The Concepts of Signifier/Signified Revisited

Paolo Rocchi

IBM, via Shangai 53, Roma, Italy
LUISS University, via Alberoni 7, Roma, Italy
procchi@luiss.it

PRINCIPLES OF COMPUTING
or FUNDAMENTALS OF COMPUTER SCIENCE

INFORMATION

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At the ACM Ubiquity Symposium 'What is Computation' Ruzena Bajcsy holds that computation can be seen as a transformation of information:

> ***"In order to answer the question, "What is computation?", I will rephrase it to "What is Information?""*** **(*)**

(*) R. Bajcsy. Computation and Information. *Ubiquity*, December 2010, p.1.

But what is information?

Over twenty-five theories make attempts to provide an answer

- The *statistical* theory of information by Shannon (1949);
- The *algorithmic* theory of information by Solomonoff, Kolmogorov (1965), and Chaitin (1977);
- The *economic* theory of information by Marschak (1971);
- The *living system* information theory by Miller (1978);
- The *autopoietic* theory of information by Maturana, Varela (1980);
- The *biological* information theory by Jablonka (2002);
- The *cybernetic* information theory by Nauta jr. (1970);
- The *dynamic* theory of information by Chernavsky (1990);
- The *fisherian* theory of information by Fisher (1950);
- The *general* information theory by Klir (1991);
- The *general* theory of information by Burgin (2009);
- The *hierarchical* information theory by Brookes (1980);
- The *idependent* theory of information by Losee (1997);
- The *logical* theory of information by Tarski (1983);
- The *organizational* information theory by Stonier (1994);
- The *philosophy* of information by Floridi (1999);
- The *physical* theory of information by Mityugov (1976), Levitin (1992);
- The *pragmatic* theory of information by von Weizsäcker (1974), von Lucadou (1987);
- The *qualitative* theory of information by Mazur (1974);
- The *semantic* theory of information by Carnap, Bar Hillel (1953);
- The *social* theory of information by Goguen (1997);
- The *sociological* theory of information by Garfinkel (2008);
- The *statistical* theory of information by Wiener (1961);
- The *systemic* theory of information by Luhmann (1990);
- The *utility* theory of information by Harkevich (1960).

- *The sign has a body* → ***Signifier***
- *The signifier stands for something* → ***Signified***

Two popular ideas for:

Theorists ***(e.g.Shannon)***
Engineers and Technicians
Musicians
Physicians
Zoologists
Biologists
Physicists
Jurists and many others....

"... by using the shortest channel symbol, a dot, for the most common English letter E; while the infrequent letters, Q, X, Z are represented by longer sequences of dots and dashes." (*)

(*) C.E. Shannon (1948). A Mathematical Theory of Communication. *The Bell System Technical J.*, Vol. 27, p.5.

The concepts of signifier and signified can provide essential assistance

- *to interpret the analog and the digital technologies,*
- *to explain some paradoxical aspects on computing.*

In particular ***the signifier/signified can enlighten the why and the how of***

- ***system hardware,***
- ***computer networks,***
- ***organizations of computer storages,***
- ***software programming***. (*)

(*) Rocchi, P. (2010). *Logic of Analog and Digital Machines*. Hauppauge, NY: Nova Science Publishers.

Counterpart...

Engineers normally use the mathematical language.

The notions of signifier and signified are to be revisited in mathematical terms.

A Mathematical Definition for the Signifier

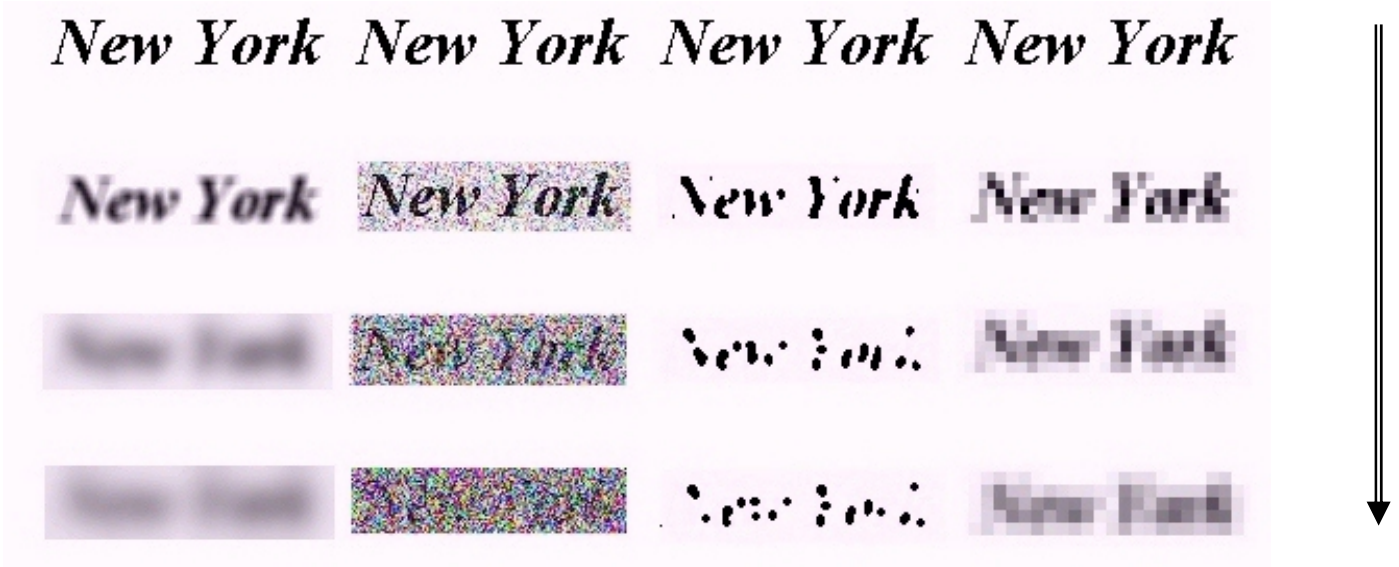
"The elementary unit of information" is "a difference which makes a difference" (Gregory Bateson)(*)

Various authors spell out the idea that sharpness is an essential requisite to information.

(*) Bateson G. (2000) - *Steps to an Ecology of Mind* - University of Chicago Press.

A Mathematical Definition for the Signifier

Lacking sharpness a signifier disappears



A Mathematical Definition for the Signifier

The entity E is a signifier if E differs from an adjacent entity E with respect to the observer R.*

We translate this phrase with the mathematical language

$$E \text{ NOT}=_R E^*$$

Where E and E^* are elements of the algebraic space $\mathcal{E}_a$. (*)

(*) Rocchi, P. (2010). *Logic of Analog and Digital Machines*. Hauppauge, NY: Nova Science Publishers.

Humanist Culture + Bateson's Lesson

The Signifier Revisited is an Astonishing Key
- to Decrypt the Logic of ComputerTechnologies,
- to Answer Paradoxical Questions.

Paradox #1

***The event**: Norbert Wiener writes:*

"If people always get the same signal, this becomes inessential and nothing may be transmitted with the same result". (*)

***Problem Statement**: A single elementary sign amounts to nothing, why?*

(*) Wiener N. (1961) - *Cybernetics: Or the Control and Communication in the Animal and the Machine* - 2nd edition, MIT Press and Wiley.

Paradox #1

Explanation: *The definition of the signifier holds that an observer is capable of seeing a signifier as long as this signifier contrasts with an adequate term of comparison*

$$E \; NOT =_R E^*$$

The inequality has no less than two terms and Wiener's paradox can be translated such as: an elementary piece of information relies upon the adjacent element and a sole element cannot work as a signifier.

Paradox #2

The event*: Mr. A purchased ticket #99 and Mr. B purchased ticket #87 of the Lottery and later they have checked the Lottery results on newspapers. Ticket number #99 printed on a newspaper notifies A is a winner, but also number #87 missing on the newspaper conveys information; the absent number tells: "Mr. B is not a winner".*

Problem Statement*: A printed number is a sign and even a lacking number signifies something. Why a non-existent sign is yet a sign?*

Paradox #2
Explanation: *Suppose that the comparison term is null*

$$E \; NOT =_R 0$$

Notably the black ink E contrasts with the blank 0; the voice is dishernible in the silence etc.The definition of the signifier is symmetrical and can be inverted in this way

$$0 \; NOT =_R E$$

This means that also 0 is a signifier and can convey information. The null element can work as a potential vehicle of information. Normally a signifier has a body, and by exception a signifier may be body-less. People employ silence instead of sound to transmit their feeling; vacuum is in use instead of matter; darkness in place of light; blank instead of a black form and so forth.

THANKS FOR YOUR ATTENTION !