# REPETITION and DESIRE: Echo, Narcissus, AI and I

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*Echo and Narcissus – John William Waterhouse*

## Abstract:

I revisit the western myth of Echo and Narcissus and how it perdures in the technologies we design, our perception of reality, and our criteria for what we consider meaningful representation.

While Echo's imprints are easily traced , Narcissus hides its lovely face in the many manifestations of AI.

I present examples of synthetic voice as benchmarks of technological innovation and share my exploration of ML for dynamic mapping, and finally, my discovery of a strange vocal persona.

## ECHO AND NARCISSUS

The story starts in ancient times with Echo and Narcissus as described by Ovid in the 8th century, in his book The Metamorphoses[1].



*Jupiter (Zeus)  and Juno (Hera)*

The nymph Echo  had a body and was not merely a voice but was cursed to only repeat the last words out of many. Juno, the queen of the gods, daughter of Saturn and wife of Jupiter, made her like that, to punish her from keeping her away from seeing Jupiter lying around with the nymphs (he was a philanderer…) So, when Juno realized Echo had tricked her,  she said, 'I shall give you less power over that tongue by which I have been deluded, and the briefest ability to speak' and what she threatened she did.
Echo only repeats the last of what is spoken and returns the words she hears. Her voice remains, but her bones they say, were changed to shapes of stone. She hides in  woods and caves, no longer to be seen on the hills, but to be heard by everyone. It is only sound that lives in her.

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[1] Ovid: The Metamorphoses Bk III:339-358

As for Narcissus, son of the river god (Cesiphus)  and the water nymph (Liriope), he was prophesized to live to a mature age as long as he does not discover himself. That was not to be the case.

While resting from the heat and excitement of one of his many chases, he lied down and rested by a pure,  unclouded pool.

While he drinks, he is seized by the vision of his reflected form. He loves a bodiless dream. What he sees is only a shadow of a mirror image. But he is astonished by himself and unknowingly desires himself.  How often he gave his lips in vain to the deceptive pool, how often, trying to embrace the neck he could see, he plunged his arms into the water, but could not catch himself!

What he has seen he does not understand.  What he sees he is on fire for, and the same delusion both seduces and deceives his senses.

Fool, why try to catch a fleeting image, in vain? What you search for is nowhere: turning away, what you love is lost! What you perceive is the shadow of reflected form: nothing of you is in it. It comes and stays with you, and leaves with you, if you can leave!

   He kept returning madly to the same reflection, and cries in despair. The image became obscured in the rippling pool as his tears stirred the water.  As he saw it vanishing, he cried out ' Where do you fly to?  Stay, cruel one, do not abandon one who loves you!'

He laid down his weary head in the green grass, death closing those eyes that had marveled at their lord's beauty.

Why go back so far and tell these stories you may ask?
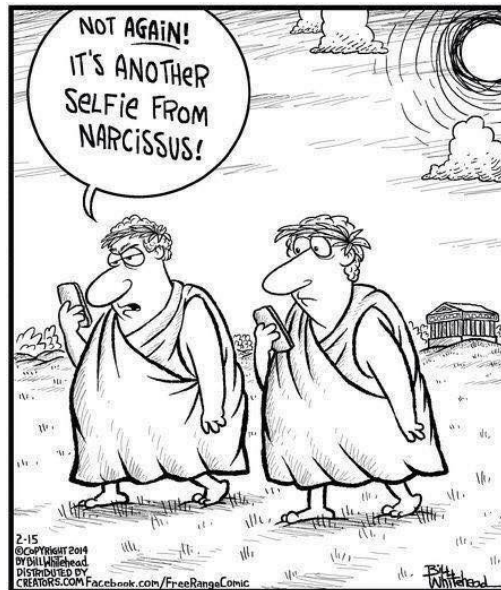


Well… these myths run through a large part of the western world and beyond, seeping thru our existence, shaping our imaginations. We converse with the gods we create, and our desire to believe in our creations is solid.
But now is not the time to forget our maternity and  look at the patterns in the tea leaves.

I can understand Echo, she is a bit of schemer (I think I would have done the same… not tell on friends…) but yet… it is a harsh punishment.
But Narcissus… I am not sure. Why did he not play with his image? Why did he not fall in love with the play of his disruptive gesture and watch the distortions and new faces instead of his fixed, perfected and so frozen image? He might have escaped death, or at least have a good time on the way.
Now, we fast forward a few hundred or may be, thousands of years.
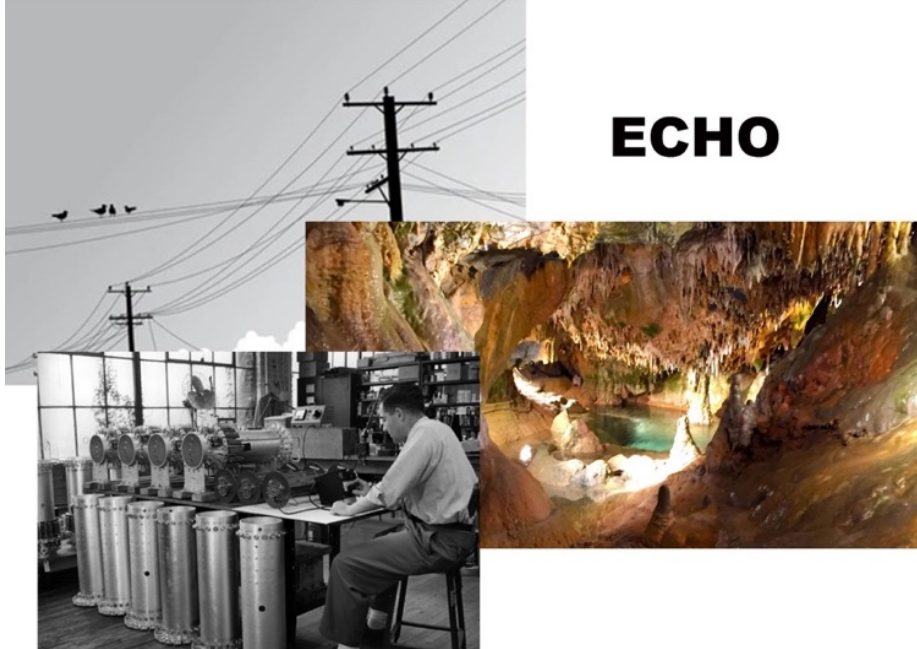
ECHO

While Echo's bones turned to stone in forests, hidden caves[2] and mountainous retreats, she remained in  our cravings for repeated chants and melodies, music running thru our heads, patterns sticking to our brain, words heard in passing, memories…She moved thru phone lines, oil cans, mercury tubes[3] bounced through buckets[4], filled empty chambers and  fully reappeared in 1940's in the close grooves of Pierre Schaeffer[5], the tape loops of Bebe and Louis Barron [6], Pauline Oliveros[7], the hypnotic patterns of Terri Riley[8] and many others, and much later in the multitude of sequencers which can create obsessive repetitions and transformations.

 Medley of Schaeffer-Barron-Oliveros-Riley

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[2] For example, the caves at  Chavin de Huántar in Peru
[3] Tel Ray's Oilcan echo and mercury storage circa 1943,
https://www.computerhistory.org/revolution/memory-storage/8/309
[4] BBD Delay (Bucket Brigad Delay) (ref: https://www.effectrode.com/knowledge-base/history-of-delay/)
[5] Pierre Schaeffer. Etude Pathétique (1948)
[6] Bebe and Louis Barron's  all electronic score for the Forbidden Planet (1956)
[7] Pauline Oliveros, Bye Bye Butterfly (1967)
[8] Terri Riley, A rainbow in Curved air (1969)

Echo eventually frees herself in the wild manipulation of one of the first live sampling circuits of Paul DeMarinis in his 1976 string quartet. You can barely recognize her[9].

 Paul DeMarinis String Quartet-video

I myself came of age during the delay/sequencer passion and while at Joel Chadabe's SUNY Albany Moog studio[10] in 1976 became lost in repetitive patterns [11].
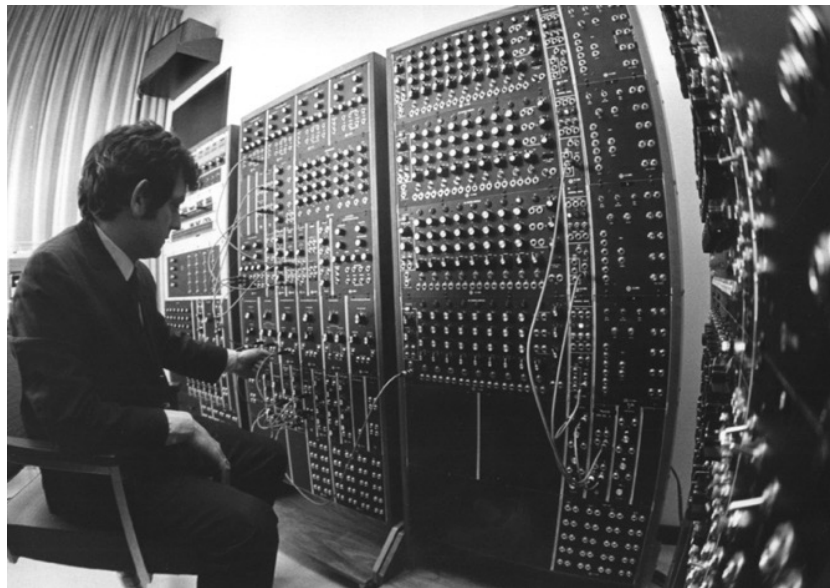

*Joel Chadabe in SUNY-Albany's CEMS studio, circa 1980's*

 Sonami- Migrations 1978

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[9] Paul DeMarinis is considered to be one of the first to create live sampling circuitry with which her performed his "String Quartet" with David Behrman (1976).
[10] Joel Chadabe (1938-2021) designed the CEMS (Coordinated Electronic Music System) with Robert Moog, housed at SUNY Albany.
[11] Laetitia Sonami "Migrations", 1978 created at SUNY Albany CEMS, remixed for  Air Texture 007 (2020)

## NARCISSUS - THE VOICE



*Narcissus - Image Paul DeMarinis*

Now we are done with Echo.  So… Narcissus?

Well… Narcissus was in love with an image, not comprehending it to be a reflection devoid of autonomous existence. An image perfect for deception.  If manipulated, even just gently with the water's wrinkles, it would bring despair. But where did he get this idea of perfection? Who taught him perfection?  What guided this delusion which led him to his own death?
Again, I wish Narcissus had loosened up a bit. Where would we be now?!

I reflect on my experience with the various schools of contemporary music in the seventies in Europe, what experimentation meant, hi art, low art, talent, virtuosity….  I think about friction, distortion and errors…
How I ended up in California where technology's refuses were embraced, artifacts cultivated.  I learnt to love technology's discards, sounds left at the bottom of the barrel, broken voices and obscured melodies…[12]

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[12] Educated in the late seventies at the now defunct Center for Contemporary Music, Mills College, a hot bed of musical experimentation, technological inventions and absorption of technology's artifacts.

The voice has been an effective measuring stick for how satisfying our re-creations are, a challenge for our synthesis tools - a bit like curly hair in synthetic images, and an interesting way to assess our relation to music: Do you want artifacts, glitches, distortion…or do you like it smooth, persuasive, envoutante? Where are you?...

The voice created in 1984 by Xavier Rodet Chant[13] software appears to me now like the song of the mermaids. It did not charm me then.  But listening[14] to its polished surfaces only slightly perturbed by faint tremolos, makes it captivating. It was a great milestone in breathing spirits in the wires.

 Mozart Magic Flute- Yves Potard

Many years later in 1996, we experimented with David Wessel and applied CNMAT's CAST[15] system to control the synthesized voice of Tibetan singer Tsering Wangmo[16] in real time. I could then play her voice with the *lady's glove*, bend it, freeze it, multiply it, telefocus on a narrow band. It did feel like magic (if not total appropriation!) This was 1996.



**Nga'i pa Yul**
Laetitia Sonami
Live @ The Kitchen NYC 1996

Collaboration with David Wessel &
Laetitia Sonami
Live manipulation of Tsering
Wangmo's traditional Tibetan song
with the lady's glove,  using
CNMAT's CAST

 Nga'I pa Yul, Wessel-Wangmo-Sonami

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[13] CHANT http://anasynth.ircam.fr/home/english/category/logiciel-associ%C3%A9/chant
https://www.ee.columbia.edu/~dpwe/papers/RodetPB84-CHANT.pdf
[14] Yves Potard's Computer Model III's rendition of Mozart the Magic Flute
[15] Nga'I pha Yul ("my homeland") a traditional Tibetan song re-synthesized with CNMAT's CAST system (Additive Synthesis System Tool kit).
[16] https://www.arts.gov/honors/heritage/tsering-wangmo-satho

Since then, the voice has flown over many roads. It is a benchmark of AI's successes with deep fakes and some artists patenting or fighting the use of their vocal cords.

Now comes the story about my relationship with my voice, my voice and me, me and Narcissus.

**AI AND I**

When on my unquenched thirst for new, dynamic, fluid, forms of synthesis, Rebecca Fiebrink introduced me to IRCAM's RAVE[17], hoping it would do the trick.
I had embraced Machine Learning thanks to her Wekinator software[18].
I had left the *lady's glove* behind and built the Spring Spyre in 2013 to take full advantage of her software.
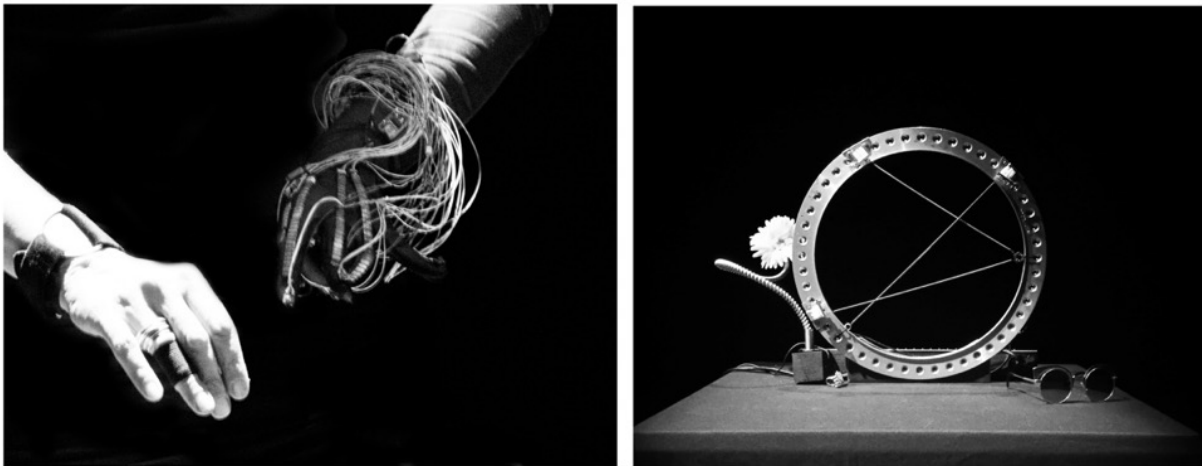


*Sonami's lady's glove and the Spring Spyre*

After 25 years with the *lady's glove*, mapping sensors to synthesis was the bottle neck, slowing down my experimenting.

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[17] a Realtime Audio Variational autoEncoder model  https://github.com/acids-ircam/RAVE
[18] http://www.wekinator.org/

Wekinator (and more recently Rapidmax) allowed to dynamically and fluently connect features extracted from sensors, in this case the audio signals from the three springs attached to pickups,  to synthesis [19], in this case Miller Puckette's phase-aligned formant synthesis [20](paf~).
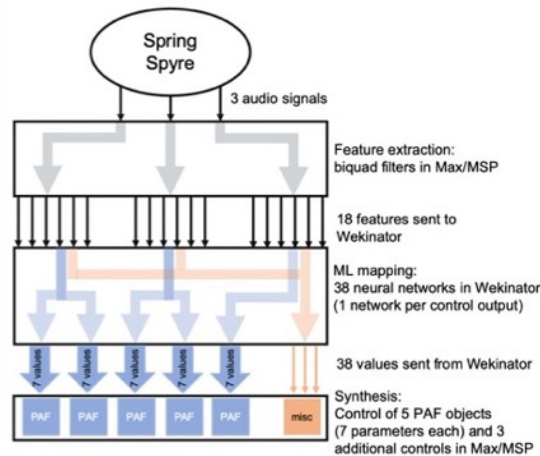


*Spring Spyre and Wekinator - Mapping*

I can easily reassign the features to different mapping and explore what I refer to as the predictability index. "Synthesis  terrains" of various width can be mapped, creating  a range of  results. A narrow terrain creates high predictability, a wider terrain brings higher, even random changes, thus lower predictability.
While this process is meant to control synthesis in live performance, it allows me to hear unexpected sounds, one of my recurring desire.



*Synthesis Terrains.  Training ML  with different "predictability indexes"*

[19] See https://www.nime.org/proceedings/2020/nime2020_paper45.pdf
[20] https://msp.ucsd.edu/Publications/icmc05-reprint.pdf

The  desire with RAVE was also to hear new sounds and  train the system to create hybrids by feeding samples from various sources and let them mutate, but it turned out into an exploration of my voice.

I had embarked on training my voice in RAVE for a performance piece of 100 Millions with Paul DeMarinis and SUE-C, followed by the grossly exaggerated 100 Trillions performance with that same band, last year[21].
My voice model turned out to be like a rooster just waking up from a wild night, somehow like my current natural voice, but worst …a  strange breed, an ill-fated encounter between Echo and  Narcissus's twin (the one who plays with his reflection).

I listen to this voice double with awkward curiosity and resignation.
Note, I do not fault RAVE, but my limited understanding, means and time.

It sounds like I am speaking languages foreign to me…. I may have a speech impediment….it repeats what I say…but in such a way that I can be fooled at thinking it is interpreting…

live processing of sonami's voice

After all, it only learnt what it was taught, hours and hours of me reading Ovid's Metamorphoses aloud, thousands and thousands of hours of training, looking for patterns in the samples.
How could it come up with sounds from unknown spaces, when its terrain is limited by my own terrain, it is not inventing but reshuffling.
I can intercept the signals from encoder to decoder, inject new data, insert ML in the path, but it still keeps its allegiance to the original timbre, its shape and feel.

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[21] An interstellar performance inspired by Italo Calvino's Cosmicomics. Three observers, scattered across the universe  don't know of each other's existence, but call out anyway, sending signals towards the only visible destination they share. 100 Millions, 100 Trillions
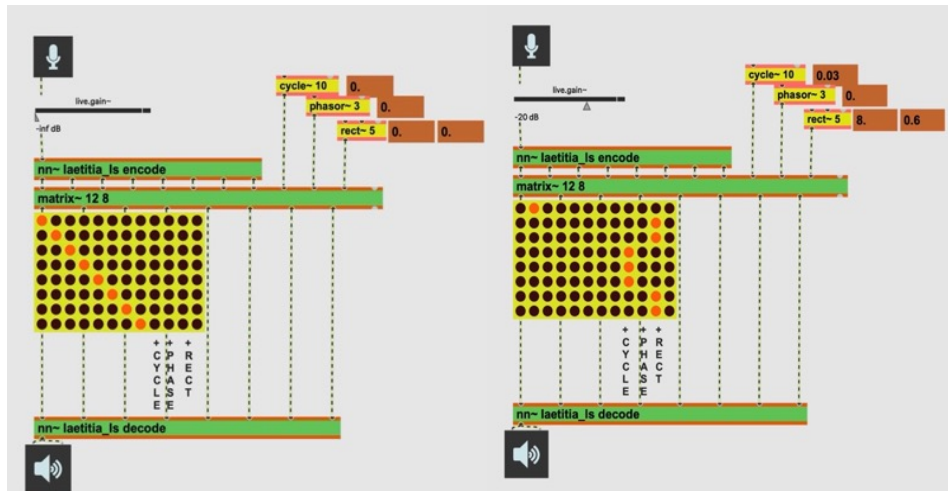
*RAVE nn~ patch – mapping encoder to decoder  - Intercepting and training signals between the two nn~ stages.*

I wish I could have access to ML which would blend pattern matching. Can we have  both supervised and generative Machine Learning? Is it possible?
Can we make the process faster, more nimble so artists can actually experiment more readily, be more creative? All these tools are so promising.  I do not understand any of it.  I am only using them and trying to be creative and bend them as far as possible and,  I do have lots of desire.
And while we are at it, can we bring in other myths, myths with less vengeance, myths with different hierarchies?

In the meantime, I can get my voice to lament when laments are not allowed.

 live lament of sonami's voice

I can also get it to chant endlessly while I go out for another drink.

 live mantra-like voice

And  before I finish this talk, I am reminded of the gods talking to Narcissus:
"Fool, why try to catch a fleeting image, in vain? What you perceive is the shadow of reflected form: nothing of you is in it. It comes and stays with you and leaves with you!

*THANK YOU!*