The Elocuter: I Must Remind You We Live in Dada Times…

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Abstract

The Elocuter is a sonification device that attaches via suction cup to a computer screen. It translates newspaper headlines about the global economic crisis into spoken words, composed of impossible sequences of allophones similar to a Dada poem. The project references poetic experiments of the Dada movement of the 1910/20s, specifically the play with language as a way to respond to a seemingly irrational political and cultural context. Finally, this project can be placed in the history of combining human and machinic components into instruments for performance.

Keywords

Economic crisis, news headlines, sound poem, Dada, Futurism, Arduino, Processing, SpeakJet

ACM Classification Keywords

J.5 Arts and Humanities: Arts, fine and performing; H.5.2 User Interfaces: Voice I/O; B.4.2 Input/Output Devices: Voice; H.5.1 Multimedia Information Systems: Audio input/output; H.1.2 User/Machine Systems: Human information processing

General Terms

Design, Experimentation, Theory

Introduction

"Banks Prepare for Big Bonuses, and Public Wrath" read a headline in the January 9th business section of the New York Times. The article states: "Bank executives are grappling with a question that exasperates, even infuriates, many recession-weary Americans: Just how big should their paydays be?" It continues that "… six-, seven- and even eight-figure sums for some chief executives and top producers — will probably stun the many Americans still hurting from the financial collapse…" This is the setting for our work *The Elocuter: I Must Remind You We Live in Dada Times…* More than a year after the beginning of the massive global economic crisis, explanations about its exact causes are still vague and in the face of the disaster the actions of some of its protagonists remain incomprehensible. Despite researchers' and scientists' best efforts to streamline and technologize financial processes, the events that lead to their collapse remain deeply and troublingly irrational. *The Elocuter* tries to provide a possible answer to the question: what kind of artistic responses are merited in such a situation?

Project Description

The Elocuter is a direct response to the absurdity of the current global economic crisis and its representation in online media. Similar to Dada poems reflecting the absurdity of world events in the 1910's, *The Elocuter* reads out news headlines in a new, seemingly non-sensical language. It emphasizes the failure of language to communicate the falter of global capitalism and its complex implications in a meaningful way. *The Elocuter* is a small device that attaches itself via suction cups to a computer screen. It has a speaker with volume control, a light sensor and a simple pushbutton for sensor calibration. It receives its power from the

computer's USB port. Technically, the Elocuter is harvesting news headlines reflecting the economic crisis from online sources such as CNN, Bloomberg and the New York Times. A custom program displays these headlines as scrolling text, similar to stock market quotes, in white letters on a plain black background. *The Elocuter* reads the brightness value of each letter with a photocell and pairs this value with an allophone. In this process words are translated into impossible sequences of allophones similar to a Dada poem. Inspired by Dadaism, but addressing our own digital context, we are consciously creating a paradoxical situation: mixing the extreme rationality of computers and the irrationality of dada language play.

figure 1. *The Elocuter* with its suction cup and integrated photocell reading a news headline off the computer screen.

Technical Aspects

The Elocuter combines off-the-shelf components to create a unique experience and representation of today's economic condition. A photocell, an Ardunio board mini and a SpeakJet synthesizer IC connected to a speaker all work together to translate brightness values of white letters on a black background into allophones, uttered by a robotic voice.
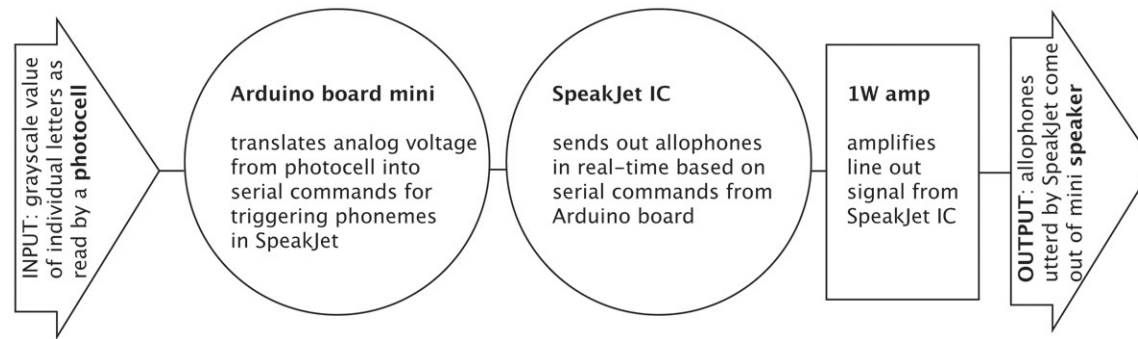
INPUT: grayscale value of individual letters as read by a **photocell**

Arduino board mini

translates analog voltage from photocell into serial commands for triggering phonemes in SpeakJet

SpeakJet IC

sends out allophones in real–time based on serial commands from Arduino board

1W amp

amplifies line out signal from SpeakJet IC

OUTPUT: allophones utterd by SpeakJet come out of mini **speaker**

figure 2: *The Elocuter* system diagram.

area underneath photocell

b**a**ilouts

ba**i**louts

running text

a results in a comparatively **dark** averaged graytone

i.e. the photocell measures **1.9** Volts

i results in a comparatively **light** averaged graytone

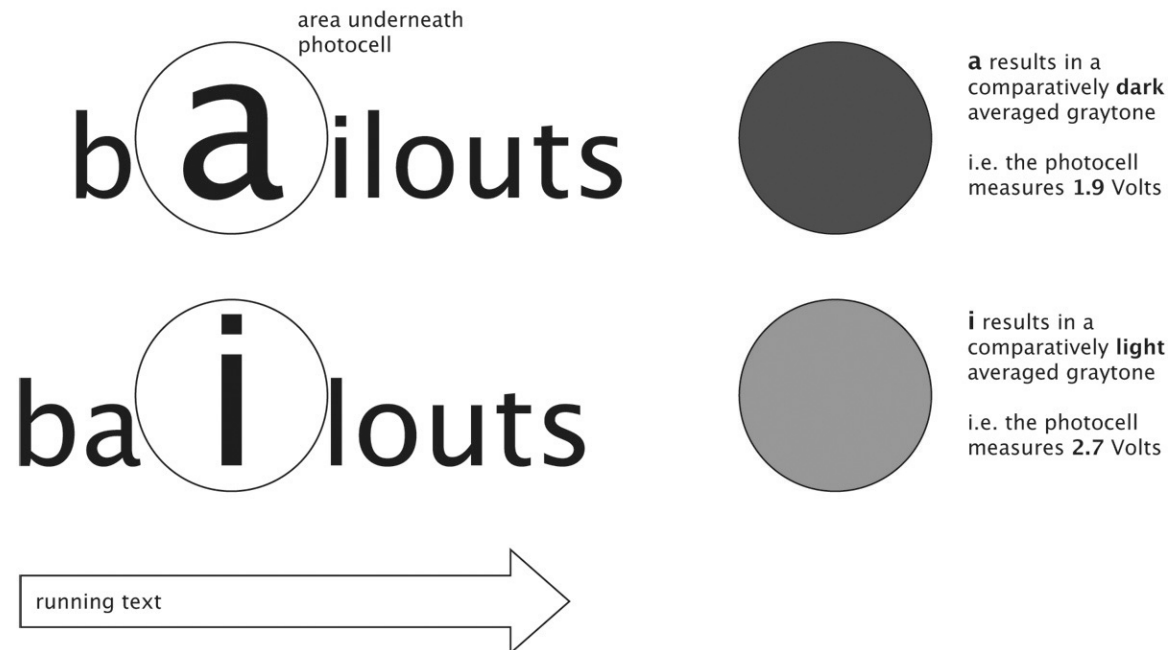i.e. the photocell measures **2.7** Volts

figure 3: simple letter recognition by using averaged grayscale values of individual characters read by a photocell.

The process of identifying letters on a computer screen optically using low-tech photocell readings rather than for example computer vision or optical character recognition (OCR) techniques was inspired by human design strategies in the creation of a typeface. When designing a new typeface, typographers often work aesthetically with the different areas of white and black in individual letters to create visual rhythms in running texts. Similarly, in our project, the photocell evaluates letters visually making use of the fact that each black letter, when averaged against a white background results in a different shade of gray (see figure 3).

One technical aspect of the project that has not yet been documented extensively elsewhere is the interfacing of the Arduino board with the SpeakJet synthesizer IC. We decided to include it as part of this paper for reference to other developers, designers and artists. Magnevation, the developer of the SpeakJet IC defines it in its user manual as "a completely self-contained single chip voice and complex sound synthesizer" [4]. We chose this IC for our project because it allows easy control through serial messages from almost any microcontroller. For *The Elocuter* we used the Arduino board mini as a microcontroller because of its small footprint and ease-of-use.

The SpeakJet synthesizer IC has two modes of serial control – one that controls the Mathematical Sound Architecture (MSA) module directly and one that uses a system called Serial Control Protocol (SCP). Communicating with the chip's MSA module allows access to the preconfigured 72 speech elements (allophones), 43 sound effects, and 12 DTMF Touch Tones. *The Elocuter*'s voice output is created using this serial control mode since it allows direct access to the

chip's preconfigured allophones. Sending serial data in SCP format allows the 5-channel synthesizer and the EEPROM in the SpeakJet to be controlled by an external microcontroller. The following two figures show short Arduino (Ardunio version 0017) code samples that illustrate SCP and MSA serial control.

```
void setup() {
  Serial.begin(9600);        // the default baud rate of
                             // the SpeakJet is 9600

  Serial.print("\\0");       // open SpeakJet's Serial
                             // Control Protocol mode
}

void loop() {
  Serial.print("1J");        // set address for
                             // oscillator 1 frequency

  Serial.print("500N");      // set frequency of
                             // oscillator 1 to 500Hz

  Serial.print("11J");       // set address for
                             // oscillator 1 volume

  Serial.print("16N");       // set oscillator 1 volume
                             // to 16, value range: 0–31

  delay(1000);               // sustain output frequency
                             // for one second

  Serial.print("X");         // exit SCP mode

}
```

figure 4: SCP serial control Arduino code snippet for direct access to the SpeakJet's 5-channel synthesizer.

```
void setup() {
Serial.begin(9600);       // the default baud rate of
                          // the SpeakJet is 9600
}

void loop() {

Serial.print(20, BYTE);   // 20 is the address for
                          // the volume value

Serial.print(96, BYTE);   // this sets the actual
                          //volume value, range: 0-127

Serial.print(128, BYTE);  // this is the actual
                          // allophone value,
                          // allophone values range
                          // from 128-199
}
```

figure 5: MSA serial control Arduino code snippet for access to the SpeakJet's MSA module as used in the programming of *The Elocuter*.

For a complete list of address and control values (for both MSA and SCP control) consult the SpeakJet user manual [4].

Cultural Contextualization of Technological Experiments

An important part of the research for this project is of cultural and historical nature, an attempt to contextualize the use and function of the technological components that make up *The Elocuter*. As David E. Nye puts it: "A technology is not merely a system of machines with certain functions; rather, it is an expression of a social world. Electricity, the telephone, radio, television, the computer, and the Internet are not implacable forces moving through history, but social processes that vary from one time period to another and from one culture to another." [3]

The title of our project references the technique of elocution, taught as a remedy for stuttering and autism and as an improvement of spoken language skills enhanced by body gestures. Interestingly, early training in Elocution in the 1850s already establishes a connection between electricity and the human organs of speech as referred to in Dr. Andrew Comstock's book *Elocution Taught, Stammering Cured: Dr. Comstock's Vocal Gymnasium*: "Electricity may be used with advantage as a tonic, and also as a means of interrupting the spasm of the vocal organs." [1]

This first part of the project's title is contrasted with its second part: a quote from Sophie Taueber-Arp, a Swiss artist central to the Zurich Dada movement of the 1910s: "I must remind the reader, we lived in Dada times". The 1910s and 1920s were times of severe political, economical and social change in Europe: World War I (1914-1918) resulted in social trauma caused by new weapons of mass destruction and the restructuring of political powers in Europe. Germany witnessed one of the most radical devaluations of its currency resulting in a hyperinflation starting in the late 1910s.

Dada emerged as a cultural movement in reaction to this seemingly irrational political and cultural context. In their performances, manifestos and artworks, Dada artists found a creative response to the political, social and economic climate of the time by challenging taboos through provocation, spontaneity and anarchy. Of specific interest to our project is the unique nature of Dada language play showing a potential for poetic, linguistic and sonic explorations that had been previously unknown. Hugo Ball, a member of the Dada movement and inventor of the sound poem

("Lautgedicht") describes the Dadaists' approach to language in 1916: "We have now driven the plasticity of the word to a point where it can scarcely be equaled. We achieved this at the expense of the rational, logical constructed sentence, and also by abandoning documentary work…" [2] What Ball meant by this is evident in the work of French poet Tristan Tzara. In 1920, Tzara introduced a poetry engine consisting of a set of instructions on how to turn newspaper clippings into poetry. This technique relates to our choice of online newspaper headlines as a source for the sound poems that *The Elocuter* creates.

The sonic qualities of *The Elocuter*'s output are informed by two historical sources from the 1910s: Luigi Russolo's *Intonarumori* and Kurt Schwitter's *Ursonate*. Luigi Russolo was an artist of the Futurist movement which developed almost parallel to Dada. Similar to the political and provocative nature of Dada, but different in its approach to technology, Futurism focused on cutting edge technical inventions of the time as an inspiration and medium for artworks. Luigi Russolo, Futurist author of the manifesto *The Art of Noises* and one of the first noise music experimental composers used the technology of the time to create a new type of musical instrument: the *Intonarumori*. The *Intonarumori* belonged to a family of noise generators that created human, animal and machine sounds mechanically. In contrast, the poetic work of German Dada artist Kurt Schwitters, specifically his sound poem *Ursonate* (translated to *Primeval Sonata*, 1922-32), evoked the sounds of machines using only the human voice. Reconsidering these two sources, we are currently exploring new possibilities of making the sounds of *The Elocuter* less abstract yet still not

recognizable as words. For example, *The Elocuter*'s output could occasionally include combinations of allophones that almost sound like words to constantly challenge the audience's attention in trying to make sense of the sound poems.

Conclusion

As outlined in this paper, *The Elocuter* is an artistic response to the irrational nature of the current global economic crisis. Using off-the-shelf electronic components and software, the project's aim is to create a unique experience and representation of today's economic condition. It does so by referencing a rich cultural context, specifically techniques and strategies of Dada and Futurism related to our own digital condition. This helps shine a light on how technological systems can be discussed beyond their purely functional elements, not only as machines but, in the words of David E. Nye, as "expressions of a social world."

References and Citations

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[3]   Nye, David E. *Technology Matters*. Cambridge: The MIT Press, 2006.

[4]   SpeakJet User Manual. http://www.magnevation.com/ (accessed January 21, 2010)