off a portion of the tag. This allows the transformation of a long-range tag into a proximity tag that still may be read, but only at short range – less than a few inches or centimeters. The modification of the tag may be confirmed visually. The tag may still be used later for returns, recalls, or recycling.

7.4 Telemetry

Telemetry (according to Wikipedia) typically refers to wireless communications (i.e. using a radio system to implement the data link), but can also refer to data transferred over other media, such as a telephone or computer network or via an optical link or when making a robot it can be over a wire.