NYUx - Theories of Media and Technology
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November 2020

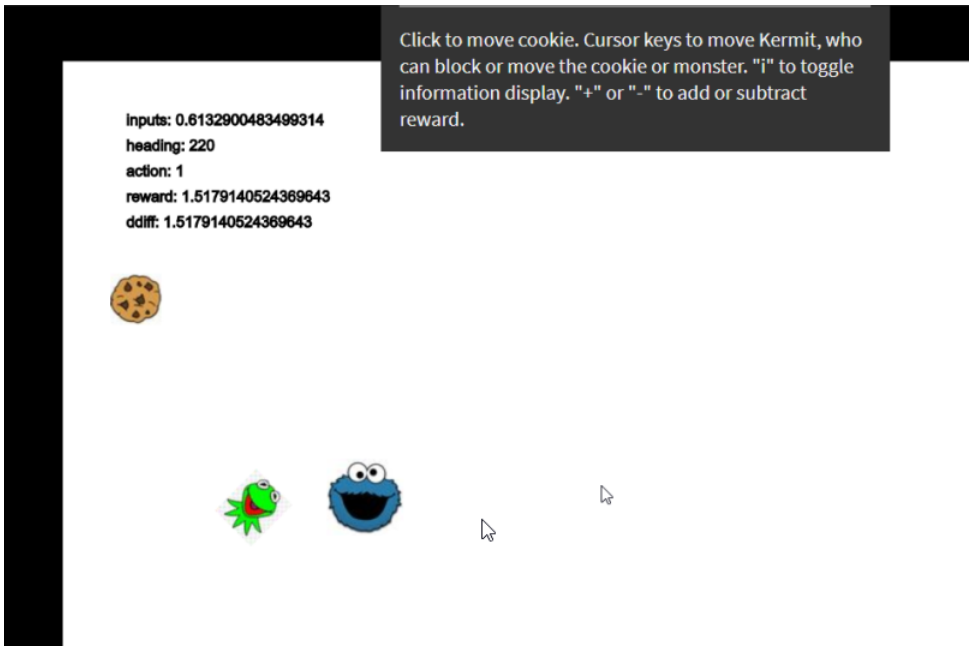
Synthesis 1

Me Want Cookie: Noisy external inputs as a constructive element in creative cybernetic conversation.

This essay step three of a four step process which has an aim: to help me produce a media artefact, which should draw on the examples and ideas already looked at. Having an aim is one of the characterists of systems analysed by cybernetics: the steam regulator, a classic example, aims to produce a steady sream of power from an erratic source, using negative feedback loops to achieve its result. To achieve its aim, the essay is going to examine own of my own artefacts: a Processing sketch I completed during the Creative Coding course called "Cookie Reinforcement", and attempting to reinterpret and develop my own intent in writing the original sketch, using the ideas and examples I have explored since, which mostly come from the field of Cybernetics.

In particular, I have been interested in the notion of cybernetic conversation as a creative process. I attempt to explain an idea I have of the value of noise in such processes, and speculate that this relates to a distinction between copying - or perfect transmission of an original message - and design or creation, which is some sort of progress towards an unknown or abstractly defined idea or ability. I am hoping that in doing this I will be able to produce a media artact which is more interesting and useful in a real world: in the same way perhaps that the mirror and tape recorder which I also examined are useful artefacts of reflexivity.

I should start by explaining the Cookie Reinformcement processing sketch (Hughson 2020a - see https://www.openprocessing.org/sketch/946371). It presents a simple world, which contains a Cookie Monster, a series of randomly positioned cookies, and a Kermit the Frog character, who can be controlled by the user. The Cookie Monster has a very basic brain, which using reinforcement learning. It has one sense: an indication of the direction of the cookie relative to it. It is able to move in eight directions. Its brain receives reward for getting closer to the cookie (perhaps a primitive sense of smell?). The reinforcement learning algorithm in its brain attempts to learn to produce actions (directions) which produce reward: essentially it has to learn to move in the dirction of the cookie in order to be able to eat the cookie, which is of course the Monster's major purpose in life.



So far, so Cybernetic, as Paul Pangaro explains:

> "Cybernetics infused many other felds with its fabulousideas, such as information about consequences of action becoming feedback to a system as it acts to achieve its goals. Foundational among the fabulous ideas of cybernetics is that systems can be construed to have their own purpose and can be studied from the frame of information rather than functional organization—or, according to Ashby—'the immaterial' rather than the material. This gave primacy to purpose, for which cybernetics stands out from other systems approaches"
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> (Pangaro 2017 p18)

All of this works more of less if Kermit stands aside and does nothing. My intent in the sketch was to have Kermit able to push ("nudge") the Monster towards the cookie, for those times when the poor monster hasn't quite figured it out, which in practice tends to happen towards the beginning of the sketch's running, when the brain is randomly formed and without order. In the sketch as it is, Kermit can do this: but there's a problem. The monster doesn't learn when he is pushed, because although he gets the rewards in the same way (assuming Kermit isn't malicious, pushing him towards Broccoli or whatever), he doesn't make the action of moving himself, and therefore can't associate the action of moving with the reward.

Rather than bad parenting by Kermit, the issue is here is I think bad physiology. Cookie Monster needs a sense of proprioception.

Proprioception is a frequently maligned sense by which our bodies know where they are spatially: how the joints are arranged and so on. Roughtly speaking, its what you use to put your finger on your nose with your eyes closed (Williams 2018). If the Cookie Monster had such a sense (and, possibly, a sense of balance and acceleration: this distinction is too fine to be concerned with), his brain could associate the fact that he's moving with progress towards cookies irrespective of whether his motion was a result of his own action (moving), or being pushed by Kermit.

In this setup, we would have a richer system of interaction. In both cases, progress essentially consists in getting the Monster's brain organised in such a way that it makes progress towards is aim better. Such organisation creates order, a process which necessarily requires work. The system can therefore be understood as an iterative spiral which makes progress towards this goal: an effective brain organisation (internal state) which processes effective cookie finding behaviour (external goal).

The state of the system considerd as a timeseries of the organisation of the Monster's brain, with increasing order as time passes. This resembles perhaps the layering of "simulacra", talked about by the artist Geoffrey Drake-Brockman (n.d), where "one thing pretends to be another thing, which in turn is a copy of something else". He relates that "as this stack deepens, the idea of the original loses validity": except that here an idea is not losing its validity so much as gaining it (insofar as an idea of how to finding cookies is being formed, not lost!). Brake-Brockman goes on to suggest that for him "the order becomes reversible", something he calls the "reverse Pinnochio effect". It's interesting to think of learning as a notion of refining and enhancing ideas.

This idea of progress in ideas contrasts with the notion of effective communication about being about getting an original messsage through without being corrupted by noise. In one of the exercises for this course, we were invited to model a conversation in a cafe based on cybernetic principles. My submission went like this:

> "Conversation is generally thought of as happening between two minds. These live in brains, and alternate in roles between source and destination. The source brain sends its message using a transmitter, which is the vocal tract: tongue, vocal cords, teeth, lungs, controlled and co-ordinated by muscles, nerves and subordinate bits of brain (which possibility include something like a language module which converts thoughts to words first...). The vocal tract makes the medium, the air, vibrate. The receiver is starts with the ear drums on either side of the receiving brain. These vibrate

> and amplify signals to the inner ear, which does some complex signal analysis and sends an electrically encoded signal up the aural pathway to the bit of the destination brain that understands words and thence to the other brain-mind, at which point the cycle repeats in the opposite direction.
>
> There can be lots of sources of noise in this process. The most obvious would be noise in the café: other people blabbing away, the radio or TV in the background, music or traffic, dishes being washed or broken. These also vibrate the air, and distrupt the words. Maybe the crisps the people are eating are too noisy, and the crunch moves quickly up the mandibles to the bones of the inner ear. Another problem might be noise in the destination brain: maybe they're thinking about something else, and the source's signal is filtered out. "
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> (Hughson 2020b)

Here noise is essentially viewed as a negative, from the external environment, which can prevent a signal getting to its destination correctly. But this begs a question: if the aim of conversation is to transmit an original message clearly, why do people meet in cafes to have them? It's presumably not just about food, even if the cookies are particulary good. I asked this questionon the forum a little later:

> If the surrounding environment in a cafe - other conversation, TVs, - is a source of noise, but people still go to cafes, then noise must a somewhat desirable thing - or else we'd talk to friends in sound proof meditation chambers with cake delivered by drone.
>
> What - or who - then is the desirable amount of noise? Can noise become the message, and the message noise? IS noise the icing on the conversation cake? Or should we forget about conversation altogether because noise is the message?
>
> (Hughson 2020c)

The suggestion here is that (a certain amount of) noise must be a good thing, otherwise people would not seek it out.

If we combine this idea with notion of a good idea emerging iterately in the Cookie Monster's brain, we might come to a conclusion opposite to the one suggested by my initial analysis of the conversation: rather than noise being a problem which corrupts the transmission of a message, noise is an essential part of a process which allows the formation of a message in the first place. Otherwise put, I go to a cafe to have a conversation, because the noise in the cafe (or indeed in my interlocuator's brain) will give me something to talk about.

To return to the Cookie Monster system: if we integrate Kermit (and hence a human controller) into the system, and the Cookie Monster has proprioception, the monster's progress would (I think) be faster. I don't know this, since I haven't yet done the necessary work to modify the sketch. Nevertheless, let's assume it will work. Based on this, we could arrive at a more abstract idea: progress towards goals can be made easier by integrating external information into one's system (in this case feedback from Kermit in the form of nudges). And we would have a sytem of two agents, Kermit and the Monster, who could be understood as being in a kind of conversation, the aim of which is to produce effective cookie seeking behaviour (and, presumably, to satisfy Kermit's paternalism, and possibly to involve the human user in some sort of vaguely edu-taining game abou the power of reinforcement learning, and hopefully eventually the dubious merits of broccoli). The Monster has to learn to distinguish noise from message: maybe Kermit can see something he can't, like a giant broccoli beside the cookie....

This notion of conversation is, I have learned, a common theme in so-called "second order" cybernetics, and has frequently been linked to notions of design process by authors such as Ranulph Glanville (2014). My take

on the idea so far is this: design is a process by which we make process towards new ideas (works or artefacts). It is an iterative process: typically, a designer might sketch on paper, and then read the sketch, and then repeat, aiming to make progress towards an as yet unknown better idea (rather than say trying to faithfully transmit a previously established messgae). The designer essentially alternatives between two roles: transmitting (drawing) and listening (reading the drawing), and has probably learnt to do so under the tutelege of somebody at design school (or otherwise). So design can be like a cybernetic process where two personae are played within the self: just as our inner Kermit-parent can help to steer us towards (or away from) the cookies on the shelf.

A good designer will also seek to itegrate external influence into their process (by talking to users etc). This is similar perhaps to the role of someone else in a conversation: they don't just reflect back at us perfect transmission of what we say, but send back partial copies, moduled, perhaps by noise in the environment. Conversation is a cybernetic design process, which hopefully produces good (better) ideas, rather than just retransmitted the old ones. Eventually we arrive at an idea of catalysis, as expressed by Gordon Pask (1995 p7):

> "The role of the architect here, I think, is not so much to design a building or city as to catalyse them: to act that they may evolve."

The constrast to the mirror is perhaps instructive: neither a mirror nor a tape recorder can do anything but reflect back at us a copy of the idea put into them, one reduced by noise. But other systems can add information too. The PoseIO artefact for proprioceptive interaction (Lopes 2015) is like this to: more than a mirror, because it can integrate into our proprioception information from the external world. Tango dancing is similar too: the interest in dancing with different people is preisely that they provide new and different stimulus, or noise, out of which we have to co-create movement.

In abstract terms, the distinction is between an iterative process or copying, or imitation, where a "perfect" original idea (artwork etc) is absorbed and copied, with a descreasing level of fidelity (or aura?); and a creative process, where the degree of order, or detail, or effectiveness, in a system is increased through a similarly iterative process. (Perhaps this is the idea of playfulness and emergence which Brake-Brockman seeks in his work?).

This essay has been a conversation with myself which has sought to create a useful idea of what to do for my project submission next week. If my thoughts are not as ordered as I would like them to be, I at least have an abstract idea: I would like to create a conversational media system, which allows the iterative development of an idea (a meme perhaps, in Dawkin's original sense) to some better state than what was originally input. An idea should be allowed to flow between an agent's mind and another, perhaps artificial, mind, encouraging iteration and improvement by way of feedback. It should integrate external inputs, or noise, as a means of making this progress happens. It should not just be a passive interface. It should not be solely about transmission of an existing idea, but about a process of development. Perhaps both imitation and creation are necessary in such a system. If a system can act as a mirror for our own thoughts, perhaps this mirror can also modulate and challenge the reflection it sends back. Another metaphor might be the designer's sketchbook. Or a good cafe.

This still ill-formed idea may change: there is much I have only skim read, but like a noisy cafe where the atmosphere is good, I hope to absorb some of the ideas I think I'm looking for.

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