

Noise, Phenomena and the Digital Psychosis

Giuseppe Torre

University of Limerick - Ireland

giuseppe.torre@ul.ie

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Abstract

With respect to digital technologies, noise is something that is at once both fought and sought. We may wish to minimise noise in communications but require it for encrypting the very content communicated. We may wish to minimise noise when recording sound but also want to use it to improve the fidelity of the recording process. The catch is that noise is both an abstract idea and a concrete thing that does not sit comfortably in relation to systems that are deterministic/probabilistic, such as digital technologies. This is a fact that computer scientists know well but that is systematically overlooked in order to safeguard and improve the functioning of digital technologies, such as digital instruments. Indeed beyond the plethora of different kinds of noises, the comparison between analogue and digital technologies highlights the existence of just two types of noise: one that is naturally occurring (noise) and one that is humanly constructed (pseudo-noise). Digital technologies operate by moving from noise to pseudo noise, in order to then 1) crystallise reality into mathematical constructs and 2) create realities from mathematical constructs. This makes the digital realm a type of technology different from any other, namely, one in which noise is fiercely fought and used for the digitisation process but then relentlessly sought, and always denied, within the digital realm. This observation points to at least two further implications: one is that noise may point to essential differences between analogue and digital technologies; the second is that the presence or absence of noise may lead to either crippled or diverse phenomenologies. To this extent, digital technology, rather than revealing by challenging (Heidegger), has more to do with enabling a psychotic stance towards reality - one in which reality has been made to conform to our mathematically constructed idea of it ... and one which might be too much even for a phenomenologist to overcome. These arguments will be developed from the perspective of a digital art practitioner.

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The idea I wish to bring forward is that noise is all there is. Or that at least noise is all we have got to remain sane. Yet, of course, the question ‘what is noise’ must be addressed first.

I should immediately clarify that, as far as this paper is concerned, noise is not to be interpreted as a solely acoustic phenomena. On the contrary, my use of the word noise is loose and broad and, for that, could be interpreted as closely relating to words such as chaos, random, entropy and alike. In fact, many of these related words will appear in this text and, at times, also used as synonyms of noise. Yet, I stress that the word noise is in fact the one to use. Chaos, on the contrary, is often understood as the opposite of order or, as in mathematics, as a property of a system. In philosophy, chaos often points to a condition preexisting knowledge. In theology, chaos points to the condition preexisting life created by God. All this is not what I mean to discuss. On the other hand, noise is not to be intended either as a disturbance, an annoyance or an error. Or at least not only as such. Noise, as a preliminary attempt towards a description, is simply anything that escapes our attention and interpretation. Noise is not the opposite of meaning but on the contrary the amniotic fluid within which meaning takes place. Noise and meaning go hand in hand. Noise, in truthfulness, shouldn’t even be talked about. Noise should not even have a name. And yet words are granted because it constitutes a fundamental part of our experience. Maybe, recalling Bakhtin, noise is the once-occurrent event of Being in action.....events that occur only and only once, non-repeatable, uncountable...reality as noise. Hence noise is all there is.

Noise is all there is only if we are ready to admit that we do not know what’s in it. Noise is all there is if we do not believe in fate, destiny or grand Designers. There is no passage from chaos to order as in the Genesis. Nor from ignorance to knowledge, from darkness to light. Reality is not order ordered. Nor just order, for that matter. In fact it is noise all around. Reality is noise but not in the sense that no structure may underlie it. Rather in that no grand structure is necessarily defining it. The simple reason is that we ought to distinguish our readings from our desires, our knowledge from our certainties. We can read individual instances of reality as cycles, patterns, logic, that is for sure. After all, we are not only beings that have evolved, born out and thriving (or locked) in patterns (day/night, seasons, tides, birth, growth, death etc.) but we are also pattern-searching beings in that we want, and can, search for these patterns around us ¹. In fact it is through these very cyclic features that lies

¹See Levi-Strauss’ *The Savage Mind* for an eminent example of literature that shows how we look for pattern

the possibility for any human epistemological project and with it the goal to discern order within the apparent chaotic structure of the Universe.

Yet we cannot be as arrogant as to pretend that reality is just a giant puzzle prepared for us ². Nobody is, some may argue. It may be so, especially in certain intellectual circles. Yet the language of science, especially through its constant popularisation of its wonders, tells us otherwise and it is leading us astray. While science appears to ignore existential questions, it certainly believes that a full understanding of the Universe via its method is at hand. Certainly a compromising position but more dangerously an attitude for which reality is made reduced to all we know and all that we will come to possibly know. For this very reason the concept of noise is all the more important - not to shed light on what we know but on the fact that, possibly, not all may be knowable. Noise, in fact, may not belong to knowledge but exceeds it. Noise is all there is.

This belief that science may lead humanity to all answers has, of course, a long history and it is grounded, I argue, on the simplest and yet most comforting stories of all: that the universe is order. From Pythagoras' numerology, Heraclitus' order, Anaxagora's spiritual rationality via Plato's input in transforming philosophy into a science via the introduction of a science of method, as Husserl would have it, to Locke and Hume's push for an independent scientific method two beliefs remained unchanged: that the world is ordered and governed by laws created by God and that this order and law can be discovered. Today, after God's death, we dropped only the words "created by God". That the world is ordered and that its laws can be unveiled are the two fundamental axioms, or implicit mantras, that motivate all epistemological projects - science and technology in primis (humanities studies, in contrast, and in light of much postmodernist work regained a more skeptical attitude with regard to all this.).

There is more. In this long history we have now reached the point in which our trust in an ordered universe does not necessitate sophisticated reasoning nor specialised laboratories for proof. Today we have digital technology which, governed by logic and numbers, provides itself as a proof of a universe both governed by numbers and reproducible by numbers; everywhere and all the time; whenever you want, wherever digital is.

From numerology to digital technology the circle is closed: phenomena are both read as numbers and re-created via numbers. Through this double process that cradles us in our belief in an ordered reality we have begun to confuse our understanding of the events with the events themselves. What is forgotten, whether innocently or because it's considered only an "obvious" detail not worth mentioning in the face of "higher" utilitarian goals, is that there is no identity between our mathematical model of reality and reality itself, but only similitude.

and order

²Or maybe it is a puzzle for us and when we will discover such Truth we will have a laugh together with its creator: "ah ah! and me going insane to understand it all! ah ah".

In fact, noise haunts the former and permeates the latter. Noise is all there is.

Digital and its alchemy of noises

The way in which digital technology treats noise can shed some light on how we have come to confuse dreams and reality. With respect to digital technologies, noise is something that is at once both fought and sought. To understand such a bipolar attitude, allow me to lead the discussion with a curated series of examples.

Inaudible and unpredictable

Simplifying enormously, the chain of events leading to the digitisation of a sound is as follows: a sound, which is the effect of air molecules propagating by oscillation, hits the membrane of a microphone who begins to oscillate accordingly (analogously). Such oscillation causes in turn an analogue variation in the resistance of a flow of electrons. Thus far the process is said to be analogue. It is at this point then that the analogue to digital conversion of said current begins. The ADC (analogue to digital converter) is the name given to a wealth of processes responsible for the conversion of a given varying current into a series of discrete and time dependent units - i.e. bits³. Within this complex chain of event, noise plays a very important role. In fact, without noise the quality of the resulting recording would be poor. One would imagine that achieving high quality digital audio requires a chain of events in which noise is minimised at all costs. Yet, as stated, noise play a fundamental role in providing high fidelity audio. The catch is that there is more than one type of noise. The unwanted signal or unwanted distortion we are able to hear is one kind and it is the one we want to minimise. The second kind of noise is not noise gathered along the cables and circuitry but noise that is intentionally added to the analog input signal before being digitised (i.e. being converted to digits). The reason for doing so is to minimise the error in the very recording process. In technical terms this is called dither and it is done to minimise the errors introduced by amplification and the sample-and-hold circuit. In layman terms the process is required in order to randomly nudge up or down sampled values that, when passing through the ADC stage, would inevitably fall within the cracks of the smallest unit of measurement with a predictable pattern. In lieu of an example, if you were to store various quantities only as either 0 or 1, how would you store values such as 0.3 or 0.6 or 0.5 and so on? As 0 or 1? If you use a rule, for example: all number bigger than or equal to 0.5 will be stored as 1 and all other as 0, we would distort the signal by having added arbitrary noise to it - the overall quality of the recording will be poor. The engineering solution consists then of adding noise (yes!) but a particular kind of noise; a noise that is not

³Binary digits (bits) are often considered the essence of the digital but they are not as indeed there are non-binary (e.g. ternary) computers that are said to be digital as well. I have offered a more in depth analysis of the question about the digital in a book titled "An ethico-phenomenology of digital art practices" - Routledge 2021 in print)

arbitrary nor can be defined by any mathematical pattern. For this kind of noise we are not concerned with the fate of any floats falling in between 0 and 1 because this noise is added to the input signal itself before entering the ADC chain leading to its digitisation. It is noise added in the pre-digital stage - i.e. analogue noise. This noise is inaudible because it has a volume that is half the Least Significant Bit (LSB) - or half the space between 0 and 1 if one prefers to visualise it. In simple words, this tiny added noise randomises values in the space between what would eventually fall in between the cracks of zeros and ones at the hands of the ADC. Via this process, the resulting digital samples will be of a higher quality.

There a number of interesting things that this brief story highlights. First, noise is fought if falling in the audible range while it is sought if falling into the inaudible. Second, and following from the previous, noise is not necessarily a directly perceivable phenomena and yet its existence leaves its footprints leading to improved results in the recording process . Third, there are two kind of noises: one is artificial and one is naturally occurring. The former is the one we would have generated if algorithmically deciding what to do with the values in-between. The latter is instead noise that does not fall into any predictable pattern and one that is achieved via analogue processes and hardware ⁴.

The safety of the unknowable

At this point, anyone is likely to ask why not randomise the algorithm proposed earlier? If noise is what is needed, would a simple random function not suffice for dealing with 0.3, 0.6 etc.? Can there not be a simple software program dealing with it? Not exactly. While technically possible, this is not the recommended way. The reason is that digital computers are inherently bad at producing random numbers. We ought to be outside mathematics to tap into the chaotic, random and noisy structure of reality. Digital noise is not noise. This is not a purely speculative distinction. Understanding the difference has important, critical in many cases I would stress, implications that are very practical. Scientists and technologist know this best but how, when and where to apply noise is far from obvious or set in stone. In communication, noise is often seen as interference, something that can jeopardise the safe, correct and meaningful exchange of messages from a sender to its receiver. Hence spurious noise is certainly unwanted in the space in between them.

When wanting to encrypt communication however, the story is slightly different. Noise is in this case wanted but, again, where and when and what kind must be decided carefully. The issue is two fold. On one side we need a key (a sort of pass-code, password, secret phrase) to add to the signal we want to transmit so as to make it unreadable while in transit. When the encrypted signal reaches its destination then, the receiver needs to have the same key in

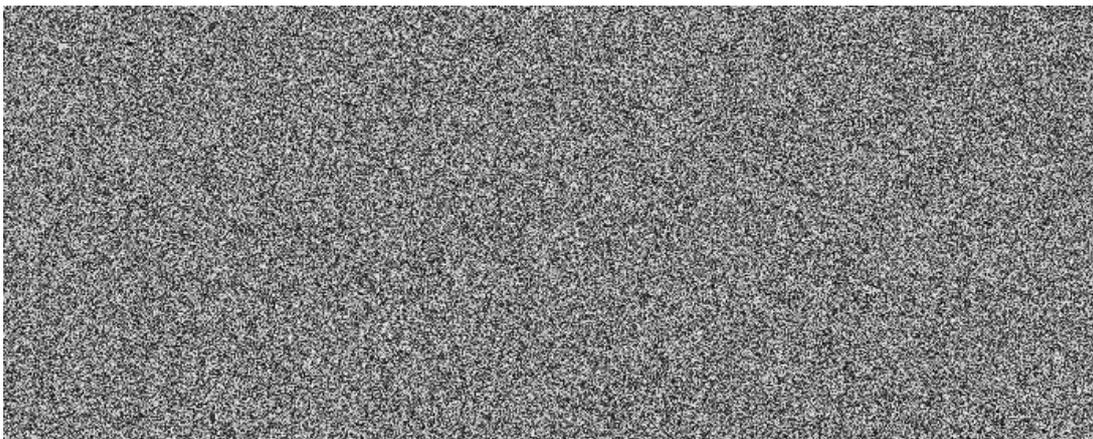
⁴I should probably add that the process explained here applies to any signal wanting to be digitised and not sound only.

order to extract the message. Knowing the key allows the receiver to separate key (noise) from signal so as to read the message. In this case, the important thing is that the receiver must have the key to decrypt the message. On the other side though we need to carefully consider how to generate this key. We must find a method to make our key difficult to guess, predict or calculate in order to maintain the level of secrecy of our message. This is where the kind of noise used to generate the key becomes important. A digital system producing a random key via a sequence of noisy processes is, for security experts, the least preferred method. Knowing the algorithm and its initial conditions makes it possible to predict its output (the generated key). For this reason, cryptanalysts prefer to use hardware number generators - devices that are able to generate numbers in response to variation in natural phenomena such as thermal, atmospheric noise, quantum properties and so on. In short, hardware that lends an ear to the uncountable (of the) universe: noise.

Once upon a time there was noise in every household

Hence there are two type of noise: a noise that is possible to control, describe, analyse, count and a noise that is not. The former is known as pseudo-noise or pseudo-random noise; the latter is known as noise. At times, the same dichotomy is described with the terms of pseudo-random and random. Whether each kind is sought or fought, as seen, depends on the circumstances. Yet, the fear is that, under the pressure of an ubiquitously digitised society, we have come to under-appreciate such differences with the dramatic consequences of having developed a psychotic attitude towards reality.

Many, for example, would describe the image below as depicting static noise on old analogue TV sets.



But it is not. The image is only a digital reproduction of that static noise. There is similitude but not identity between the two. The main difference is that the color of each pixel in the image is generated digitally via an algorithm written in Java (see Processing.org).

```

int [] pix = new int [210000];

void setup(){
    size(700, 300);
}

void draw(){
    for (int i = 0; i < width; i++){
        for (int a = 0; a < height; a++){
            stroke((int)random(256));
            point(i, a);
        }
    }
}

```

The random function (i.e. "rand()") generates pseudo-random sequences of numbers in the range between 0 and 255 - the range of admissible shades between white and black. To tell a long story short, the code is a mathematical attempt to simulate reality - the attempt to count the uncountable.

The true static noise the image is imitating is something completely different. Unfortunately this is something that I cannot show in a paper which is presented in digital format. Nor it is of any value to see me next to an old analogue TV in the video accompanying this paper - a video that, in fact, was digitally recorded and hence presenting the viewer with yet another approximation of the real noise⁵. The only way to experience static noise is to gain hold of an old analogue TV, turn it on, look at its noise, listen to its noise and loose yourself in it. What you will see and hear is anything that the antenna picks up - from the interference of your local appliances to cosmic radiations - plus all the noise of the electronic components of the TV. Unfortunately, since the beginning of the new century, countries all over the world began to switch off analogue transmissions and began migrating all communications to the digital network. Today, in Europe, all TV stations broadcast digitally. No analogue TVs are sold either other than in antique shops....maybe... and if working at all. If you find one in your old garage like me, do not throw it! Turn it on!

The problem of numbers as mediators between me and my world

If one wants to tell it bluntly, what distinguishes digital devices from any other kind of technologies is their inability to create noise. This does not mean that digital devices are "noise-proof".

⁵Let alone the fact that compression algorithms are bad in any case when it comes to compress noise.

similarities between dices and databending would make one think that in databending true randomness is at play. But it not. The difference existing between the throwing of a dice and a databending process lies elsewhere. Not in the properties of the input or the output but in the way in which the two relate to each other ⁶.

The difference is indeed that, in the throwing of a dice, input and output stands in a direct and unmediated relationship. The throwing, my hand, wind, gravity, quarks and the universe in all of its uncountable parts participate (or conjure if you wish) in resolving to one face of the dice facing up. In a databending process such unity is instead lost at the hands of a digital medium that mediate the relationship between input and output. The typing, my hand, posture, wind, light, tiredness, quarks and the universe do not exists. To exist is only a key pressed or a mouse pointer across a screen now separated from the rest. The digital medium has filtered out all but a a small countable portion of the universe (the pressed key) for which a series of digits can be assigned. Input (pre-digital) cannot be said to be the cause of the digital output. The digital is just playing its own permutation and probability game.

Nausea

Digital systems are not just bad at generating noise/randomness/chaos but they actively cut themselves out from the open, uncountable noise surrounding them in order to operate. Digital systems funnel the uncountable continuum into a stream of numbers and logic. In fact, in their wildest dreams digital devices would wish to be completely "noise-proof". But they can't, of course, because they too belong to this reality as anything else. Hence a (true) glitch remains both a threat and a reminder that isolation is only a dream. Yet I would argue that an even wilder dream for the digital world exists and it would be the ability to create true noise. By doing so, the digital world may as well superimpose itself to, equate to, compete and detach itself from the rest of reality by creating one of its own. Once again, this would be a wild dream only useful to comfort ourselves in our belief in an ordered reality and a concrete possibility of controlling it. When we wake up, we will realise that reality is neither ordered nor controllable.

Digital technology's way of dealing with and creating noise (i.e. pseudo noise) offer further points of discussion. On one hand, it highlights how irreparably destructive is to mediate the world via a mathematical representation of it. A destructive process that is nevertheless supplanted by an apparent constructive one via the ever-increasing precision with which the virtual approximate the real. We shall not be fooled by it of course; it is all about an over-signification via a reductionist process that, moving from noise to pseudo-noise, crystallises reality into fragile mathematical constructs. If meaning and knowledge are threads that one carves out from an indiscernible continuum, digital technology attempts - successfully in many

⁶In fact, the situation would not change even if we have countable inputs and uncountable output as, for example, for the famous flap of a butterfly's wings (input) to which will will never know never know what it will lead to

cases - to make these threads the only thing there is while discarding all the rest. Digital systems provides us with a ring without a halo, a fish without water, a point in a vacuum, abstractions with always loser ties with the concrete. In this respect, digital technology presents peculiarities that make it different from other types of technologies such as analogue, modern or ancient. In fact, rather than being just another kind of modern technology as presented in much literature or revealing by challenging (Heidegger and to mention a famous discussion in relation to technology) digital technology attests to our psychotic stance towards reality - one in which reality has been made to conform to our mathematically constructed idea of it.

Noise disrupts this picture by attesting the distance between similitude and identity and hence it becomes a reminder for the duality of our existence between life and reason, phenomena and discourse, life and culture.

“And as a result, two worlds confront each other, two worlds that have absolutely no communication with each other and are mutually impervious: the world of culture and the world of life, the only world in which we create, cognize, contemplate, live our lives and die or - the world in which the acts of our activity are objectified and the world in which these acts actually proceed and are actually accomplished once and only once. An act of our activity, of our actual experiencing, is like a two-faced Janus. It looks in two opposite directions: it looks at the objective unity of a domain of culture and at the never-repeatable uniqueness of actually live and experienced life” (Bakhtin 1993, p.2)

I always liked this passage in Bakhtin and especially the metaphor of the Janus because, in my opinion, it describes and summarises brilliantly the method, the paradox and the force of phenomenology: the necessity to nullify any distance between subject and object (life/phenomena) while unavoidably requiring it to be other through its a-posteriori reasoning and discourse(culture).

We can't be with two feet in one shoe, simple as. But it may be that, through the ubiquitousness of the digital and its (nearly-)lack of noise, we have become too comfortable with one foot always in the same shoe. Or, to return to our Janus, we have been starring too long at one face (culture) and forgotten about the other (life). In a heavily digitised society like ours, we have become accustomed more than ever to posit questions that always falls within the limits of whatever epistemological projects are at hand. Limits dictated by reason, namely logic and/or numbers, with the ultimate result of believing that the other face of the Janus (i.e. life outside numbers and culture) is identical to the one we keep looking at. It is not identical; it is, at best, similar. Noise, as the once-occurring event of Being, unique and singular, cannot be thought of but only experienced.

Noise is all there is then. Or, at least, it is all we have got to remain sane. Noise as a reminder to keep us close to important existential questions so as to retain a balanced

perspective on any epistemological project we might like to contribute to. And this includes, of course, phenomenology and its own relativists or solipsistic demons. Noise lastly, with its root in nausea, epitomises too our feelings towards the silence given to our existential questions and the unknowable: fear, preoccupation, anxiety, unease. Like noise then, nausea is all there is (see Sartre). And while through the digital we may wish to cure this nauseating noise, it is only through, with and within noise that we feel (and are) alive.

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