

# breath, data, death

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keys: code poetry, kinetic installation, physics, poetry, vispo

## Abstract

*Data representation refers to well established conventions to encode and decode information, eventually collected from external stimuli.*

*Scientific investigations often insist on a precise hierarchy:*

$$\boxed{\text{data}} \rightarrow \boxed{\text{laws}} \rightarrow \boxed{\text{symmetries}}$$

*Once a clear connection between phenomena and measuring devices is established, further relation between data (numbers) and theoretical expectations may be inferred, with the help of proper graphical representations.*

*Depending on the kind of information to be extracted, various pictures may be adopted (frequency table, stem and leaf plot, line plot, scatter plot etc.).*

*In this paper, scatter plot, unsupervised lettering and vispo get combined to connect together visual and phonic experience from a one word poem.*

## I. STATEMENT

*Breath* [ˈbreθ]: an amount of air taken into one's lungs.

This word, indicating the elementary measure of breathing, has roughly the time span of a quiet, single breath.

For the purpose of this experiment, it is conceived of as the constitutive, yet unstable, state of breathing.

With a **Zoom H4n Pro** recorder, 78 close repetitions of the word have been acquired as a mono file. At the same time, the phenomenon has been tracked through a **KY-038** sound detection module, driven by a **Kuman UNO** board, to collect some corresponding voltage signal.

In the first instance, the whole sequence (Fig. 1, p.7) and the very first occurrence of the word (Fig. 2, p.7) are conventionally plotted as *Amplitude vs Time* and *Power Density vs Frequency (Periodogram)*.

The data of the single breath is then entered into details from quite an unconventional perspective.

Tweaking the basic options of the **LaTeX TikZ** package, the effect of the word/act of breathing on air molecules is displayed within unframed scatter plots (left column, p.8-9)

The background noise before and after the word has deliberately been considered as the ground, though chaotic, state of air.

A collection of symbols, each standing for a particular molecule, dynamically adapts according to the sampled voltage signal, whose instant value, chosen within the time interval  $[0.2\text{ s}, 0.7\text{ s}]$ , is conveniently scaled and passed on to the nested **hspace**, **vspace**, **scalebox** and **raisebox** instructions. In addition to this, molecules get gradually replaced by the word itself, till the whole volume of air it hits is mapped into a set of pure letters.

The right column (p.8-9) presents the same data within conventional Cartesian coordinates, wherein wave scattered molecules are displayed as bare points.

The for loop instruction accounts for 78 iterations.

The original body of the one-word poem thus reveals the frames of a potential, invisible, kinetic installation.

A word without relationships is like sound without a resonating medium: addressing this issue is the goal of the present work.

## II. INTRODUCTION

An atom in itself consists of protons, neutrons, electrons.

proton $\rightarrow$ baryon	$\uparrow$ quark: 2	$\downarrow$ quark: 1
neutron $\rightarrow$ baryon	$\uparrow$ quark: 1	$\downarrow$ quark: 2
electron $\rightarrow$ lepton	elementary	particle

Free proton  $\approx 10^{30} - 10^{35}$  years.

Free neutron  $\approx 10^1$  minutes.

Neutrons are stable into a nucleus.

Electron  $\approx 10^{28}$  years.

The age of the Universe  $\approx 10^{10}$  years.

A word in itself consists of consonants and vowels.

Consonants and vowels are rather stable into a word.

Free consonant or vowel  $\approx 10^0$  seconds.

Consonants and vowels combined into a word  $\approx 10^{-1}$  seconds.

Free breath  $\approx 10^0$  seconds.

Breaths combine up to  $\approx 10^9$  seconds.

The age of the Universe  $\approx 10^{10}$  years.

A pure substance need not be of a single element or compound.

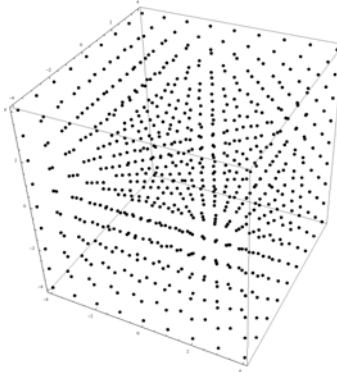
It may exist in different phases with distinct molecular arrangements.

A pure poem need not be of a single letter or word.

It may exist in different forms with distinct verse arrangements.

A sample of copper:  $Cu$ ,  $Z = 29$ , group 11, period 4 et cetera.

A lattice built from  $Cu$  atoms exhibits face-centred cubic symmetry.



```
table[point[{x,y,z}],{x,-4,4},{y,-4,4},{z,-4,4}], axis:true];
```

*Breath*: 1-syllable, 6-letter word, 4 consonants, 2 vowels.

A poem from a single word: *breath*, 6 letters, 3 rows, 26 lines.

```
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
breath breath breath
```

**olivetti**

78 shifts of breathing.

*Breath* arranged on a page, loose-ended.

Olivetti Studio 46 on Olivetti paper.

An electron in itself is not a sum of parts.

That does not make it less real, though.

A whole field whose equilibrium state is zero everywhere but in a point we call electron.

It subtracts itself from zero.

It acts at a distance.

A word in itself is not a string of letters or a pitch.

It is the sum of all the relationships it establishes and of the blank space around.

White is not a neutral pigment.

Paper is not a neutral medium.

They're all part of the statement.

### III. METHODS

While reading out loud, the neuron's electric signals parallels the air through the lungs, though faster.

*Ar* ( $\approx 0.9\%$ ), *O<sub>2</sub>* ( $\approx 21\%$ ), *N<sub>2</sub>* ( $\approx 78\%$ ), *CO<sub>2</sub>*, *O<sub>3</sub>*, *H<sub>2</sub>*, *Ne*, *He*, *CH<sub>4</sub>*, *Kr*, *N<sub>2</sub>O* ( $\approx 0.1\%$ ) tend to subsume the rigorous geometry of the text.

Each phoneme triggers a spike within thermal noise.

Each spoken word is a large-scale disturbance.

Brownian motion engages Cartesian composed order.

Air molecules set themselves as precarious points of tension between letters.

Air molecules become letters themselves.

A certain batch of molecules may be treated as a zero word.

The text thus becomes an invisible kinetic installation.

Air molecules are driven against membranes.

The one suspended above a fixed conductive plate detects pressure waves.

They are converted into a voltage signal.

The eardrum receives the same vibrations.

The brain recombines them into words.

Death is here treated as some local hidden variable.

It is zero everywhere now but somewhere in the future.

It has been proved to be inconsistent at the time of the experiment.

## IV. RESULTS

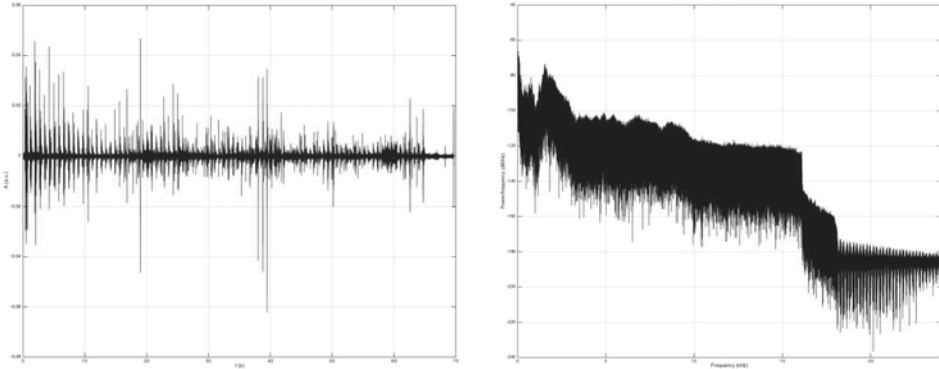


Fig. 1: 78 repetitions of *breath*, *Amplitude vs Time* (left), *Power Density vs Frequency* (right).

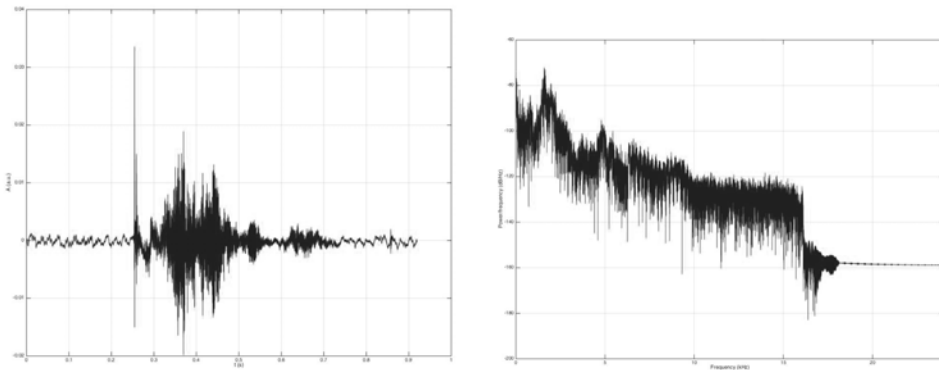


Fig. 2: single *breath*, *Amplitude vs Time* (left), *Power Density vs Frequency* (right).

The Fast Fourier Transform (FFT) of the original signal has been implemented through a dedicated GNU Octave script.

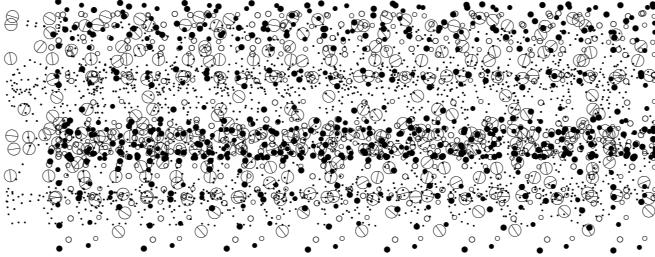
The sketch to print on the serial monitor the values proportional to the voltage signal, sampled every 100 *ms*, reads as follow:

```
int breath=A0; int air=0;
void setup () {Serial.begin (9600);}
void loop () {sensorValue = analogRead (breath);
Serial.println (air, DEC);
delay (100);}
```

```

#include <air.void.h>
int main() {;
int breath;

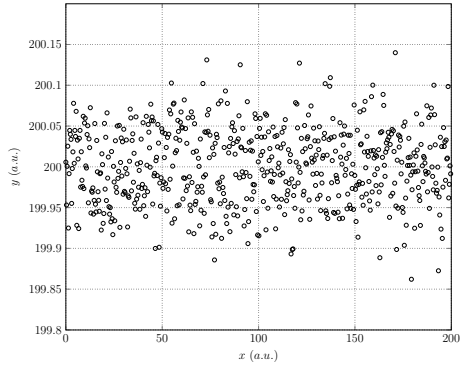
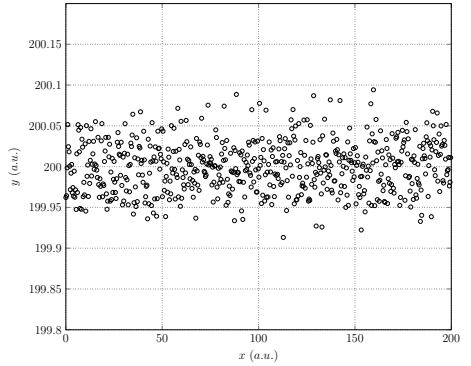
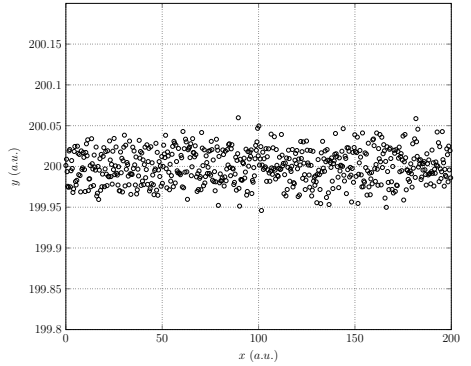
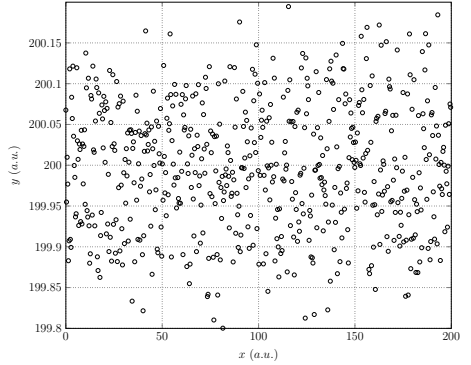
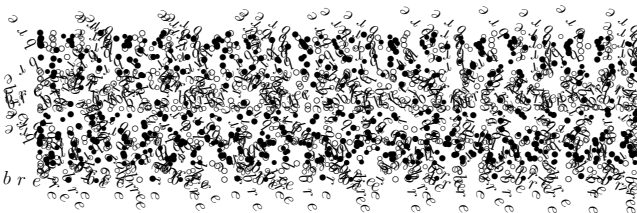
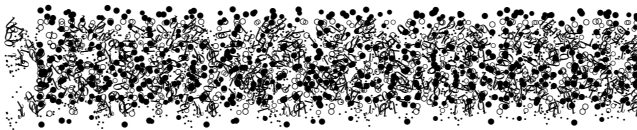
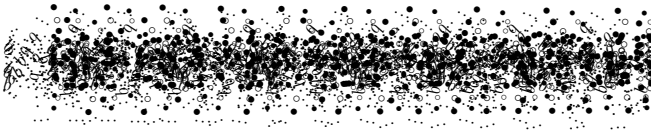
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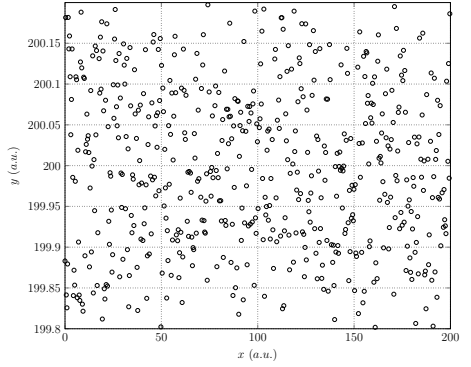
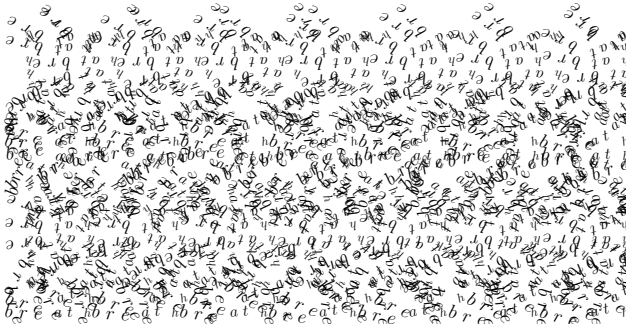
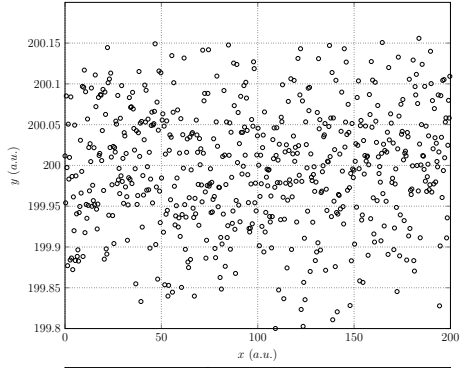
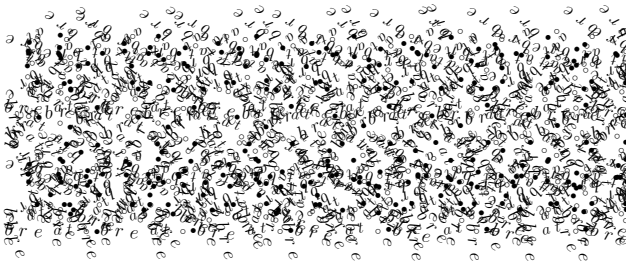
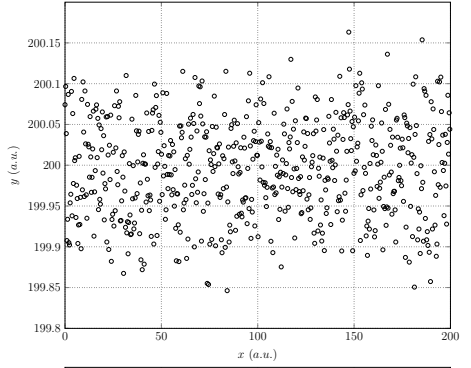
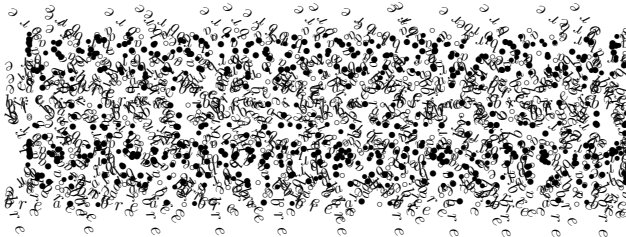
```

breath=1;
do {

```



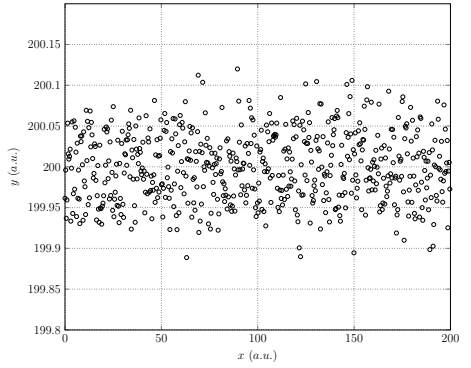
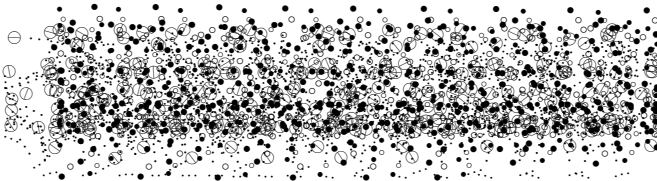




```

breath++; }
while (breath <= 78);

```



```

return 0;
}

```