TOPIC: CREATING NOVEL DISPLAY USING BUBBLE NUCLEATION

PROJECT IGR 205

Fig 2. Touch interaction with (sensing and projection) an ice wall [4]

Fig 3. Group of living plants [5] for a visualization

Description

Human interaction with materials such as water, fire, soap bubbles is rich and multi-sensorial. Our interaction with such natural materials is based on ephemerality (short-lived interaction) and forgetting versus the prevailing technology-focused persistency of data. Traditional screen-based displays leave a lot to be desired in terms of such physicality and experience.

Researchers have previously developed the concepts of calm computing [1], ambient media (e.g. [2]) and ambient communication (e.g. [3]). As an example, researchers have created display called IceWall [4], an interactive multi-touch wall (Fig 2.) built from pure ice in an outdoor environment in winter in Finland. The properties of ice as material allow realization of computer vision based multi-touch tracking. More importantly, the ice wall stands in the tradition of ice buildings like igloos or ice hotels. Recently, the palette of materials to design with is increasing as researchers further explore materiality in human computer interaction (HCI).

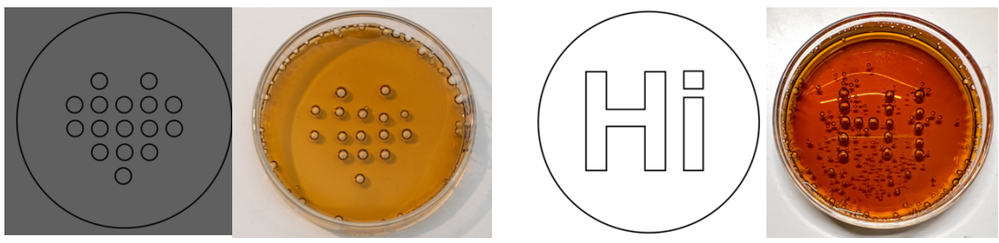

Fig 1. Visualization created using bubbles nucleated at specific points on a petri dish. Regular carbonated beverage was poured into the dish (modified using a custom process) to achieve this display output.

Goal

This project will begin with an introduction to ephemeral displays and interaction design by Professor Harpreet Sareen. The students will then be led through instruction sessions at Studio Design to create a display that can controllably display bubbles of a carbonated beverage on a petridish (Fig 1). The students will learn how to use a vinyl cutter and material application to create such a display.

Each student team will be given the supplies to recreate this bubble display and to test variation of outputs with various liquids, temperature and bubble variation over time. Students are encouraged to think out of the box about ways to visualize this information. What aspects of ephemerality and interaction best suited for such a display? Why should not also digital information be presented transiently? Broadly, could we even design systems that naturally grow and age? Students will brainstorm and present a few example applications possible through such controlled bubble nucleation. Each team may also develop a software workflow that can “pixelate” an input image to bubble size variation that can fabricated on a vinyl cutter.

Teams will be closely supervised by Professor Sareen who will be involved throughout the project. Each group is expected to meet once a week with their supervisor and discuss their ideas and the direction of the project.

Prerequisites:

Basic understanding of Computer Graphics

Acquired Skills:

Being able to apply a research driven design process for HCI projects
Understanding the ephemerality and interaction in context of various materials
Being able to run a vinyl cutter for various application
Constructing a novel display, and creating a custom software workflow for a fabrication machine such as vinyl cutter

References:

[1] Weiser, Mark. "The Computer for the 21 st Century." Scientific american 265.3 (1991): 94-105.
[2] Ishii, Hiroshi, and Brygg Ullmer. "Tangible bits: towards seamless interfaces between people, bits and atoms." Proceedings of the ACM SIGCHI Conference on Human factors in computing systems. 1997.
[3] Gaver, Bill. "Provocative awareness." Computer Supported Cooperative Work (CSCW) 11.3 (2002): 475-493.
[4] Virolainen, Antti, et al. "Cool interaction with calm technologies: experimenting with ice as a multitouch surface." ACM International Conference on Interactive Tabletops and Surfaces. 2010.
[5] Holstius, David, et al. "Infotropism: living and robotic plants as interactive displays." Proceedings of the 5th conference on Designing interactive systems: processes, practices, methods, and techniques. 2004.

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