

Media Lab Europe

European Research Partner of MIT Media Lab



What will be the future of human relationships as mediated by technology ?

Humans have a fundamental need for contact with other humans. Our interactions and relationships with other people form a network that supports us, makes our lives meaningful, and ultimately enables us to survive. The Human Connectedness research group explores the topic of human relationships and how they are mediated by technology. Our mission is to conceive a new genre of technologies and experiences that allow us to build, maintain, and enhance relationships in new ways. We also aim to enable new kinds of individual bonds and communities that were not possible before but may be beneficial or fun.

Director	Stefan Agamanolis
Researchers	James Auger Joëlle Bitton Elena Corchero Aoife Ní Mhóráin Dipak Patel
Alumni	Arianna Bassoli Jonah Brucker-Cohen Cian Cullinan James Harris Marije Kanis Jimmy Loizeau Julian Moore Florian Mueller

<http://www.medialabeurope.org/hc>

For more information, email stefan@media.mit.edu

*Highlighted projects
January 2005*

Aura

an intimate remote awareness system based on sleep patterns

whiSpiral

a spiral-shaped shawl that carries whispers of your loved ones

Passages

a very close proximity media space

iBand

a wearable device for handshake-augmented interpersonal information exchange

Iso-phone

a total submersion telephonic experience

RAW

an audio/photographic tool for conveying minimally-mediated impressions of everyday life

tunA

a handheld ad-hoc radio device for local music sharing

Mutsugoto / Pillow Talk

a body-drawing communicator for distant partners

Open Window

an ambient virtual window for bolstering wellness and healing potential during a hospital stay

Habitat

a range of connected furniture for awareness of daily routines and rhythms between distant family members

Reflexion

a responsive virtual mirror for interpersonal communication

Breakout for Two

an exertion interface for sports over a distance

Portrait of Cati

a portrait with a sense of its personal space

One2One / Floral Display

a toolkit for creating personalized ambient media links for conveying togetherness over a distance

Palimpsest

a layered video manuscript of social interaction

iCom

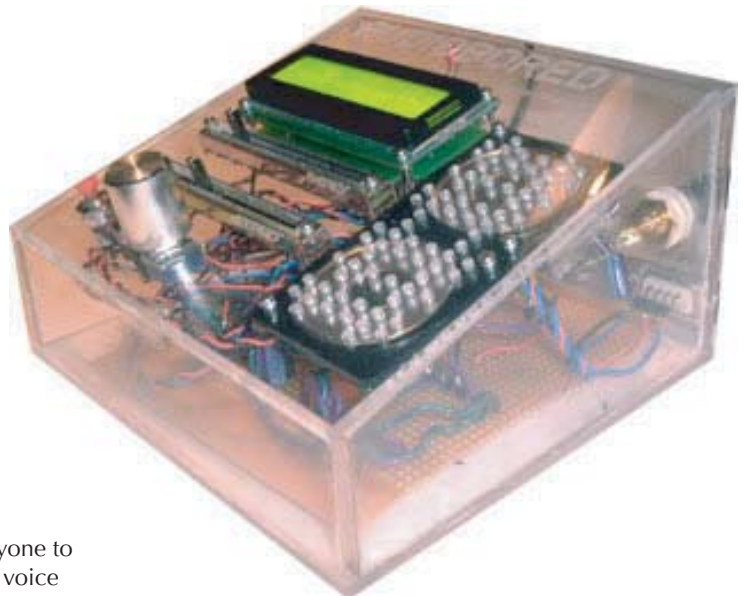
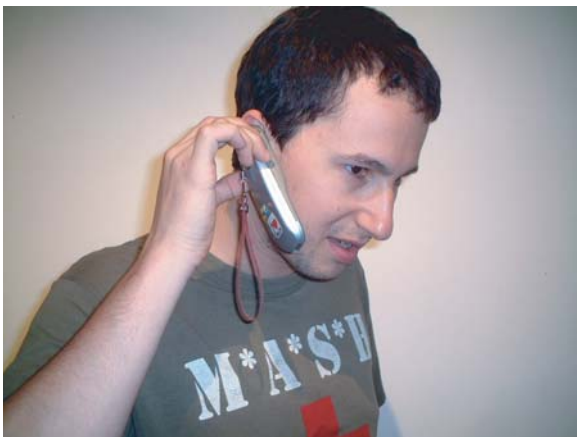
a multipoint awareness and communication portal for connecting remote social spaces

AudioBored

a public audio online message board

Jonah Brucker-Cohen, Stefan Agamanolis

AudioBored is a public audio bulletin board that allows candid opinions, thoughts, ideas, and exclamations in the form of short audio messages to be posted live in a shared web space as well as a public audio installation. By calling a toll-free number on any telephone, anyone can leave a message on this “answering machine without an owner” and share it with the world. These messages are organized by various themes and threads, and once posted they cannot be deleted.



AudioBored consists of an automated server that allows anyone to place a call from any telephone and record an anonymous voice message onto the system. The caller may select to contribute to particular topic threads or just to leave a general candid message. These messages are saved in a database that is available globally via the AudioBored web site, as well as locally on a physical answering machine. This machine, placed in a public space, has physical sliders that let passers-by navigate and listen to the messages recorded in the different threads.

AudioBored enables anybody with a telephone to post voice messages to the Internet from specific locations and scenarios in which Internet access may not be easily available, such as at public events, political rallies, entertainment spectacles, and so on. For example, people in the midst of a crowded protest march could voice their opinions from the center of the action, and these messages would be accessible on the AudioBored web site immediately upon being recorded.

AudioBored augments the concept of a traditional telephone answering machine by adding a networked component to its everyday use and situating it in a public space. The project also adds a voice component to the previously text-only platform of online message boards. The system can store messages over time to build a personal or public archive of ongoing communications within an organization, individual relationship, or community.



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Aura

an intimate remote awareness system based on sleep patterns

Aoife Ní Mhóráin, Dipak Patel, Stefan Agamanolis

Aura is a prototype background communication device that aims to create a sense of emotional presence between two people who are separated by space or time. An augmented sleeping mask records sleeping rhythms and infers an emotional state of the wearer. This information is transmitted to a remote location and mapped to musical selections in a personal keepsake “music box” that represents the remote partner.

One of the most delicate forms of connection between close partners is rooted in a sense of awareness of each other’s emotional state. For example, one partner can often tell if the other is feeling down by interpreting, sometimes unconsciously, a variety of subtle signals to which they have been attuned over a period of time, like body movement, facial expression, voice quality, and so on. Physical or temporal separation, consequently, can impede partners from maintaining this kind of intuitive awareness.

Aura investigates the possibility of reinstating this subtle awareness regardless of separation. Rather than just a cognitive awareness of someone else’s state, Aura aims to convey emotional information in a visceral way, similar to what is sensed when one has a “gut feeling” about something.

Aura consists of a sleeping mask with an embedded electro-oculogram that can detect eye movements typical of REM sleep. Data from the mask is used to grossly estimate whether or not the wearer has had a good night’s sleep, which is in turn used to infer if he/she is in a good or bad mood the following day. This information is transmitted to the remote location and mapped to music compositions or selections that play inside a precious box recalling a jewelry or music box. By opening the box the remote partner can listen to music that was composed from their loved one’s previous night of sleep.

Music was chosen as a medium because we felt it was something that could evoke the visceral quality of the emotions inferred from the captured data. Conceptually, Aura aims to enable the user to not only listen to but also feel their distant loved one’s emotional state. The project has highlighted a number of difficulties in designing remote awareness systems, especially those that use physiological measurements as a basis for capturing emotion. Ultimately we feel that a greater understanding of the mechanisms of human emotion is required to produce communication devices capable of abstracting and reconstructing emotional information effectively.



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Breakout for Two

an exertion interface for sports over a distance

Florian 'Floyd' Mueller, Stefan Agamanolis

Traditional sports foster bonding and team spirit through the sharing of a physically taxing competitive activity. This project aims to build the same sense of community over a distance, not with email and instant messengers, but with real balls, sweat, and exertion.

Breakout for Two employs an *exertion interface* — an interface that deliberately requires intense physical effort and can be expected to be physically exhausting when used for an extended period of time. In short, it gets your adrenaline moving and makes you sweat, just like any physical exercise or sport.

The Breakout for Two game is a cross between soccer, tennis, and the popular video game *Breakout*. Participants in remote locations must throw or kick a real soccer ball at a local physical wall to break through a projection of virtual “blocks” that partially obscure a live video image of the other player. The effect is one of a virtual game “court” in which the competitors are separated by a barrier through which they can interact.

The blocks on each player's screen are synchronized — when one player breaks through a block, the same block disappears from the other player's screen. The player who breaks through the most blocks wins. Games typically last several minutes and can incorporate varying levels of difficulty.

Our hypothesis is that augmenting an online sport or gaming environment with exertion will greatly enhance the potential for social bonding, just as playing an exhausting game of squash or tennis with a new acquaintance or co-worker helps to “break the ice” and build friendships. The heightened state of arousal induced by the exertion also potentially makes the interaction more memorable.

We conducted a study to test these hypotheses and evaluate the effects of exertion interfaces, with encouraging results. Players in Breakout for Two said they got to know each other better, became better friends, felt the other player was more talkative, and were happier with the transmitted audio and video quality in comparison to a control group playing an analogous game using a traditional non-exertion keyboard interface.

A potential future application is a sort of virtual athletic facility or “country club” that consists of several exertion environments for engaging in sports at a distance.



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Desktop Subversibles

a collection of background awareness applications based on desktop ubiquity

Jonah Brucker-Cohen, Stefan Agamanolis

Desktop Subversibles capitalizes on the ubiquity of our interactions with computer desktops to convey awareness of activity and a sense of shared network space among the members of an online community. The applications in the suite add a networked and physical dimension to standard desktop activities like copy/paste, mouse movements, and clicks to highlight their collective and collaborative potential.

Download Desktop Subversibles at <http://www.coin-operated.com/ds>

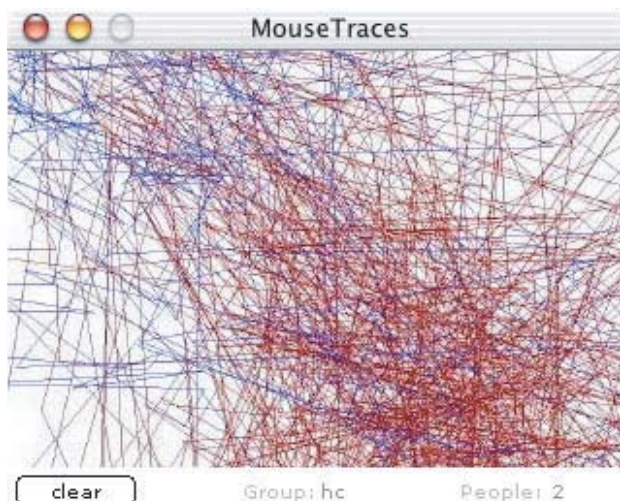


Clicks / a distributed mouse click collector rendered as sound in public space

Clicks is a networked application that collects mouse clicks made by each person connected. Once collected, clicks are sent to a central server and each connected client is assigned a unique tone which is played in a physical location, creating an ambient sound installation serving as an indicator of computer use on a potentially global scale.

MouseTraces / a background graphical display of mouse movements between two people across distance

MouseTraces is an application that focuses on background connectedness and awareness between two people across distance. Looking at the specific relationship of networked computer usage, the project captures mouse movements on the desktop and transmits a graphical representation of this movement across the network to the other person.



MouseMiles / a networked collective mouse mileage indicator manifested in physical space

MouseMiles is a networked mileage indicator for your mouse. Over time it calculates the mileage traveled by every connected mouse and relays that information to a central server. The server collects all of the incoming mileage and outputs the distance in real-time to move a physical object, such as a model train around a track.



Clipt! / a networked sticky-note application that provides ambient glimpses of the copy and paste activity of other users

Clipt! is a networked application that provides an ambient connection to other people's desktops by distributing the contents of each user's clipboard. The project works like an automatic Post-It or sticky note that is meant to allow people to catch a glimpse of the cut and paste activity on other people's machines.



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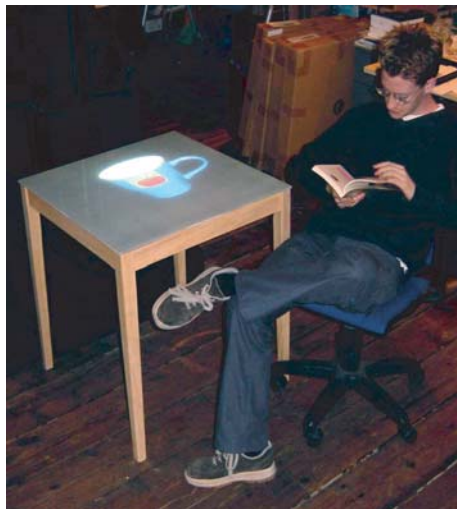
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Habitat

a range of connected furniture for awareness of daily routines and rhythms between distant family members

Dipak Patel, Aoife Ní Mhóráin, Stefan Agamanolis

In family relationships, awareness of daily cycles and routines (or more importantly, deviation from these patterns) is particularly important. This awareness helps to convey reassurance and a sense of context for communication, and it provides a means for background synchronization of rhythms between those in the bond. Habitat explores the potential of using household furniture as a network of distributed ambient display appliances for conveying this kind of awareness between family members separated by a distance.



The current Habitat system comprises two geographically separate, networked café or kitchen tables. Each table integrates a computer, an ISO-standard RFID (Radio Frequency Identification) tag reader, and a video projector.

Unique RFID tags are embedded in objects typically placed on kitchen tables at each site, such as cups, plates, books, and so on. Placing these items on the table causes messages to be sent to the remote table, which displays a graphical representation of the objects. The system operates in both directions, conveying impressions of presence and activity around the tables at each site.

When items are removed, their representations at the far end fade away slowly, enabling in a single glance an impression of the recent history of events and overall daily rhythms around the far table. The system is designed to operate reliably 24 hours a day and can handle multiple tagged objects simultaneously at each site.



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iBand

a wearable device for handshake-augmented interpersonal information exchange

Marije Kanis, Cian Cullinan, Anna Gavin, Stefan Agamanolis (Media Lab Europe); Niall Winters (London Knowledge Lab)

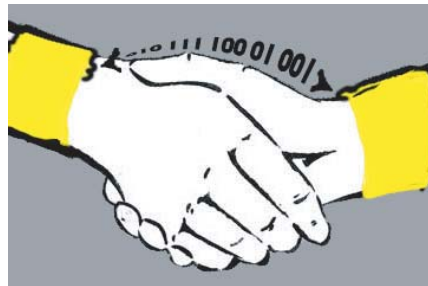
Initial meetings and introductions mark the first moments of building new relationships. Yet these important moments are often awkward or forgotten, sometimes because of the natural failings of human memory (not being able to recall someone's name) or because there is a lack of a catalyst for a richer interaction. The iBand is a new wearable technology that aims to address these problems. The device is a bracelet that stores and exchanges information about you and your relationships. Data exchange occurs only when you shake hands with another user. Information gathered and processed is reflected on the bracelet itself and can serve as a reminder or as an ice breaker for further conversation.

The iBand project aims to leverage the simple gesture of the handshake, coupled with the qualities of jewelry to act as tangible keepsakes and reminders of relationships, to explore potential applications at the intersection of social networking and ubiquitous computing.

The prototype is a wearable bracelet, adjustable in design for different kinds of users (male, female). When worn, the circuit board and battery lay flat under the wrist and an infrared (IR) transceiver is positioned near the back of the thumb pointing toward the hand such that it is visible to an IR transceiver on another device when shaking hands. A handshake is detected via infrared transceiver alignment combined with hand/wrist orientation and gesture recognition using a 2-axis accelerometer.

In a full experience with this prototype, the user first enters contact/biographical information into a kiosk, which stores it in a database and assigns a unique ID number to their iBand. The user can also create a personal logo that appears on the LED display woven into their device. When the user shakes hands with another iBand user, ID numbers and logos are exchanged and stored. The LED display cycles through the stored logos at a pace reflecting the number of hands that have been shaken. When the user returns to the kiosk, it displays a list of new contacts by looking up the collected ID numbers in the database.

We are currently working on further prototypes that include additional functionality and richer wearable displays to support a variety of social networking and interaction analysis applications.



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iCom

a multipoint awareness and communication portal for connecting remote social spaces

Stefan Agamanolis

iCom is a media installation that forms a bridge between different locations. It operates in a continuous and background mode, integrated with the surrounding space. The portal enables awareness of remote activity and promotes a sense of connection among those generating it — be they colleagues, family members, or friends in distant lands.

iCom connects several sites at Media Lab Europe and the MIT Media Lab 24 hours a day. Its normal mode is *background*, providing continuous ambient awareness between all stations, but at any time it can be transformed into a *foreground* mode for ad-hoc tele-meetings or casual interaction, without the need to dial telephones or wait for connections to be established.

The screen projections at each site are synchronized, enhancing a sense of shared space and reciprocity. In addition, nothing is recorded or displayed outside of the iCom stations. If you can't see yourself on the screen, then you know others can't see you either.

iCom also functions as a bulletin board for community messages or announcements, sent via email. Clicking on a message title causes its full text to be displayed. The titles are listed in chronological order with varying size to reflect the age and popularity of a posting.



This project is being conducted in association with the Object-Based Media group at the MIT Media Lab.



The system conserves bandwidth by reducing frame rate where no activity is detected and by not transmitting audio when nobody is speaking. Clicking the windows changes their arrangement, allowing the display to be customized for a particular activity. Transmitted resolution is adjusted to reflect the size of the window. Use of connectionless networking protocols enables the system to operate effectively in congested or problematic networks.

Echo-cancelling speaker/microphones enable full duplex speech transmission. Audio at each site can be turned on and off by clicking its corresponding indicator box at the bottom of the screen.



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Iso-phone

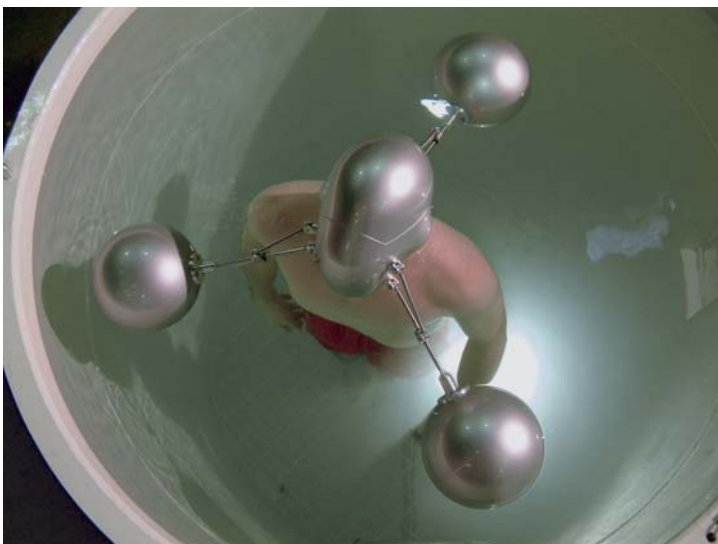
a total submersion telephonic experience

James Auger, Jimmy Loizeau, Stefan Agamanolis

The Iso-phone is a telecommunication device providing a service that can be described simply as a meeting of the telephone and the floatation tank. By blocking out peripheral sensory stimulation and distraction, the Iso-phone creates a telephonic communication space of heightened purity and focus.

The user wears a helmet that blocks out all peripheral sensory stimulation while keeping the head above the surface of the water. The water is heated to body temperature, dulling the sense of touch and blurring the physical boundaries of the user's body. The result is a space providing a pure, distraction free environment for making a telephone call. The only sensory stimulus presented is a two-way voice connection to another person using the same apparatus in another location.

Only a couple of decades ago our primary means of telecommunication was the telephone box, which essentially provides a contextually neutral space for remote conversation. Entering a telephone box equates to a cessation of all other activities, allowing the individual to concentrate solely on the conversation. The growth of mobile telephone usage however has led to telecommunication being practiced in an efficient rather than a qualitative manner. The mobile phone decontextualizes conversation. It extracts talk from specific social context, offering the user freedom to communicate from virtually any social situation regardless of the suitability. It is down to the sensitivity and discretion of the user to decide if the circumstances are suitable for communicating.



The Iso-phone attempts to redress this awkwardness and imbalance by providing a space totally dedicated to telecommunication. Going against the grain of mainstream design, the Iso-phone trades contemporary preoccupation with efficient, ubiquitous and multi-functioning products for quality and depth of a singular experience, requiring total immersion into the telecommunications media.

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Mutsugoto / Pillow Talk

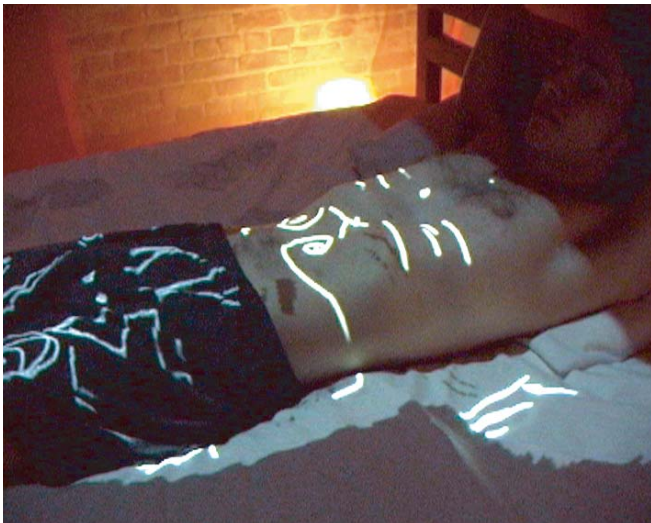
a body-drawing communicator for distant partners

Tomoko Hayashi, Stefan Agamanolis, Ciaran McGrath

Mutsugoto is an intimate communication device placed in the bedroom environment. Instead of exchanging e-mail or SMS messages using generic interfaces in business-like venues, Mutsugoto allows distant partners to communicate through the language of touch as expressed on the canvas of the human body. A specialized computer vision and projection system allows users to write or draw on their own bodies while laying in bed. Drawings made by one partner are transmitted to and revealed on the body of the remote partner.

Human intimacy is a significant but often neglected part of modern life. More people now than ever carry on long distance relationships with romantic partners, sometimes for extended periods of time. However today's communication systems are impersonal and generic. E-mail, for example, is often read and written on the same computer and at the same desk that one uses for any other kind of communication. Phone calls and SMS messages are sent and received between partners on the same devices used for work and business.

Mutsugoto is a new kind of communication device meant to be used only by romantic couples in long distance relationships. Breaking away from traditional systems intended for operation by any pair of people in any situation, the form and function of Mutsugoto is designed to more strongly reflect the character of an intimate bond.



Mutsugoto is meant to be installed in the bedrooms of two remote partners. Each partner lays on their bed and wears a special ring that emits an infrared beacon, visible only to a camera mounted above. A computer vision system tracks the movement of the ring finger and projects virtual pen strokes on the user's own body. The silhouette of the user is also captured and serves as the "canvas" for this drawing. The completed drawing is transmitted to the remote site where the same silhouette is projected softly on the bed. After laying in the same position, the distant partner can reveal the drawing by tracing their ring finger around their body. Special bed linens and curtains were crafted to enhance the mood of this romantic communication environment.



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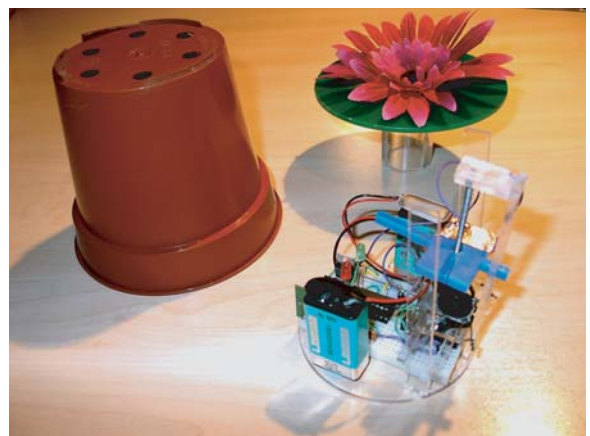
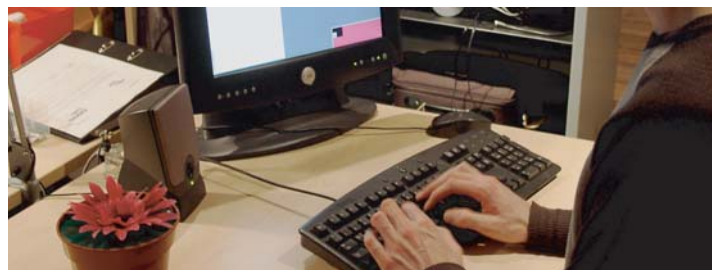
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One2One

a toolkit for creating personalized ambient media links for conveying togetherness over a distance

Cian Cullinan, Stefan Agamanolis

An important feature of healthy interpersonal relationships is a sense of attachment and closeness that is endlessly evolving and carefully balanced to the mutual benefit of the individuals involved. Lack of contact, whether due to distance or other uncontrollable factors, can throw off this balance and cause unnecessary tension and hardship. In the One2One project, we are developing a technological infrastructure for creating personalized ambient communication links to enhance a sense of presence and togetherness between two distant individuals. We are exploring a variety of passive sensing and display devices to suit individual taste and the character of the relationship.



Floral Display

Floral Display is the first ambient media link built with the developing One2One framework. It is a flower pot with a big pink flower that blooms when Cian's girlfriend, Ciara, logs into her computer at her university, and closes when she leaves. The form of a bright pink flower was chosen to reflect Ciara's love for flowers and the color pink.

The pot itself is wireless and can be carried from room to room. Inside the pot there is a simple radio transceiver and some motors that allow the flower to be opened and closed on command. The pot communicates wirelessly to a nearby computer that checks Ciara's login status at regular intervals. The battery lasts several days.



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Open Window

an ambient virtual window for bolstering wellness and healing potential during a hospital stay

Cian Cullinan, Stefan Agamanolis (Media Lab Europe); Denis Roche (Natural 5th Productions); Fran Hegarty (St. James Hospital, Dublin)

Hospital patients often feel isolated from the outside world and disconnected from the people that love them, especially if an illness requires residing within a single room for an extended period. These factors can lead to depression and a reduced potential for healing. This project attempts to counteract these effects by creating an always-on ambient aural and visual portal from the patient's room to a familiar place or environment to which the patient feels a strong connection.

A collaboration with a cancer unit at a local hospital, the Open Window is particularly targeted to bone marrow transplant patients who must undergo a difficult chemotherapy program and are allowed only a limited number of visitors for several weeks while their immune systems recuperate. The rooms the patients inhabit are small and filled with various intimidating medical technologies. Most have only a small window with a very limited view of the outside world. The illness experienced during therapy often causes patients to have difficulty focusing on simple foreground mental tasks like reading a book or watching television. All of these factors contribute additional mental strain and feelings of isolation to an experience that is already very physically challenging.

The Open Window prototype creates a projection on a wall of the patient's room that displays a live yet low frame-rate video stream from a place chosen by the patient, such as a window facing the patient's garden, a room in the patient's house, or a favorite hilltop view. These video images are captured with high quality web or mobile camera technologies set up in the desired places. Just like a real window, this virtual window to familiar place can be closed when desired and the projection space used for other purposes, such as commissioned audiovisual art pieces designed to sooth the senses.

The prototype aims for an ambient design that conveys an ongoing impression of the place while not drawing attention to itself and, most importantly, not overwhelming the patient's senses. The patient sees a single moderately static image projection that subtly updates itself once every few seconds or minutes. The hope is that the ongoing presence of this connection will have a positive and strengthening effect on the patient's mental state and healing potential, and this hypothesis is being formally tested as part of the project.

Initial trials for the Open Window project are being undertaken in partnership with Professor Shaun McCann, Director of the Denis Burkett Ward, St. James Hospital, Dublin.



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Palimpsest

a layered video manuscript of social interaction

Ben Piper, Stefan Agamanolis

A palimpsest is a manuscript consisting of a later writing superimposed upon an original writing. This word has been borrowed for the title of this project that aims to superimpose layers of recorded social interaction and present them as a single image. In contrast to conferencing tools and portals that enable chance encounters between distant locations, the Palimpsest facilitates chance encounters between different points in time.

The Palimpsest installation consists of a rear-projection screen and camera aimed across an interaction area, which could be a hallway or passage inside a building, or a special area dedicated to the installation. An Isis workstation digitizes camera images and controls the projected video display. Images of passers-by or participants entering the interaction area are extracted from the background using an in-house segmentation algorithm. These extracted images are then layered into a video loop that repeats itself every several seconds.

Because the video is looped, if a passer-by lingers in the space, she will see a delayed copy of herself entering the space from several seconds ago, and even more layers if she remains longer, together with the layers generated by other passers-by from earlier points in time. These layers accrue on the screen over several minutes, hours, even days, creating a unique visual that collapses time and compresses the recent social goings-on of the given space.

Palimpsest might be thought of as capturing and conveying the intersections of mobile humans with a particular point in space over an extended period of time. Increasing the persistence of these intersections raises awareness of the social history of a place and allows the viewer to witness the human crowd that has passed through a seemingly quiet and empty space. Even if totally alone, a passer-by is able to “transcend time” and become a part of this community, and to interact with its members, including oneself!

The Palimpsest architecture also offers new artistic possibilities, particularly with improvisational theater. Future directions on this thread include control over the length and appearance of each video layer and the addition of audio to the system.



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Passages

a very close proximity media space

Joëlle Bitton, Céline Coutrix, Stefan Agamanolis

A 'media space' is a system that integrates multiple types of media to connect distant places and groups of people. Unlike other media spaces, which often resemble nonstop video conferences, Passages uses computer vision in a new way that allows passers-by to approach as close to the interaction surface as they wish and to touch the silhouettes of their remote counterparts. The installation is intended to create a more intimate kind of portal between different cities in which one must engage the entire body to uncover the possibility of a relationship with a stranger.

Inspiration for Passages comes from early 20th century writings about the arcades of Paris, notably by Walter Benjamin and by Surrealists like Louis Aragon. For these writers, the passage became a metaphor of the urban poetry for wandering, meeting strangers, falling in love, travelling...

As an installation, Passages is situated in two different locations connected with each other via a network. A vertical translucent interaction surface, made of glass and textile and recalling a shop window, is set in each location. As a random passer-by walks in front of this surface, the contour of his/her silhouette is reflected in a visual style that evokes drawing or sketching.

This silhouette uncovers as a mask what is happening at the other location, possibly the silhouette of another person standing there. As the local participant moves, more of the remote scene is exposed. The body incarnated in a silhouette becomes the interface for a playful encounter and communication with a stranger in a far away place.

'Media spaces' have been an area of inquiry for at least 25 years, and many experiments have taken the form of always-on video conferences between selected remote locations. We feel that in these kinds of spaces, passers-by may still perceive a sense of separation because they see each other through wide-angle views captured by cameras mounted at a distance from them.

In order to create a greater sense of intimacy, we developed a new computer vision system to enable interaction at a very short distance to the screen surface, to the point that passers-by can actually touch it. This system maintains a near-perfect registration of the participants' bodies to their silhouettes no matter how close they are to the surface. The result is a perception of unusual nearness, surprising and perhaps unsettling at the same time.

With Passages, we wish to explore the possibilities and outcomes of being more emotionally and physically engaged in a media space: by incorporating elements of a private space in a public urban space; by enabling a heightened sense of proximity and intimacy; by using the body and its movement as an interface; by connecting strangers from different places and cultures.



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Portrait of Cati

a portrait with a sense of its personal space

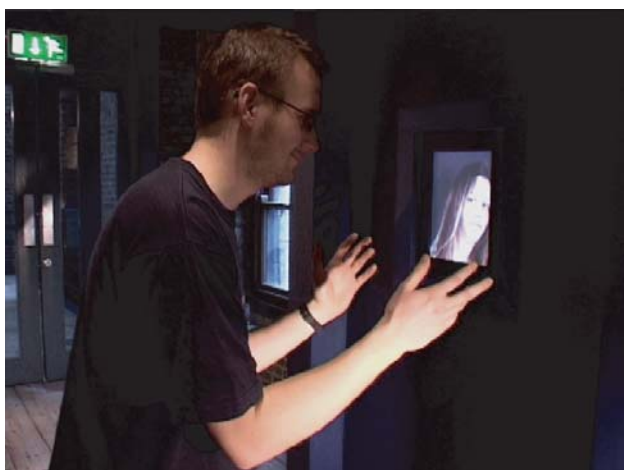
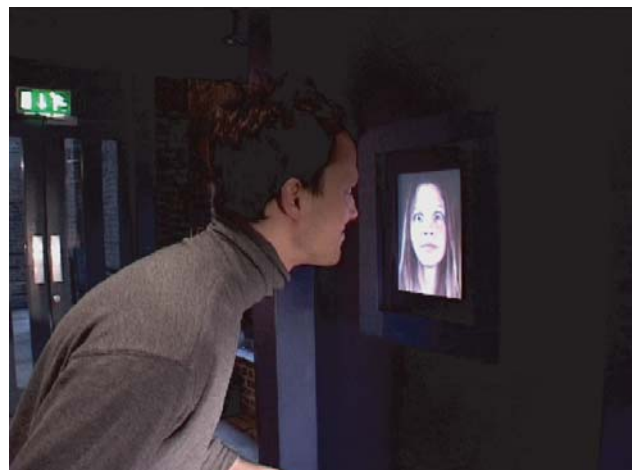
Stefan Agamanolis

Portraits are a form of keepsake that play an important role in human relationships, particularly between people in different generations. Unlike a traditional static portrait, Portrait of Cati senses and reacts to the presence and motion of spectators. As an experiment in future forms of portraiture, Portrait of Cati suggests ways that technologically-enhanced portraits can offer a more dynamic understanding of the identity and personality of the subject and forge a deeper connection between the subject and spectators of the portrait.

Portrait of Cati is a portrait that senses and reacts to the proximity of the spectator. The woman portrayed in the piece, Cati, at first appears neutral and indifferent. When a spectator physically approaches the portrait, her facial expression changes. As the spectator gestures or moves nearer and farther, her expressions become more and less pronounced. When the spectator leaves, she returns to a neutral state. If the spectator returns at a later time, Cati's face may change in a different way.

The Portrait of Cati installation consists of a navy blue wooden structure that denotes the active sensing area of the piece. One side of this structure is a solid wall on which hangs a small wooden picture frame, inside which the portrait is projected from the rear. The proximity of spectators is tracked using an electric field sensing device that can detect extremely small movements, on the order of millimeters.

Portrait of Cati was created for *Id/Entity: Portraits in the 21st Century*, an exhibition highlighting works combining the art of portraiture with computer mediation to explore how the concepts of identity and self will be shaped by new technologies. This exhibition was mounted at the MIT Media Lab in Boston and at The Kitchen Art Gallery in New York City in late 2001.



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RAW

an audio/photographic tool for conveying minimally-mediated impressions of everyday life

Joëlle Bitton, Stefan Agamanolis, Matthew Karau

Records and accounts of everyday life in our pasts and presents are often mediated by numerous third parties (researchers, producers, editors, and so on). We feel this mediation degrades the full sense of awareness and appreciation we could achieve of other peoples and places. The goal of the RAW project is to develop a new kind of recording tool, together with a method for processing and presenting the material captured with the tool, that enables a more direct, minimally-mediated relationship between its user and the later audience, possibly in a far away place or time.

What happened in that minute before you took a picture?

RAW is a system combining a tool and a process for capturing and conveying audiovisual impressions of everyday life. The project aims to enable a relationship between the user of the tool and an audience in a different place or time with an absolute minimum of editorial mediation by a third party.

The RAW tool consists of a digital still camera and a high-quality digital stereo audio recorder that captures the minute of sound *before and after* a picture is taken. The relationship created between sound and image forms a disjoint flow and opens a new field of audiovisual expression. These previously uncaptured moments in time can be kept as personal artefacts or archived for later study.

Audio is recorded binaurally using high-quality miniature microphones that are placed in the user's ears. The apparatus strives for the closest possible recording of what the user of the tool is hearing while they are taking pictures. This design was chosen in an attempt to enable the later audience to immerse themselves "into the shoes" of the person who originated the content they are experiencing, and to place greater emphasis on the subjective point of view of this original source.

We chose the African country of Mali as a starting point for thinking about the RAW project because we feel this country has a particularly rich and diverse culture that is not well recognized or understood within Western societies. We conducted a large scale workshop over three weeks in August 2003 in three locations in Mali: Bamako, Timbuktu, and Ségou; and worked with 23 people. The content gathered by these and other participants from other workshops is presented in an interactive installation.



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Reflexion

a responsive virtual mirror for interpersonal communication

Cian Cullinan, Stefan Agamanolis

Reflexion is an interpersonal video communication system that operates like a “magic mirror” in which you see a reflection of yourself together with the reflections of other participants in remote locations. The system responds to visual and auditory cues to appropriately compose the scene and emphasize the center of attention.

Each participant uses a separate station equipped with a camera, monitor, and Isis workstation connected to the Internet. Using an in-house image segmentation algorithm, the system extracts images of the participants from their backgrounds and combines them all together into a single video scene.

The system tracks which participants are speaking in order to judge who is the center of attention. Active participants are rendered opaque and in the foreground to emphasize their visual presence, while other less-active participants appear slightly faded in the background in a manner that maintains awareness of their state without drawing undue attention. The system smoothly transitions the layering and appearance of the participants as their interactions continue. Every participant sees exactly the same composition, enhancing the sense of inhabiting a shared space.

The system uses a peer-to-peer networking strategy for audio and video transmission to achieve low latency. A central server handles control messages that synchronize the screen compositions at each station.

Participants may navigate and interact with media objects that appear in the background, such as documents, images, movies, or live television feeds. We are exploring new forms of object and gesture recognition to make this interaction as natural and seamless as possible in different application scenarios.

Traditional multi-party video conferencing systems often display participants in separate windows, in scenes that often look like the title sequence from the TV show *The Brady Bunch*. The visual separation characteristic of these designs introduces a confrontational dynamic before a meeting or interaction even begins. The fact that participants in Reflexion are layered together and can “touch” and interact with each other directly in the virtual video scene creates a space with a unique and intimate social dynamic, one that is more appropriate for many kinds of applications.

Future experiments will include scaling the system to work fluidly with very large numbers of participants, developing new techniques for more natural interaction, and applying the base system in other scenarios, such as a distance learning or multi-user remote interactive theatre.



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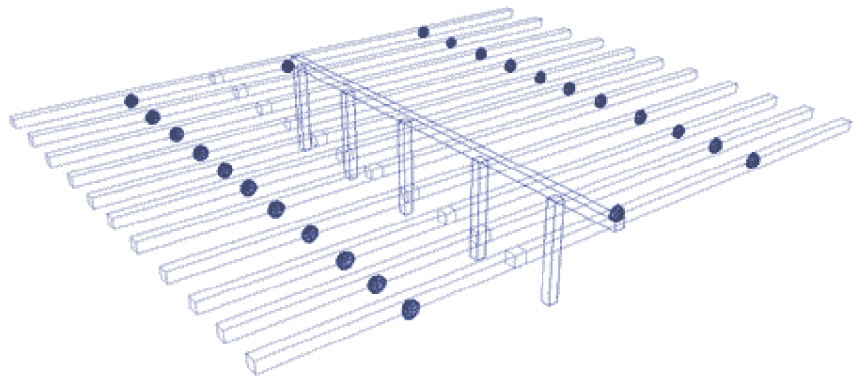
SpeakerPhone

a high-density array of speakers for presence applications

Jonah Brucker-Cohen, Stefan Agamanolis

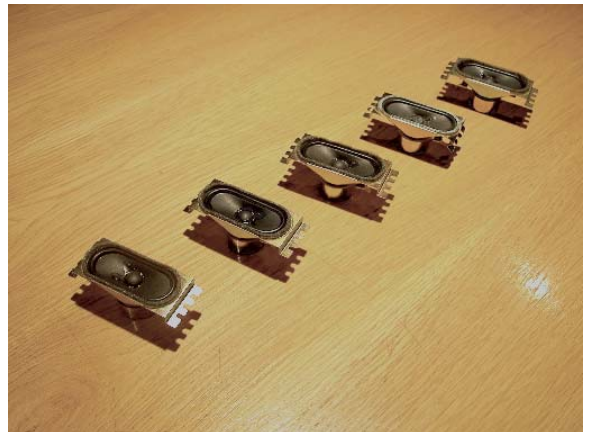
SpeakerPhone is an inexpensive, modular platform of individually addressable speakers that enables sound to be targeted instantly to a precise location and to travel along a path. The project enables a range of presence applications including the creation of highly customized physically-navigable soundscapes and the transmission and layering of sound information across multiple locations in space or time.

The current prototype consists of 24 miniature speakers arranged in a rounded rectangle and mounted on the ceiling in one room of our laboratory. Live audio or prerecorded sound samples originating from a computer or other source can be addressed to any of the speakers instantaneously, via a computer control interface. The SpeakerPhone architecture provides the ability to create customized effects, such as making a sound travel around the room in various directions and rates of speed, or having a sound follow someone moving through the room.



Unlike traditional audio spatialization techniques in which listeners must wear headphones or remain still in one location (such as a movie theater), SpeakerPhone enables the creation of a rich and multi-layered audio soundscape that is tightly integrated with the surrounding architecture and that listeners can navigate and explore by physically moving around. This soundscape can be devised for a particular effect, or it can be a reproduction of an audio environment captured with a similarly-arranged array of microphones. SpeakerPhone could also be used to “reveal” data traveling through wires and over networks as a way of increasing awareness of these concealed information pathways.

An earlier prototype featured speakers arranged in an even tighter array in which it was possible to create even more targeted effects. Future research directions include adding more independent computational capability within each speaker node, forming a self-organizing ad-hoc network protocol for controlling playback and movement of audio from node to node, and creating an analogous array of microphones for capture applications.



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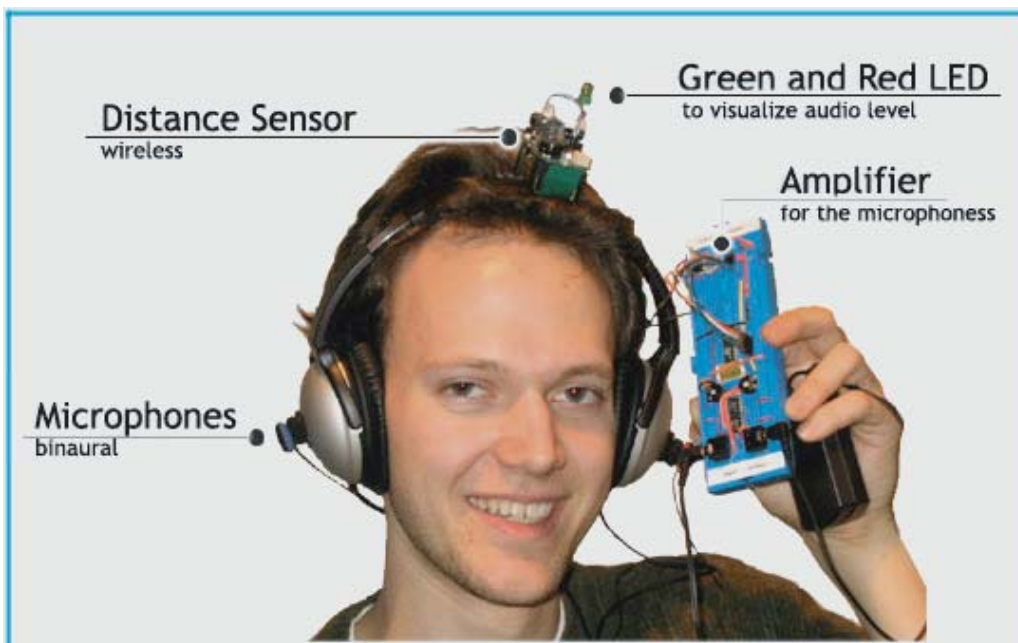
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Transparent Headphones

microphone-equipped headphones for real-time audio alteration

Florian 'Floyd' Mueller, Matthew Karau

Transparent Headphones consist of a pair of headphones with a high-quality microphone attached to the outside of each phone, and a computer that processes the audio signal and sends it to these headphones. This platform enables experiments in Transparent Hearing, including real-time audio alteration, multi-modal sensory integration, and collaborative listening experiences.



Scenarios explored thus far with Transparent Headphones:

Headphones with a Sense : Headphones that stop the music if somebody wants to talk to you and patch the person's speech through.

Pseudophone : Headphones that allow you to hear in your right ear what you normally hear in your left ear and vice versa.

I Hear What You Hear : Two sets of headphones that allow you to hear what someone else hears, and vice versa, effectively putting you "into somebody else's head" and enabling you to be constantly connected to somebody else's audio environment.

Transparent Headphones originated as a project in Sile O'Modhrain's Fall 2001 course, *A Dialogue of the Senses*.



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tunA

a handheld ad-hoc radio device for local music sharing

Arianna Bassoli, Julian Moore, Stefan Agamanolis

tunA is a mobile wireless application that allows users to share their music locally through handheld devices. Users can “tune in” to other nearby tunA music players and listen to what someone else is listening to. Developed on iPacs and connected via 802.11b in ad-hoc mode, the application displays a list of people using tunA that are in range, gives access to their profile and playlist information, and enables synchronized peer-to-peer audio streaming.

Can the Walkman become a social experience?

Can anyone become a mobile radio station?

With the tunA project we are investigating a way to use music in order to connect people at a local scale, through the creation of dynamic and ad-hoc wireless networks. tunA allows users to listen to what other people in physical proximity are listening to, synchronized to enable the feeling of a shared experience. tunA also provides the opportunity to users to share their songs in many situations and while moving around, fostering a sense of awareness of the surrounding physical environment.

In this project, music constitutes the main interest around which communities, virtual and real, can be formed and reinforced. Music is commonly used as a form of mobile entertainment, through personal devices such as Walkmans or digital players. While so far listening to music when moving around has been mostly an individual and quite isolating experience, tunA suggests it could also be made into a fun and socialising experience.

tunA can be used as a standard MP3 player for personal music, but it also keeps track of all the other tunA users who are in range and provides options to access their personal profile and playlist information. The user has an option to “tune in” and start listening to what another person is listening to. An important aspect of this work is the synchronisation of the listening experience. The “tune in” option gives in fact only streaming access to the song the remote user is currently listening to, not other songs in their playlist. To keep track of songs and people encountered, tunA incorporates the ability to keep a record of favorites.

tunA could accommodate a number of scenarios in which people gather during the course of the day. For example, while riding the bus or subway to and from work, people could discover what other commuters are listening to nearby and perhaps get to know each other over time. Or while spending an afternoon in a park or on the beach, people could tune in to the music their friends are listening while relaxing under the sun and have a shared music experience without disturbing others nearby who don't wish to listen to music.



Visit the tunA web site at <http://www.medialabeurope.org/hc/tuna>


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Viper

a tool for creating video programs that can re-edit themselves

Stefan Agamanolis

Traditional television is one-size-fits-all. Editing is fixed, and although viewers see the same thing, they often don't experience the same thing. Viper allows video producers to create responsive programs whose editing can change during viewing in response to preference or profile information, presentation equipment or conditions, or real-time sensor feedback.

Unlike traditional editing systems in which producers build a single linear video program, those using Viper create a database of annotated video and audio clips and other media objects along with a set of editing guidelines that describe which bits of this source material should be included and how they should be layered and assembled into complete high-quality programs for different viewing situations.

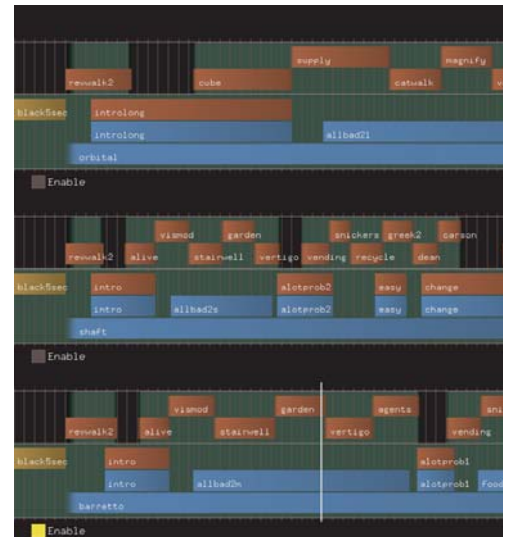
Viper consists of a prototype graphical interface for creating annotated media databases, and a framework of primitives, based in the Isis programming language, for expressing the editing guidelines. As opposed to simply splicing clips end to end, this framework enables the use of complex editing constructs, such as inserts, AB rolls, graphics, and transitions of various sorts.

Viper's playback engine supports client-side personalization, in which the final edit is performed on the viewer's receiving device, eliminating the need to transmit personal information to a distant and perhaps untrusted server.

Viper enables a new genre of video programming, distinct from traditional television, that offers new narrative possibilities and enables directors and producers to gain more control over how their programs are edited and exhibited in different viewing situations. Potential applications include individually-personalized advertisements, responsive educational video programs, and documentaries that aim to equalize experience across a population of viewers.

Several productions have been created with Viper thus far, including a responsive political campaign advertisement that tailors its presentation to portray the candidate in the most persuasive way for each individual viewer.

Viper is a continuation of a project created in the Object-Based Media group at the MIT Media Lab.



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WANDerful Alcove

an interactive play space in which participants wield magic wands and practice wizardry

Marije Kanis, Stefan Agamanolis

Magic wands have a presence in the history and legends of human cultures from thousands of years ago all the way to the present day. They are simple objects that respond to human gesture, speech, emotion, and even thought, and thanks to books and movies, they are widely understood from an early age as symbols of great empowerment. As such, the magic wand presents an interesting design opportunity as a form for a tangible computer interface. In addition to exploring the technology needed to build a magic wand interface, the WANDerful Alcove focuses on role-immersion scenarios in which these interfaces can have a socially transforming effect on their users, serving as a catalyst for ad-hoc interaction and collaboration in a story experience.

The WANDerful Alcove consists of two magic wands and a large projection of a story scene consisting of a tree in an enchanted landscape. Each wand has a different magic power associated with it. Spectators who enter the alcove and pick up a wand can make something happen in the scene immediately by gesturing with a wand — either lighting strikes or explosions depending on which wand is wielded.

Just as a real wizard student would, the participant must learn what kinds of movements to make, what kind of rhythm to use, and even what words to say in order to create the right magic. With some experimentation, the novice wizard will gain skills in the use of the wand and learn special magic gestures that cause a more controlled reaction in the story scene, either the creation of a rain storm or the emergence of the sun.



Thanks to Cati Vaucelle and Glorianna Davenport of the Story Networks group for their contribution to the creation and first phase of this project.

Instead of competition and mutual destruction, the story concept was designed to encourage and reward ad-hoc collaboration between multiple wizards. The participant is challenged to be physically active, focusing not only on his own actions but also on that of the others, to share magic power and create something beautiful together. For example, if two wizards collaborate and perform their special gestures at the same time, a rainbow emerges.



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whiSpiral

a spiral-shaped shawl that carries whispers of your loved ones

Elena Corchero, Stefan Agamanolis

Gifts and keepsakes allow us to remember friends and loved ones when we travel or move to far away places. The whiSpiral is a new kind of keepsake that explores how technology can enhance the way garments and accessories evoke memories of these relationships. Circuitry integrated directly in the textile allows your friends to record short audio messages at different points in a spiral-shaped shawl. These messages are whispered back each time you wrap the shawl around yourself, or by caressing different parts of the fabric.



The whiSpiral is inspired by the power of a simple human voice to evoke rich memories of a person or relationship, and by the power of a whisper as a medium of intimacy. Similarly, just as they are worn close to our skin, articles of clothing and jewelry presented to us as gifts are reminders of the closeness of our friends and loved ones, especially when we are far away. The whiSpiral is a new kind of keepsake that allows the simple intimacy of a whisper to be carried in a garment that you can wrap around you, take everywhere, and keep for all time.

The whiSpiral is a spiral-shaped shawl that consists of 9 miniature audio recording modules integrated directly in the textile, each capable of storing a 10 second message. The locations of the modules are made visible by exposing some of their electronic components on the exterior of the shawl, covered by a protective material resembling 3 white leaves. A microphone connector is denoted by a yellow leaf.



The whiSpiral could, for example, be given as a going-away present when someone leaves a job or moves to a new place. Friends of the recipient can record messages by removing the yellow leaves one by one, attaching a microphone, and speaking into each module while pressing a small button. When finished, the whiSpiral appears completely white and is ready to present as a gift. The whispers are released when sensors located in each audio module detect a soft caress or wrapping movement. The messages are stored in persistent memory that will not be erased when the battery occasionally needs to be replaced.



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