

IACT:
The Interactive Art
Construction Tool

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Introduction to IACT

IACT, or, “Interactive Art Construction Tool,” is a software platform for the young artist interested in interactive video and the process of art installation. Designed for novices, IACT combines sensor technologies with video media, bringing both the physical and digital together.

As interactive art becomes more and more common so too are tools for developing interactive art. As a tool in this spirit, IACT strives to bring the interactive art experience to a younger audience. The software will have a low floor for easy entry into the process of making interactive art. It is also intended to have a low ceiling, sacrificing varieties of functionality for superb capability in a single domain.

I envision the IACT system as becoming a part of a traditional art curriculum. As schools begin to utilize technologies in their core discipline areas so too will technology become a part of the art curriculum. The structure of IACT will make it a solid fit in the art curriculum, generating new forms of visual awareness – and ultimately new forms of personal awareness – through the use of new media.

The IACT software is part of a system that allows the physical to be readily combined with the digital. The software provides the programming support for a suite of sensors (light, distance, touch, etc.) plugged into a printed circuit board that utilizes experimental LOGO chip technology (see figure 1). The board can accommodate up to five sensors, which are in turn controlled by the LOGO programming environment. In many respects, the IACT software can be viewed as an important part of an, “interactive art kit.” Such a kit has recently gone on the commercial market. Built by the MakingThings company and sold through the Cycling74 company, the kit utilizes Cycling74’s MAX programming environment which already has great appeal in the interactive art making community (see figure 2). As the Cycling74 website states:

MakingThings' Teleo is a new set of hardware tools that allow you build interactive art with Max. Using the Teleo modules, you can use Max to move outside of your computer and build fully interactive physical environments that engage audiences. (from <http://www.cycling74.com>)

The IACT software should also be viewed as part of a kit for making interactive art. What will distinguish this system from something like MakingThings' Teleo system is the ease of use that both the IACT software and the LOGO-based printed circuit board will provide.

The use of digital video is becoming the norm in a variety of cultural milieus. The most recent development is the arrival of the VJ. Analogous to the DJ in the musical realm, the VJ attempts to create live video performances at a variety of events. While IACT could be viewed as a VJ tool, it strives to help nurture and develop a kind of *interactive cinematic literacy*. The development of this literacy is meant to happen within the context of a particular type of examination: IACT is the center point of a construction kit that brings together video and electronics, enabling youth to create poetic examinations of people, places, and things in their everyday lives.

Xaminations

Xaminations is a term given over to a particular way of thinking about the use of interactive video. Imagine a place that is important to you. What are the numerous ways you could represent that importance? Draw a picture? Write a paragraph? Make a sculpture? Record the noises around the space? Take a photograph? Make a movie? Would these endeavours convey the importance of the space? The Xaminations Project would like to take a little from all of these examples and add in a few additional elements. By mixing different media the Xaminations Project hopes that new kinds of understandings can be revealed about the relationship between the artist's inner life and the person, place, or thing in the external world they have chosen to represent in a visual presentation. The ultimate goal is to provide tools and experiences that allow young people to be more self-analytic in their everyday lives.

The Xaminations Project is not about adolescents documenting their everyday lives. *The Mirror Project* (<http://www.mirrorproject.org>) in Somerville, Massachusetts serves as a model for how teenagers can come to understand themselves and their world better through the production of documentary videos. The Xaminations Project emphasizes the creation of

art installations that use video and electronics as core elements in the creation of poems in light, sound, and space. Cinematographic experience is coupled with an interactive, physical experience.

The Xaminations Project would run much in the same way as a group art show is structured. A theme would be chosen by the curator (Project Director) and the artists (students participating in the project) would develop installations or “pieces” that would fall into that theme. The main medium would be video projection, with electronics augmenting the projections in order to make the art interactive. The project would culminate with an exhibition of the installations and art objects created during the project.

Self-expression is very important to the life of the adolescent as this is a stage that harbors some difficult times. A critical aspect of Erik Erikson’s psychoanalytic theory is the attention he attaches to strains between *biological maturation* and *social expectations* during adolescence. For Erikson adolescence becomes a critical period.¹ This can be emphasized greatly today, as adolescents face numerous decisions concerning their futures. David Elkind, in his book, *A Sympathetic Understanding of the Child*, describes the transformation of the pre-adolescent into an adolescent as a time when a child no longer investigates, “what is,” but begins to ask, “what if.”² Rarely is a teenager given the space to think self-analytically about their personal psychology - their fears, anxieties, the things that make them feel safe – and to present their “findings” in imaginative and new ways.

Some important questions: Will teenagers “become” more self-analytical through the art making process? Will the use of “new media” allow for a more self-analytical process? These are theoretical questions I am interested in, but it is my belief that a piece of software such as IACT will allow the user to produce interesting new media works in such a way that they will be given time to ask these kinds of questions. The ease with which digital video and sensor technology can be combined in the IACT system affords time for other critical aspects of the art making process.

¹ William Crain, *Theories of Development*, pg. 256.

² David Elkind, *A Sympathetic Understanding of the Child*, pg. 220.

Interactive Cinematic Literacy

A primary learning objective for the Xaminations Project, and the central role of the IACT system in this art making process, is the development of what I call *interactive cinematic literacy*. The term “interactive” has grown over the years to mean any number of things, mostly defined in art circles as art that is reactive to the viewer of the art work. “Cinematic literacy” also has a tradition; namely, it involves the understanding of certain aspects of the cinema, i.e. a “zoom shot,” or a, “cross fade.”

Coupling the two concepts – interactive and cinematic literacy – together is what gives the IACT system its appeal. As the user begins to plan his/her art installation he/she must consider both the cinematography to be utilized in the piece while at the same time paying attention to the ways in which interactivity – through sensor implementation – can alter that cinematography. Will a process be programmed in such a way that when a light sensor gets darker the camera will speed up its pan from the sky towards the ground? This particular example may give the user/viewer the sensation of avoidance, as if something coming through the air – metaphorically represented by the darkness the viewer of the work generated as they stepped closer to the piece – is meant to be avoided, as represented by the camera moving from a light source (sky) to a dark area (ground).

While more scenarios will be given below it should be pointed out here that IACT will force the user to consider numerous possibilities in the art making process but because of it’s ease of use the young artist will be able to work fluidly with their decisions regarding the “interactive cinema” they are creating. The ease of use built into IACT will allow the young artist to experiment with both the visual digital realm and interactive physicality. I view this experimentation as key to the art making process. John Dewey, in his his seminal work *Art as Experience* states, “ There is...a tendency among lay critics to confine experimentation to scientists in the laboratory.

Yet one of the essential traits of the artist is that [s]he is born an experimenter. Without this trait [s]he becomes a poor or a good academician. The artist is compelled to be an experimenter because [s]he

has to express an intensely individualized experience through means and materials that belong to a common and public world.³

Of course, the means and materials that form a major part of the Xaminations Project are not as common as the kinds of materials Dewey is speaking of. But the digital video camera, electronics, and digital video editing systems are growing in popularity. Because of its low floor and low ceiling, the IACT system will afford simple visual experimentation within the realm of *interactive cinematic literacy*. This is critical as I view this form of literacy as one of the primary **powerful ideas** within the Xaminations Project. Using an interactive cinematic literacy to its fullest will help the young interactive video artist develop installations about those things in their lives that are meaningful and unique to them. Developing a strong sense of interactive cinematic literacy will allow the young artist to convey their inner beliefs about their external world. The IACT system serves as scaffolding for that conveyance.

Software as Influence and Inspiration

There are a number of influences for the IACT software package. Certain key features of these influences will find their way into the IACT system, bearing in mind that IACT is geared towards a younger audience and a particular learning environment, namely schools. Here, I simply outline the basic features of those software packages that have most influenced my thinking. I will detail how these features will fit into IACT in the *Proposed Design* section.

Macromedia Director –

One of the ultimate multimedia tools, Macromedia Director is the primary influence for IACT. Designed initially for graphic designers looking to deliver web-based content with the *Shockwave* engine, Director developed an appeal for those people working in digital video. The movie metaphor that persists in the software – frames, the timeline, stage, etc. – allows for relatively easy construction of video content. So-called *extras* have been written for Director so that interactivity

³ John Dewey, *Art as Experience*, pg. 144.

can be utilized through the serial port. Mostly, it is the capabilities of Director that will influence IACT, as the means to producing interactive video in Director is cumbersome. Director's high ceiling makes it an excellent multimedia tool in general, but the reliance on the *Lingo* scripting language generates a steeper learning curve for the user. The programming paradigm (to be discussed below) in IACT gives it a much simpler feel along with a more gradual learning curve.

Apple iMovie/ Microsoft Movie Maker –

The paradigms for simple drag-and-drop digital video editing, iMovie and Movie Maker offer ease of use with high quality video production. While IACT is not a video editing tool, the lay-out and frame manipulation of these two popular pieces of software serve as a good basis for the overall “look” of IACT. Being able to readily import media and move it into a timeline serves as a good basis for importing media into IACT.

LogoBlocks –

This experiental software, meant for the programming of experimental hardware, influences the IACT system through its use of an “iconic programming” paradigm. Blocks are snapped together to create the various control structures for a computer program. The ease with which these blocks can be manipulated, and the way in which the logic of the block is built into the block's shape, allows for a very low floor and a very fast learning curve. IACT will also use the block metaphor for the control structures needed for building up conditionals.

MAX MSP/Jitter –

A tool first developed for music production, MAX is now part of the video world as well and is used widely in interactive video art circles. MAX as a programming environment has an incredibly steep learning curve with a very high ceiling. What most attracts me to MAX is the wiring metaphor it uses for developing programs. The wiring metaphor appeals to me

because it is the simplest way to show relationships between objects. In the *Proposed Design* I will detail why the wiring metaphor might be beneficial to the IACT system.

Despite the number of influences on the IACT system, only small key parts of the software discussed above are influencing the IACT design. More detailed analysis of these influences will be outlined in the “Proposed Design” later.

Proposed Design

Some of the proposed *design guidelines* for the IACT system are as follows:

- simplicity of physical/digital connections-i.e. relating physical to digital
- ease of use in programming mode (drag-and-drop style)
- solid performance with standard system requirements

In an effort to keep both the floor and the ceiling low within the IACT system, there are only a few key sections of the software that correspond to the user interface. These sections are for: programming, controlling sensors, and viewing video.

Programming-

Building Conditionals

The brunt of programming in the IACT system involves the construction of conditionals in a block world (see comments on LogoBlocks above). These conditionals will appear as *if* or *ifelse* commands that can be “filled in” with the appropriate *triggers* and *actions*. The conditional is activated when it is either clicked or when the system is placed into performance

mode. The conditionals structure will have a looping capability for controlling frames of the video. These loops will have the ability to loop back to the beginning of the video or to a specific frame in the video sequence.

Triggers

As it is meant to be an interactive art tool, the value of the sensors as the primary controllers of the video output is paramount. Within a conditional statement a block would correspond to a particular sensor (both the real sensor attached to the Printed Circuit Board and the simulated sensor built into the interface (see “The Sensor” below)). Within this block a particular value can be determined in order to establish a threshold for controlling the video “Actions” (see below). This value can also be manipulated with a series of mathematical operations.

There are a few triggers built into the IACT system that allow video output to be controlled with additional types of conditionals. One additional trigger is the “end of movie” condition, where a particular action is triggered if the loaded video clip comes to its final frame. In addition, there could be a “time based” trigger that would generate a particular action when a certain amount of time has elapsed in the video playback.

Actions

There are numerous actions that can be realized in the IACT system. These actions are the result of the triggers built into the “block conditions”. An obvious action would be to start the video clip altogether. Another is to stop or “freeze” the video clip. Some of the more interesting actions could include jumping to a certain frame in a video clip, or to a new video clip altogether. There is always the possibility of developing a suite of simple effects for the IACT system; this includes filters that could alter the video in a variety of ways.

Sensor Control-

The Sensor

The “sensor”, as it is depicted in the user interface, is a stationary object that has a small numeric display attached to it. This device can be “attached” to an “image box” that contains the relevant set of video frames. This attachment occurs through a “wiring” process (see below) that visually represents the connection between one sensor and one collection of video frames.

Wiring

Basic electronics are a key part of the Xaminations Project and keeping the metaphor of wiring intact would ultimately help the user of the IACT system. In IACT, one might simply “wire” a sensor (in the form of an icon on the screen) to a particular video clip (located in an “image box” (see below).) Wiring often gives the impression of a flow of information from one point to another. In the IACT system, the information flowing through the actual physical sensor is what controls the digital video. Getting that notion across in the user interface would be beneficial to learning the system.

Lodged between the sensor and the collection of video frames – that is, attached to the wire itself – will be an individualized shape with a distinct color. This shape will correspond to a particular conditional that is spelled out in the programming area of the interface.

Video-

The Image Box

The “image box” contains the video frames that are going to be worked with. To navigate through the relevant frames a slider located below the box can be manipulated. Forward and back arrow buttons will be located on either side of the slider so that the user can step through individual frames. There will be three image boxes on the screen at any one time. This will allow the user to upload three distinct collections of video frames,

allowing for the interactive programming of three distinct video clips.

A Scenario – The User Flow

The IACT system is meant to be used within a workshop format, as part of the Xaminations Project. A student would begin the process of developing a project not with the software or accompanied hardware, but with paper and pencil. The first stage of this process would involve **story boarding** as the young artist gives over serious thought to the subject matter he and she has started to work with.

Julia has a fascination for basketball and has decided that she wants to express this fascination through an interactive installation. After considering what she wants to convey she begins to storyboard her ideas. Julia wants to convey something about the speed of the game and wants to use a “Sharp” distance sensor in conjunction with IACT’s ability to speed up frames of video.

After storyboarding the relevant material – and here one must really consider how the sensor technology will be merged with the digital video – the young artist is now in position to carry out **video capture**. Here, *interactive cinematic literacy* is “put to the test” so to speak, as the creator of the interactive piece considers what kinds of imagery will work best with his/her idea.

Julia coordinates with her older brother Tommy and they agree to meet on the school playground on a day that Julia is participating in the workshop. She brings the digital video camera and explains to her brother what she wants to film. Using a tripod so that the image is as steady as possible, Julia films her brother as he dribbles the ball in place. The image only shows him from the waste down as he dribbles at a steady rhythm.

After capturing enough footage (about a minute and a half worth) the young artist is ready to **upload** their footage into a “third party” editing system. The IACT software does not offer editing capability nor can one apply substantial effects. By using a “third party” editing system, the user can **edit** and add **effects** to the footage ahead of time. These choices are just as important as the footage that has been captured.

Julia uses iMovie to completely edit the video she has captured of her brother. She ultimately decides not to add any special effects but she does pair down the footage from about a minute and a half to twenty-seven seconds. She has gathered a solid piece of footage showing the basketball moving up and down at a steady beat.

Once the video footage is in the computer it must be broken up into frames, as this is the only way that the IACT software can display the footage. Most off-the-shelf video editing systems have the ability to export video footage into frames, placed in a special folder on the desktop. Once this has been completed the user can **upload** the relevant frames into IACT.

After transferring her frames of video to the desktop, Julia opens the IACT interface which she was introduced to at the beginning of the workshop. In order to upload the material she wants to work with she merely finds the image box she wants to work with (she picks the middle one) and she types the name of the file that contains her frames. After clicking on the “load” button, the very first frame shows up in the middle image box – an image of her brother’s legs with the bottom portion of a basketball in view at the top of the frame. Above the slider that is attached to the top of the image box is a small box containing the number 1. This indicates that this is the first frame in the entire sequence. Using the slider, Julia can move back and forth between the first frame and the last – in this case there are 97 frames total. As she toggles between one end and another she sees all of the frames of her movie. The two arrows on either side of the slider allow her to step through the frames.

Once the frames have been accessed in IACT, they can now be manipulated using the sensor technology provided. The printed circuit board (programmed ahead of time) is sending the relevant data to the IACT system. The user of the system is now ready to enter the **programming** mode.

Julia has to consider carefully how she wants to program her sequence of frames. The data from the sensor – in this case sensor 1 – appears on the desktop in the sensor icon labeled “sensor 1”. It moves through different values as Julia moves her hand closer and further away from the sensor. After seeing the progression of numbers Julia begins to get a sense of the pattern. She is ready to open up the “conditional” box in the programming section of the software. Here she snaps out some conditional blocks and drags them by the colored circle shape. Next, she fills in the spaces in the conditional blocks with the appropriate triggers – in this case referring to sensor 1 – and the appropriate actions – in this case referring to the frame speed. By dragging the shape over to the sensor icon and clicking on the icon itself, Julia can begin to draw a “wire” to the middle image box where her imagery resides. After double-clicking again on that image box the wiring is completed. The yellow shape that was connected to her program shows up in the middle of the drawn wire. This then corresponds to the program that Julia had written.

Once the program is constructed in IACT it can easily be tested in **performance** mode.

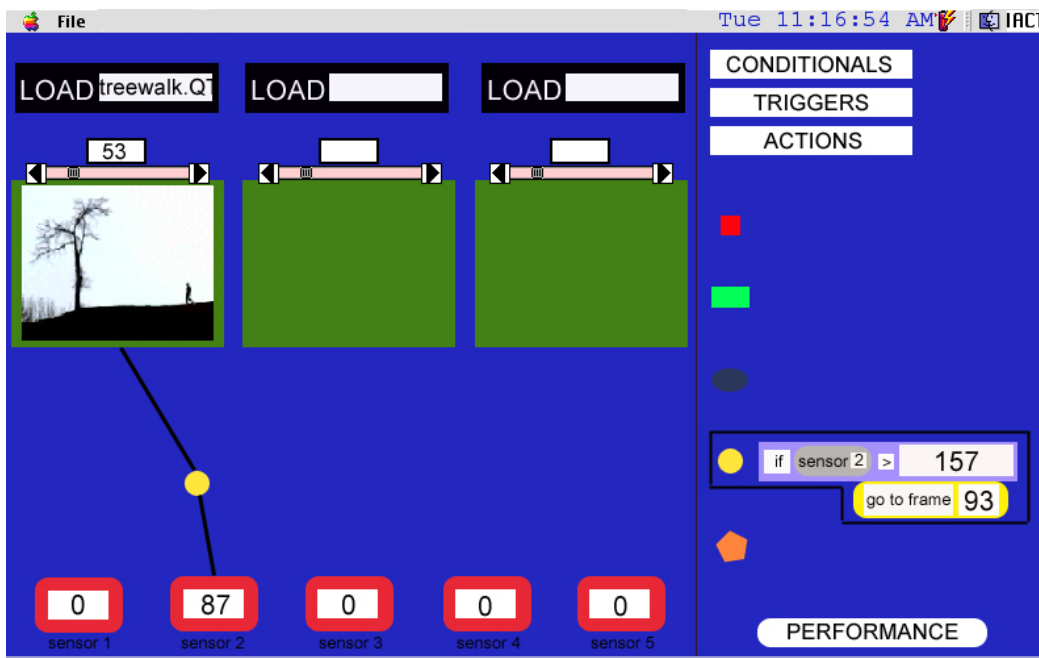
Julia clicks on the “performance” button which launches a large-screen view of her video sequence. The basketball begins to move up and down at a certain frame rate. As Julia moves her hand closer to the sensor the frame rate picks up, but not at a fast enough rate. Julia then double-clicks on the screen which returns her to the programming mode. She then makes an adjustment to the parameter established in the actions section of her block code. Clicking on the performance button once again, Julia is able to get immediate feedback from her programming changes.

Conclusion

Granted, the scenario offered above is an idealized version of how the IACT software would be used. More complicated scenarios exist – scenarios that include more complicated cinematography (i.e. multiple video clips) and many more sensors. The point is to demonstrate the main design guidelines – simplicity in combining the physical and digital, ease of use through a drag-


and-drop programming style, and solid performance with standard system requirements.

The popularity of interactive art is fully evident in both the art world and in higher education art curriculums. Bringing this form of expression to a younger audience seems worthwhile, not because it is important that we develop more interactive artists but because it is possible to develop a certain sensibility in younger people. By easily combining video footage with interactivity young students will have the opportunity to express themselves in new ways and learn something about themselves in the process.




File Tue 11:16:54 AM IACT

LOAD [] LOAD [] LOAD []



sensor 1 sensor 2 sensor 3 sensor 4 sensor 5

CONDITIONALS
TRIGGERS
ACTIONS

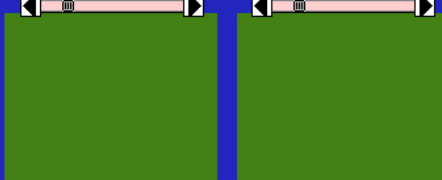



PERFORMANCE

File Tue 11:16:54 AM IACT

LOAD treewalk.Q LOAD [] LOAD []

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sensor 1 sensor 2 sensor 3 sensor 4 sensor 5

CONDITIONALS

if place trigger >

place action here

PERFORMANCE