The Language of Motion in Communication Design

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Abstract

This paper investigates motion as an integral component of design. The notion of time—intertwined with motion—is considered the organizing principle to which all other design elements must relate. The paper defines the “language of motion” as a tool of communication and “motion literacy” as the act of understanding how motion can be used to communicate more effectively.

The work presented in this paper result from experimental and multidisciplinary approaches to investigating the language of motion within code-based systems and interactive environments.

These case studies, developed at the Dynamic Media Institute in Boston, range from a participatory installation that investigates the role of physical proximity in interpersonal communication, to an on-screen dynamic visualization where natural metaphors of microbes are used to represent the structure and attributes of an email inbox.

1. Motion and Communication and a “Language”

Motion—as integral to design—should be considered and explored as a language of communication.

At the Dynamic Media Institute in Boston the concept of a “language”—understood as a system of elements combined according to the rules of a grammar for the purpose of communication—incorporates the challenges of synthesizing multiple “dialects” and “codes” that have traditionally been segregated into distinct disciplines [1].

Similarly to the concept of “visual language,” that so profoundly influenced design and its education in the 20th century, we should apply the metaphor of linguistic structure to exploring and teaching the fundamentals of dynamic media—specifically the application of kinetic form and expression that can be defined as the "language of motion." Moreover, similarly to promoting “visual literacy” in design curricula we need to foster "motion literacy"—the understanding how motion can be used to communicate more effectively.

Communicating with the language of motion involves issues of “what” is moving (and in what environment—on screen or in space), and “how” that something is moving. The “how” question refers to the kinetic form and its grammar, defined by both space and time dimensions of motion such as velocity and amplitude. That, in turn, refers to a kinetic “behavior” of an object. That object is the “what”—typography, an illustration, a diagram, video content, 3-d object—virtually anything. And these objects carry the meaning expressed in their native language—material, pictorial, verbal, numerical, cinematic, etc. Therefore motion—or kinetic behavior—applied in combination with those native languages of pictures and words and numbers, etc.—amplifies and multiplies the potential in making meaning [2].

2. Motion and Sequence and Interaction

Kinetic behavior is one of the central issues of the language of motion and motion literacy. But of course kinetic form and the meaning of motion have already been explored within various disciplines of art and science. In those multiple disciplines, various expert languages and codes and dialects of motion have been developed.

One of the most spectacular historical examples of the design process for a dynamic media structure is a post-production diagrammatic storyboard for *Alexander Nevsky*, a 1938 film by Sergei Eisenstein [3], a Russian film director and one of the first theorists of the medium. That storyboard is a timeline in which visual representation of the film components are precisely synchronized into a sequence of “audio-visual correspondences” including film shots, music score, a “diagram of pictorial composition”, and a “diagram of movement.” The “diagram of movement” represents specifically the camera work resulting in on-screen motion. Choreographed very precisely, in fact to a fraction of a musical measure, this “diagram of movement” attests to how essential for the cinematographer was on-screen motion and its meaningful integration with all other elements of his vocabulary. The same challenge of integrating motion as a meaningful component of communication design should remain the focus of research and practice for contemporary designers.

Exploring the concepts of kinetic behavior requires the same awareness as studying cinematic vocabulary—the awareness of the system of communication that combines the visual, sonic, and kinetic aspects into a synchronized, multi-sensory experience. Especially, the kinetic behavior triggered interactively— which occurs in response to pointing, dragging, clicking by a user—is one of the central issues of motion literacy.

Another spectacular example of an expert language of motion is the language of music. In this case [4], music conductors Boulez, Eötvös, and Robertson rehearsing Karlheinz Stockhausen’s “Répétition” for three orchestras, use the language of precise gesture to translate the musical text into musical experience. They communicate among themselves in a very precise language of motion. They communicate—without producing any sound—their musical concepts (and the interpretation of that specific piece of music) to more than two hundred musicians and eventually to hundreds of listeners. **Time** is the structural element of music and sound, and of cinema, and of any time-based media—and of motion itself.

Sound design has already become a part of communication designer's vocabulary. Gesture—understood as motion that has meaning—is next to be explored and adopted by designers.

Informational "gesture" plays a meaningful role in on-screen interfaces. As users, we widely accepted the computer on-screen icons move or jump certain way, in order to tell us something. The kinetic behavior of icons may be user initiated or computer initiated. Through their motion, icons notify us, warn us, advise us, orient us, and prompt to action. These behaviors are not formally codified—but perhaps they should be, in order to become even more precise in what and how they communicate.

But the challenging issues of the language of motion and gesture in multi-touch screen environments—are still in front of us. We are just scratching the surface—literally. The success of multiple-touch displays has elevated gesture to a new role in interface design. The sci-fi movie "Minority Report" becomes reality—and perhaps in its better version. Better, because it is proven that purely gestural interfaces—like in "Minority Report" movie—perform rather poorly. The human body prefers a tactile feedback. Multi-touch screen technology delivers that tactile experience and is now migrating to the desktop—and away from the desktop. Current popularity of "Wii" interactive platform, as well as most recent MacBook multi-touch pad—are precursors of things to come, where integrating gesture and touch may actually be more successful that each one on its own.

That is why, parallel to research in technology, more research and exploration in interface design is needed. The dynamic vocabulary of motion and gesture must contribute to a universal language of communication.

3. Case Studies

3.1 Proximity Lab

Evan Karatzas's work, entitled "Proximity Lab" was developed as masters' thesis requirement at the Dynamic Media Institute in Boston in 2005.

Proximity Lab is a participatory installation and experimental interface platform designed to visualize relationships between users and mediated spaces. The system directs attention to the intersections of physical and computational interaction.

An 8-foot by 16-foot by 7-inch by 7-inch walkable platform, fitted with radio frequency ID (RFID) technology, sits at the center of the Proximity Lab system. Participants wear shoes fitted with RFID tags, enabling the system to track and record their positions in real-time. System outputs consist of a ceiling-mounted video projector pointed down onto the platform and amplified speakers positioned at opposite ends of the platform. Images projected directly onto the floor are accompanied by stereo sound as a continuous response to the actions and interactions of participants.

The study seeks to stimulate inquiry on the concepts of physical proximity, social interaction and computational mediation. Semi-facilitated experiences involving algorithmic logic, system observation of behavior, and dynamic role assignment are offered to participants for contemplation and discussion.

"Proximity Lab" case study

Two program modules have been developed for Proximity Lab: "Social Circles" and "Loop Holes." Each program runs for three minutes.

Social Circles deals with the visualization of social activity and physical proximity. Small shapes bustling with movement surround users and follow them as they navigate the platform. The molecules orbit around participants and react kinetically when users approach one another.

Molecules are color-coded to distinguish individual users. Molecules can be exchanged. As the session progresses, molecules mix and the distribution of colors reveals the unique interactions of the group.

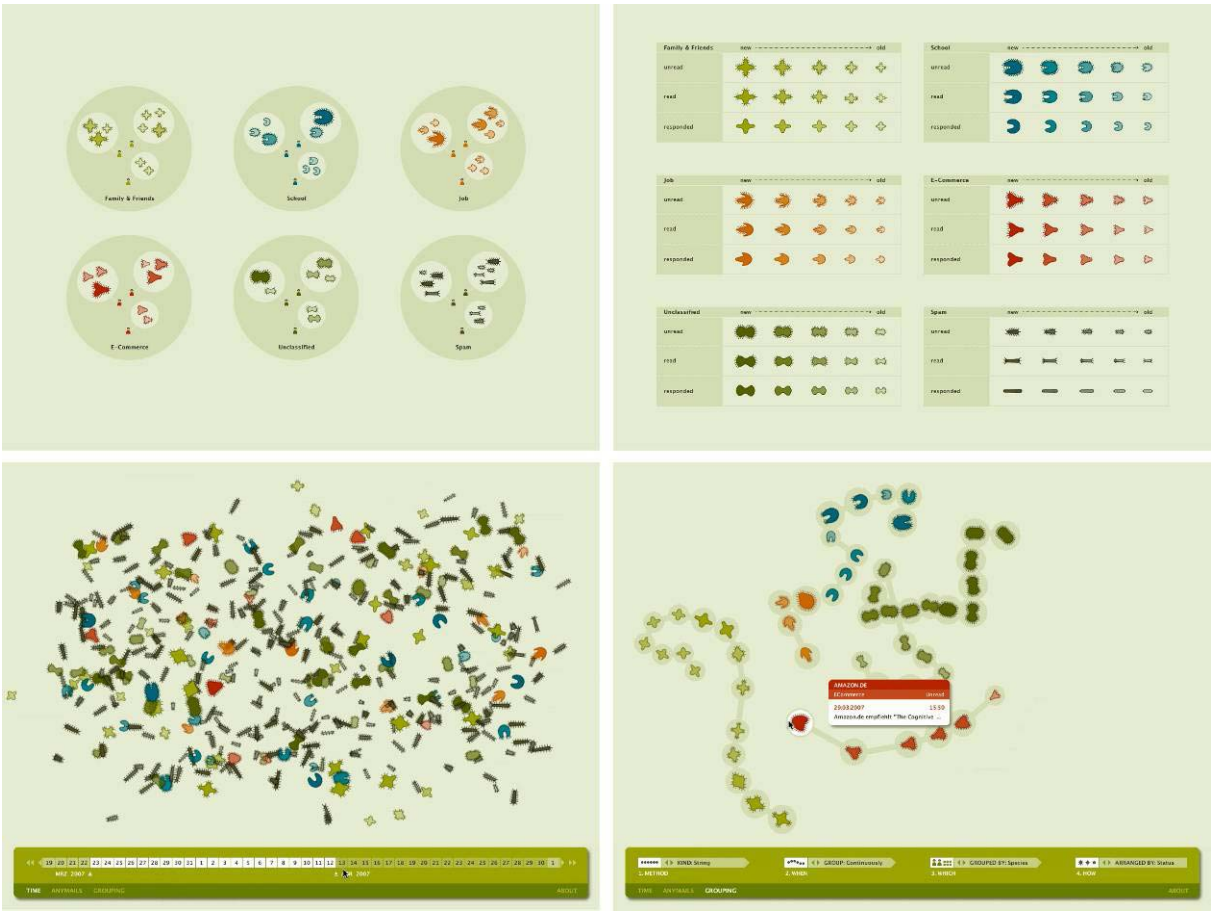
Loop Holes is a sound instrument that reconfigures itself based on user interaction. Sound spots are represented as simple shapes that reveal kinetic and sound properties when activated. Chance sound performance and composition coexist. Each of the eight spots represents a note in a fixed scale. Each time the spots reconfigure the timbre and distortion of the sound set changes. At first, the notes are undistorted with short attack and sustain. As the loops progress, sustain gets longer, creating overlap and chordal opportunities. Frequency modulation also adds to the variation.

First configured in a simple and organized manner, the sound spots gradually separate into scattered arrangements. Are these configurations random or based on the behaviors of participant? The progression and location of sound spots is based on interaction with the system. The user who interacts with the system the least are targeted by the system. Sound spots reposition themselves around this user, encouraging more active users to approach less active users.

3.2 AnyMails

Carolin Horn's work, entitled "AnyMails" was developed as masters' thesis requirement at the Dynamic Media Institute in Boston in 2007.

"AnyMails" is an application written in "processing" programming language that visualize the structure and attributes of the user's email inbox, using the metaphor of microbes. Each email is represented by one animal, each category of emails correspond to a species of microbes, the status and age of an email is indicated by the size, as well as kinetic properties—specifically, the velocity of the microbe.



"AnyMails" case study

All incoming emails in the "AnyMails" system are categorized in six groups: family and friends, school, job, e-commerce, unclassified, and spam. These categories are represented by six species of "animals," which are different in color and form. The

age of an email (when it was received) is visualized by the size and opacity of the animal (for instance, a new email is big and opaque, an old email small and transparent). The status of an email—unread, read, or responded—is shown by two animal attributes: the number of hair/limbs and velocity (for instance, unread email is "hairy" and swims fast; a read email has less hair and does not swim so fast anymore; a responded email is "hairless" and barely moves).

In its initial state, all animals are swimming freely. Users can then apply various filters (by category, by status), browse the system by time (day, week, month) or visually group animals based on various criteria: the user can group by "species" or by status; the user can make certain "species" visible or invisible (fade in and out); the user can go back in time to see email received over different periods of time; the user can scroll through timeline to preview inbox in search of certain patterns formed by certain attributes of the mail arriving in the past.

Last, by not least, the user can group emails continuously. In this mode all emails are grouped in the form of strings, defined by selected properties and customized arrangement in each group.

4. Postscript

The author of this paper is interested in collaborating with colleagues who may share the enthusiasm of researching the language of motion in the context of dynamic media. Please stay in touch.

References

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