

A Brief History of Auto-Tune

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Abstract

This is the final article in ***Sounding Out!***’s April Forum on “Sound and Technology.” Every Monday this month, you’ve heard new insights on this age-old pairing from the likes of *Sounding Out!* veteranos **Aaron Trammell** and **Primus Luta** along with new voices **Andrew Salvati** and **Owen**

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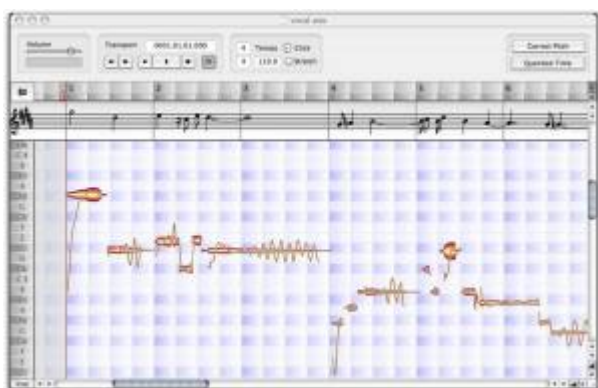
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This is the final article in ***Sounding Out!***'s April Forum on “Sound and Technology.” Every Monday this month, you’ve heard new insights on this age-old pairing from the likes of *Sounding Out!* veteranos **Aaron Trammell** and **Primus Luta** along with new voices **Andrew Salvati** and **Owen Marshall**. These fast-forward folks have shared their thinking about everything from Auto-tune to techie manifestos. Today, Marshall helps us understand just why we want to shift pitch-time so darn bad. Wait, let me clean that up a little bit. . .so darn badly. . .no wait, run that back one more time. . .jjuuuuust a little bit more. . .so *damn* badly. Whew! There! Perfect!—**JS, Editor-in-Chief**

A recording engineer once told me a story about a time when he was tasked with “tuning” the lead vocals from a recording session (identifying details have been changed to protect the innocent). Polishing-up vocals is an increasingly common job in the recording business, with some dedicated **vocal producers** even making it their specialty. Being able to comp, tune, and repair the timing of a vocal take is now a standard skill set among engineers, but in this case things were not going smoothly. Whereas singers usually tend towards being either consistently sharp or flat (“men go flat, women go sharp” as another engineer explained), in this case the vocalist was all over the map, making it difficult to always know exactly what note they were even *trying* to hit. Complicating matters further was the fact that this band had a decidedly lo-fi, garage-y reputation, making your standard-issue, **Glee-grade** tuning job decidedly inappropriate.

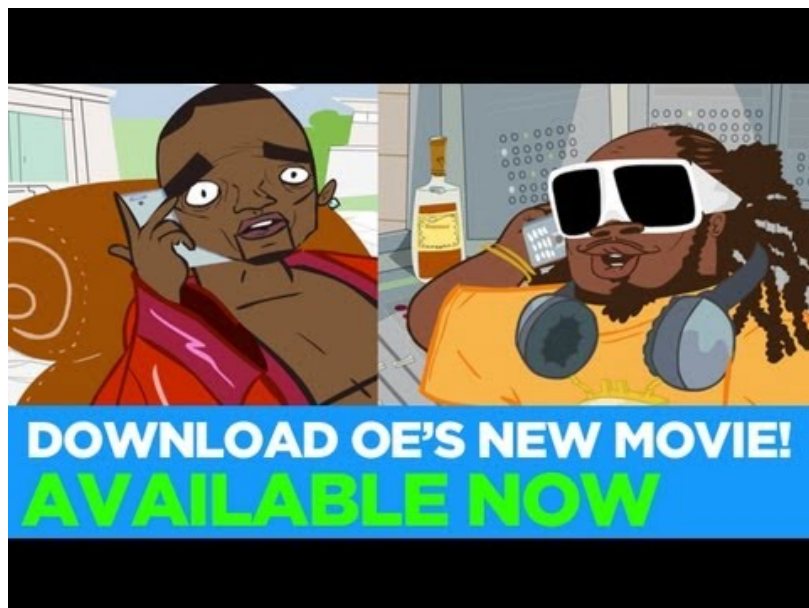
Undaunted, our engineer pulled up the Auto-Tune plugin inside Pro-Tools and set to work tuning the vocal, to use his words, “artistically” – that is, not perfectly, but enough to keep it from being annoyingly off-key. When the band heard the result, however, they were incensed – “this sounds way too good! Do it again!” The engineer went back to work, this time tuning “even more artistically,” going so far as to pull the singer’s original performance *out* of tune here and there to compensate for necessary macro-level tuning changes elsewhere.



"Melodyne screencap" by Flickr user Ethan Hein, CC BY-NC-SA 2.0

The product of the tortuous process of tuning and re-tuning apparently satisfied the band, but the story left me puzzled... Why tune the track at all? If the band was so committed to not sounding overproduced, why go to such great lengths to make it sound like you didn't mess with it? This, I was told, simply wasn't an option. The engineer couldn't in good conscience let the performance go un-tuned. Digital pitch correction, it seems, has become the rule, not the exception, so much so that the accepted solution for too much pitch correction is *more pitch correction*.

Since 1997, recording engineers have used Auto-Tune (or, more accurately, the [growing pantheon of digital pitch correction plugins](#) for which Auto-Tune, Kleenex-like, has become the household name) to [fix](#) pitchy vocal takes, lend [T-Pain](#) his signature vocal sound, and [reveal the hidden vocal talents of political pundits](#). It's the technology that can make the tone-deaf sing in key, make skilled singers perform more consistently, and [make MLK sound like Akon](#). And at 17 years of age, "The [Gerbil](#)," as some like to call Auto-Tune, is getting a little long in the tooth (certainly by [meme](#) standards.) The next U.S. presidential election will include a contingent of voters who have never drawn air that wasn't once rippled by Cher's electronically [warbling voice in the pre-chorus of "Believe"](#). A couple of years after that, the Auto-Tune [patent](#) will expire and its proprietary status will dissolve into to the collective ownership of the public domain.



<https://youtu.be/0wcU4ysY7-Y>

Growing pains aside, digital vocal tuning doesn't seem to be leaving any time soon. Exact numbers are hard to come by, but it's safe to say that the vast majority of commercial music produced in the last decade or so has most likely been digitally tuned. *Future Music* editor Daniel Griffiths has ballpark-[estimated](#) that, as early as 2010, pitch correction was used in about 99% of recorded music. [Reports](#) of its [death](#) are thus [premature](#) at best. If pitch correction is seems banal it doesn't

mean it's on the decline; rather, it's a sign that we are increasingly accepting its underlying assumptions and internalizing the habits of thought and listening that go along with them.

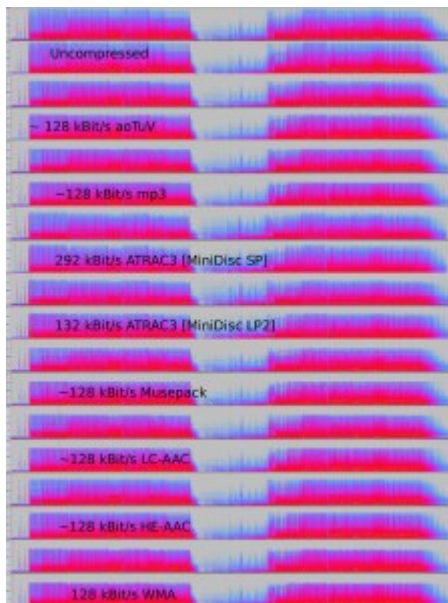
Headlines in tech journalism are typically reserved for the newest, most groundbreaking gadgets. Often, though, the really interesting stuff only happens once a technology begins to lose its novelty, recede into the background, and quietly incorporate itself into fundamental ways we think about, perceive, and act in the world. Think, for example, about all the ways your embodied perceptual being has been shaped by and tuned-in to, say, the very [computer](#) or [mobile device](#) you're reading this on. Setting value judgments aside for a moment, then, it's worth thinking about where pitch correction technology came from, what assumptions underlie the way it works and how we work with it, and what it means that it feels like "old news."



"Anti-Tune symbol"

As is often the case with new musical technologies, digital pitch correction has been the target for no small amount of controversy and even [hate](#). The list of indictments typically includes the homogenization of music, the devaluation of "actual talent," and the destruction of emotional authenticity. Suffice to say, the technological possibility of ostensibly producing technically "pitch-perfect" performances has wreaked a fair amount of havoc on conventional ways of performing and evaluating music. As [Primus Luta](#) reminded us in his *SO!* piece on the powerful-yet-untranscribable "[blue notes](#)" that emerged from the idiosyncrasies of early hardware samplers, musical creativity is at least as much about digging-into and interrogating the apparent limits of a technology as it is about the successful removal of all obstacles to total control of the end result.

Paradoxically, it's exactly in this spirit that others have come to the technology's defense: Brian Eno, ever open to the [unexpected creative agency](#) of perplexing [objects](#), [credits](#) the quantized sound of an overtaxed pitch corrector with renewing his interest in vocal performances. *SO!*'s own [Oswaldo Oyola](#), channeling Walter Benjamin, has similarly offered a [defense of Auto-Tune](#) as a democratizing technology, one that both destabilizes conventional ideas about musical ability and allows everyone to sing in-tune, free from the "tyranny of talent and its proscriptive aesthetics."



“Audiodatenkompression: Manowar, The Power of Thy Sword” by Wikimedia user Moehre1992, CC BY-SA 3.0

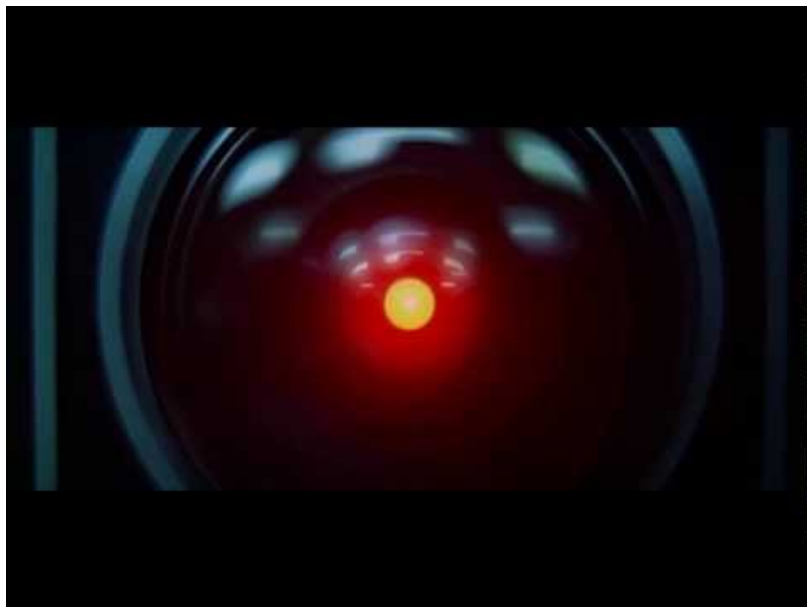
Jonathan Sterne, in his book *MP3*, offers an alternative to normative accounts of media technology (in this case, narratives either of the decline or rise of expressive technological potential) in the form of “compression histories” – accounts of how media technologies and practices directed towards increasing their efficiency, economy, and mobility can take on unintended cultural lives that reshape the very realities they were supposed to capture in the first place. The algorithms behind the MP3 format, for example, were based in part on psychoacoustic research into the nature of human hearing, framed primarily around the question of how many human voices the telephone company could fit into a limited bandwidth electrical cable while preserving signal intelligibility. The way compressed music files sound to us today, along with the way in which we typically acquire (illegally) and listen to them (distractedly), is deeply conditioned by the practical problems of early telephony. The model listener extracted from psychoacoustic research was created in an effort to learn about the way people listen. Over time, however, through our use of media technologies that have a simulated psychoacoustic subject built-in, we’ve actually learned collectively to listen like a psychoacoustic subject.

Pitch-time manipulation runs largely in parallel to Sterne’s bandwidth compression story. The ability to change a recorded sound’s pitch independently of its playback rate had its origins not in the realm of music technology, but in efforts to time-compress signals for faster communication. Instead of reducing a signal’s bandwidth, pitch manipulation technologies were pioneered to reduce the time required to push the message through the listener’s ears and into their brain. As early as the 1920s, the mechanism of the [rotating playback head](#) was being used to manipulate pitch and time interchangeably. By spinning a continuous playback head relative to the motion of the magnetic tape, researchers in [electrical engineering](#), [educational psychology](#), and [pedagogy of](#)

the blind found that they could increase playback rate of recorded voices without turning the speakers into chipmunks. Alternatively, they could rotate the head against a static piece of tape and allow a single moment of recorded sound to unfold continuously in time – a phenomenon that influenced the development of a [quantum theory of information](#).

In the early days of recorded sound some people had [found a metaphor for human thought in the path of a phonograph's needle](#). When the needle became a head and that head began to spin, [ideas about how we think, listen, and communicate followed suit](#): In 1954 Grant Fairbanks, the director of the University of Illinois' Speech Research Laboratory, put forth an influential model of the speech-hearing mechanism as a system where the speaker's conscious intention of what to say next is analogized to a tape recorder full of instructions, its drive "alternately started and stopped, and when the tape is stationary a given unit of instruction is reproduced by a moving scanning head"(136). Pitch time changing was more a model for thinking than it was for singing, and its imagined applications were thus primarily non-musical.

Take for example the [Eltro Information Rate Changer](#). The first commercially available dedicated pitch-time changer, the [Eltro](#) advertised its uses as including "pitch correction of helium speech as found in deep sea; Dictation speed testing for typing and steno; Transcribing of material directly to typewriter by adjusting speed of speech to typing ability; medical teaching of heart sounds, breathing sounds etc.by slow playback of these rapid occurrences." (It was also, incidentally, used by Kubrick to produce the eerily deliberate vocal pacing of [HAL 9000](#)). In short, for the earliest "pitch-time correction" technologies, the pitch itself was largely a secondary concern, of interest primarily because it was desirable for the sake of intelligibility to pitch-change time-altered sounds into a more normal-sounding frequency range.



<https://youtu.be/ARJ8cAGm6JE>

This coupling of time compression with pitch changing continued well into the era of digital processing. The Eventide Harmonizer, one of the first digital hardware pitch shifters, was initially

used to [pitch-correct episodes of “I Love Lucy”](#) which had been time-compressed to free-up broadcast time for advertising. Similar broadcast time compression techniques have [proliferated](#) and become [common](#) in radio and television (see, for example, Davis Foster Wallace’s account of the “[cashbox](#)” compressor in his essay on an LA talk radio station.) Speed listening technology initially developed for the visually impaired has similarly become a way of producing the audio “fine print” at the end of radio advertisements.



“H910 Harmonizer” by Wikimedia user Nalzatron, CC BY-SA 3.0

Though the popular conversation about Auto-Tune often leaves this part out, it’s hardly a secret that pitch-time correction is as much about saving time as it is about hitting the right note. As Auto-Tune inventor Andy Hildebrand [put it](#),

[Auto-Tune’s] largest effect in the community is it’s changed the economics of sound studios... Before Auto-Tune, sound studios would spend a lot of time with singers, getting them on pitch and getting a good emotional performance. Now they just do the emotional performance, they don’t worry about the pitch, the singer goes home, and they fix it in the mix.

Whereas early pitch-shifters aimed to speed-up our consumption of recorded voices, the ones now used in recording are meant to reduce the actual time spent tracking musicians in studio. One of the implications of this framing is that emotion, pitch, and the performer take on a very particular relationship, one we can find sketched out in the Auto-Tune [patent language](#):

*Voices or instruments are out of tune when their pitch is not sufficiently close to standard pitches expected by the listener, given the harmonic fabric and genre of the ensemble. **When voices or instruments are out of tune, the emotional qualities of the performance are lost. Correcting intonation, that is, measuring the actual pitch of a note and changing the measured pitch to a standard, solves this problem and restores the performance.** (Emphasis mine. Similar passages can be found in Auto-Tune’s technical documentation.)*

In the world according to Auto-Tune, the engineer is in the business of getting emotional signals from place to place. Emotion is the message, and pitch is the medium. Incorrect (i.e. unexpected) pitch therefore causes the emotion to be “lost.” While this formulation may strike some people as strange (for example, does it mean that we are unable to register the emotional qualities of a performance from [singers who can’t hit notes reliably](#)? Is there no emotionally expressive role for pitched performances that defy their genre’s expectations?), it makes perfect sense within the current affective economy and division of labor and affective economy of the recording studio. It’s a framing that makes it possible, intelligible, and at least somewhat compulsory to have singers “express emotion” as a quality distinct from the notes they hit and have vocal producers fix up the

actual pitches after the fact. Both this emotional model of the voice and the model of the psychoacoustic subject are useful frameworks for the particular purposes they serve. The trick is to pay attention to the ways we might find ourselves bending to fit them.



<https://youtu.be/1ahXg1vEkGc>

Owen Marshall is a PhD candidate in Science and Technology Studies at Cornell University. His dissertation research focuses on the articulation of embodied perceptual skills, technological systems, and economies of affect in the recording studio. He is particularly interested in the history and politics of pitch-time correction, cybernetics, and ideas and practices about sensory-technological attunement in general.

Featured image: “[Epic iPhone Auto-Tune App](#)” by Flickr user Photo Giddy, CC BY-NC 2.0



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