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Essay in the Style of Douglas Hofstadter

EWI

Explanatory Note

by David Coco-Pope,
Professor of English at the University of California, Santa Cruz

The following article was written in the style of my good friend the writer and cognitive scientist Doug Hofstadter. It was written not by a human being, but by my computer program EWI (an acronym for "experiments in writing intelligence"). EWI was fed the texts of two of Hofstadter's books—namely, *Gödel, Escher, Bach* (winner of the Pulitzer Prize for General Nonfiction in 1980) and *Metamagical Themas*—and then, following its code, EWI carefully analyzed these two books for their uniquely Hofstadterian stylistic elements and features, after which it recombined these stylistic elements in new fashions. EWI thereby came up with some 25 new and highly diverse "Hofstadter articles," one of which is given below, and the article is followed by a brief commentary about EWI and its output by Hofstadter himself.

Actually, I should state up front that the wonderful sparkling dialogues of *GEB*, which are a substantial part of that book, were not used by EWI in generating any of the articles, because EWI is unfortunately not yet able to work with inputs that belong to different genres, such as chapters and dialogues. To combine stylistic aspects of two or more different genres of writing represents a very thorny challenge indeed. Endowing EWI with that extra level of flexibility is one of my next major goals.

All 25 articles generated by EWI (which, incidentally, it generated at the pathetically slow rate of 10 minutes per piece, as it was running on an outmoded PowerBook dating from 1994, whereas on a Macintosh today it would be closer to 30 seconds per piece) had roughly the same level of literary quality and originality, and the topics EWI wound up writing about were highly variegated—for example, an "i"-less version of chapter 9 of Aldous Huxley's novel *Eyeless in Gaza,* a comparison between three mathematical theorems and three human faces, an essay about James Clerk Maxwell's youthful study of the rings of Saturn, a short biography of Alexander Pushkin written in anti-Onegin stanzas, an analysis of 10 favorite "bon mots" by Hofstadter's friend David Moser, and so forth and so on. All these topics emerged automatically from EWI's stylistic analysis of the two books mentioned—I played no role whatsoever in the process. My only role came later—it was to choose one article for publication, and I chose this particular one simply because I felt that of all of EWI's efforts, it was the most accessible to the general public.

I hereby dedicate this article written by EWI to Doug, with much gratitude for his ever-helpful and stimulating criticisms of my many years of work in trying to understand the infinite mysteries of writing style.

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*I*n his 1991 book *Computers and Musical Style,* David Cope, professor of music at the University of California at Santa Cruz, explains that in roughly the year 1980 he started working on the idea of a computer program that could compose new pieces, because at that period in his life he was suffering from what he humorously calls "composer's block" (obviously an analogue to writer's block). He quotes a diary entry from back then in which he expresses his desperate desire for some kind of help in getting out of his rut and starting again to compose new pieces.

His first attempt along these lines was a computer program that he designed expressly to imitate his own composing style. He worked on it for about a year, but to his frustration, he couldn't figure out how to describe his own composing style in rules precise enough for a computer to obey. So he abandoned that avenue and tried a radically different one, which was to write a style-extracting program—a program that, when fed the scores to a number of different pieces by a particular composer, would carefully peruse and analyze those scores in many subtle ways, looking for what made them unique, and that would then incorporate those newly identified hallmarks in brand-new pieces that it created.

This program was initially called Experiments in Musical Intelligence, but eventually Cope shortened its name to just EMI, and it has justly become very famous for its remarkable compositions. For example, EMI has composed numerous "Chopin mazurkas," some of which sound, at least to me, eerily like the genuine article, and somehow that gives me the creeps. Also, one time Cope took Sergei Prokofiev's unfinished Tenth Sonata for Piano and had EMI finish it, and he claims that this work counts as Prokofiev's Tenth Sonata, backing up his claim by saying that no musician has ever been able to point out the spot in the second movement where Prokofiev died and where EMI took over the composing job.

I find all of this very troubling, because quite obviously EMI doesn't have any emotions and hasn't lived in the world. It's just a few thousand lines of code that have no knowledge of any kind of human happiness or suffering, and that are just about the surface level of note patterns. It bothers me enormously that its output sounds, on occasion, so strangely real and so seemingly filled with emotions, and I've thought about this for years now. All this has led me to giving numerous lectures about EMI around the world, sometimes back to back with Cope himself, and I have also written a long article expressing my troubled musings about EMI, titled "Staring EMI Straight in the Face—and Doing My Best Not to Flinch."

The first time I ever talked about EMI back to back with Dave Cope was in Santa Cruz. Several weeks before the encounter, I had sent Dave the scores to 12 small piano pieces that I had written many years earlier, because I thought it would be fun as well as educational to have the audience hear a piece or two by me and a piece or two by EMI imitating "Doug Hofstadter style." Well, when I arrived that day to give my talk, Dave told me that EMI had indeed written a new "Doug Hofstadter-style piano piece," but unfortunately it hadn't been able to use all 12 of my pieces as input. When I asked him why, he told me that EMI couldn't combine stylistic aspects of pieces that have different time signatures, and it happened that of my 12 pieces, only two had the same time signature.

Now I have to admit that it struck me as very weird that EMI would be blocked by such a superficial difference between two pieces as the fact that they possess different time signatures. To me this was almost as if Dave had said that EMI couldn't combine stylistic aspects of a piece printed in blue ink and a piece written in red ink, or a piece written in *allegro* and another written in *allegretto.* It made no sense at all to me, but it's what Dave told me, and so that was that. He did add, though, that one of his next major goals was to endow EMI with the capability of combining stylistic aspects of pieces with different time signatures, which he characterized as "a very thorny challenge indeed."

As for the piano piece that EMI had composed "in my style," well, I certainly recognized some of my compositional gestures here and there (it had a lot of harmonies that I like, but they were all blatantly lifted from my two pieces). And so in the end, I wasn't sure what to make of the "artificial Hofstadter" music. Yes, it sounded like me on *some* level, but it sure didn't sound like me on a *deep* level—at least not to *me*! It didn't sound like it was *saying* anything. On the other hand, some of EMI's imitations of other composers still really sounded pretty darn genuine to me, such as some of its "Chopin" mazurkas (and Dave, imp that he is, even dedicated one of them to me!), as well as a certain Bach-style aria for soprano, piano, and violin. That piece is really amazing, and I swear, I'll never have any idea how EMI came up with it using just surface-level stylistic features.

I have puzzled for a long time about why it is that so many people who encounter EMI and its pieces are so *untroubled* by its skill in composing (that is, by the power of its music), and why, having heard me lecture about EMI or having read my article about it, they so often seek to reassure me that composing new pieces in a well-known composer's style is a piece of cake, and not at all comparable to having invented one's own style. They are eager to explain to what they perceive as the deluded music lover Doug Hofstadter that no matter how beautiful, powerful, and original a "new

Chopin ballade" might be, no matter how moved he might feel by it, he should not feel sad or worried if he finds out that a smallish computer program, and not a human being (let alone Chopin himself), composed it, because mimicry is merely mechanical; only originality is hard to come by.

It seems as if these well-meaning people genuinely believe that composing music of any sort, no matter how beautiful and touching it is, is merely a matter of coherently throwing together a bunch of stylistic devices ("riffs," one might call them), and once those devices have been evolved by some human, there no longer is any need whatsoever for *heart* or for *soul.* Composing in that human's extraordinarily moving style then becomes totally mechanical, totally masterable by someone else, totally encapsulatable in a bunch of little style rules. In this weird, weird view of music, pieces of music doesn't *say* anything, don't have *content,* don't have *meaning,* don't *speak*—they are just well-polished assemblages of stylistic flourishes. They are just long, rambling "sound bites," so to speak.

Well, I don't see music whatsoever in this fashion, and here I'd like to explain why, and I think the best way I can get my views across is through an allegory in which music is replaced by another creative discipline. To that end, then, let's imagine that Dave Cope hadn't been a composer but a physicist. To underscore the counterfactuality of this idea, we'll rename him "Dave Pope," and we'll appoint him professor of physics at the University of California at Santa Cruz. And now we're off and running with the following hypothetical scenario …

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[From Dave Pope's diary, around 1980]

Oh, goodness me… I'm suffering from an awful attack of physicist's block. Somehow, who knows from where, I got this crazy idea of writing a computer program to help me break out of this godawful rut and to at last do some good new physics again. God knows, I need to do *something* to help myself escape from this pitiful, useless, depressing state of wheel-spinning!

[From Dave's diary, around one year later]

Well, I worked very hard at trying to figure out the key hallmarks of what I do when I make a new physics discovery, and I truly gave my all at writing it all down in an algorithm. Alack and alas, though, after a year's worth of intense attempts to do this, I have deeply failed—I just can't seem to analyze what it is that I do when I make a physics discovery. It seems simple to me, but I guess that it's not so simple after all.

[From Dave's diary, a few months later]

Eureka! I have what I think might be a great new idea! Instead of trying to imitate my *own* physics style, which I just wasn't able to do last year, I think that I'll try to write a *general* style-extractor algorithm. This computer program will be much easier to write, because it won't have to know the details of my mind or of any *specific* person's mind. Instead, it will merely look at a set of articles by *any* particular physicist—physicist X, say—and it will extract X's style of thinking directly from the articles. (My own attempts at figuring out X's style wouldn't be of any help, as last year's futile attempts showed in spades—I couldn't even figure out what's behind my *own* physics style, let alone anybody else's, for Pete's sake.) Once I've got style extraction perfected, then my new program will be able to write a new article in X's style, the style that the program itself has revealed through its careful scanning of the various articles. I think I'll call this future program EPI, for Experiments in Physics Intelligence.

[From Dave's diary, some 25 or so years later]

By gosh, a long time has sure passed since I wrote in here! Well, just as I said I would in my previous entry, 25 years ago, I worked very hard for many years on developing my computer program EPI, and yes indeed, it got pretty darn good at doing what it did! For example, EPI wrote physics articles galore in the styles of Einstein, Bohr, Maxwell, Dirac, Pauli, Gell-Mann, and Feynman.

Of course I also had it write a few articles in my own less profound style! And I must say, those particular articles were so much more in my style than the ones by the earlier program that I wrote, even though that first program had been so carefully constructed with the specific aim of capturing my style and *only* my style! I guess there's a general lesson somewhere in there for somebody.

I also had EPI do a lot of other related things, like writing articles in a mixture of styles, such as a Feynman/Gell-Mann hybrid, and even a Maxwell/Einstein combo. That was fun, and lots of neat discoveries came out, but I didn't think it was as interesting as imitating just one individual's personal style, so I didn't pursue it all that much.

The key thing I figured out was that each physicist has a set of signatures that characterize his or her style, and I showed EPI how to extract those signatures. Signature extraction is a pretty mechanical thing to do, as it turns out. Wouldn't you know!

Of course all this hard work (and believe me, it was backbreakingly hard!) has earned me my share of critics. I suppose it's inevitable whenever you do something controversial like this. Some people, such as Doug Hofstadter, that spoilsport from Indiana, complained about the whole idea of EPI, say-

ing that talking about an "Einstein style of discovery" (or whoever you want) misrepresents what doing physics is all about. He says that doing physics well involves *thinking profoundly,* not just following some kind of cute little "Einstein-style rules of thumb" or "Feynman-style rules of thumb." And on more than one occasion, Doug has loudly and almost angrily proclaimed that Albert Einstein was far more profound than EPI is.

Well sure, I agree entirely with Doug—but even so, talking about the Einstein style makes perfect sense to me. From my life of experience in doing physics, I've observed that all that physicists do is rearrange and recycle various previous ideas of physics, each person having his or her own characteristic style of reshuffling old ideas. Even Doug has said that all new physics ideas are based on analogies with old physics ideas, so I don't see for the life of me why on earth he objects to the basic idea underlying EPI—after all, it's practically his own theme song! He should love it! And as far as greatness, well, the point is, it took *Albert Einstein himself* to come up with the Einstein style. My little EPI certainly couldn't have done *that* on its own. I make no claims about EPI having true, profound physics creativity like that. Far be it from me to make such grandiose claims!

And yet Hofstadter keeps on insisting, though, that making Einstein-style discoveries necessarily involves having Einstein-like imagery and insights and ideas, and that that would require a profundity that EPI couldn't possibly have. Well, I beg to differ. After all, what else is there to EPI than gleaning exactly the type of images, insights, and ideas of a particular physicist who already lived and wrote articles? For any physicist X, if EPI reads several of X's articles, why then, by golly, EPI will do physics "just like X"—that is to say, in the unique style that (we all agree) only X himself (or herself) could have invented!

I know this claim of mine is correct, and even Doug does, because he felt so threatened by EPI (I truly cannot imagine why) that for a few years he went around giving lectures in various physics departments all around the United States and even in a few in Europe, in which he would read aloud a genuine article by Einstein as well as an EPI article in "Einstein style," not revealing which one was which and asking people to vote. Well, as it turns out, sometimes entire departments were fooled, taken in by EPI's articles. And honestly, I have to give Doug credit, because he found this whole thing terrifying, and yet he had the intellectual honesty to conduct these experiments and then to report their results to me. And it warmed the cockles of my heart, I have to say, because the new discoveries à la Einstein were often judged by the physicists in the audience to be every bit as good as the original discoveries that Einstein himself made!

My favorite story along these lines was the time when Doug visited Rockefeller University in New York and gave his usual lecture with the usual test of Einstein versus EPI, and the whole theory department at that august institution, including a couple of Nobel Prize winners (bless their hearts!), was taken in by an EPI article written in Einstein style. They really thought it was by the master himself! Now, that was a true feather in my cap, and I can't thank Doug enough for having given it to me!

But this doesn't in any way, shape, or form mean that I claim to have replaced Einstein by EPI, because, after all, as I said above, it took *Einstein himself* to create his unique personal style. No, even if EPI is roughly as good at writing Einstein-style physics articles as Einstein was (as all these double-blind tests prove, in fact), still EPI is of course not as good or as deep a physicist as the individual it is imitating—that goes without saying!

For example, although by now EPI has produced, I'd say, about 100 times as many Einstein-style discoveries as Einstein himself did (and they're all at about the same level, all indistinguishable from his style), I of course would never ever claim to have really gotten to the essence of Albert Einstein's *mind*! That would take some chutzpah! I mean, Einstein is one of the greatest thinkers in the history of humanity! How could I, little old Dave Pope from Santa Cruz, California, claim to have captured all of the secrets in Albert Einstein's mind by writing a mere few thousand lines of style-extraction code? I'm just a physicist of humble achievements and, as a computer scientist, a complete nonentity. To make such a claim would be humongously self-aggrandizing, and I'm not that kind of guy.

By the way, I just have to mention that I recently took some writings of Lev Landau and imitated them—or rather, I had EPI imitate them (sometimes I kind of confuse the two of us, which is understandable after all these years). Readers of my diary (if ever there are any—hi there, reader, if you're out there reading this!) will probably remember that it was the great Landau who had written nine out of the ten classic volumes that he wanted to write on physics when he had a horrible auto accident and suffered serious brain damage, and after that he just never was the same person he had been. It was a terrible, tragic nightmare for Landau himself, and a huge loss for Russian physics. Well, in homage to the great Russian physicist from whose writings I myself actually learned so much in grad school, and whom I so deeply admire, I decided to have EPI write the tenth volume in the great Landau series (this volume was on quantum electrodynamics, as it happens), and to my deep gratification, no one could tell that Landau himself hadn't written it. That got me—or rather, it got EPI—some good press in Russia.

But of course producing Landau's tenth volume was just a bagatelle. No one really wanted to publish the book, since it was merely a book in the style of someone who had already lived and published a lot of stuff himself. Still, I was very proud of the fact that no one could tell which chapter Landau had failed to finish due to his terrible accident, because the book just flowed on seamlessly all the way to the end, covering topics he'd intended to cover but never did. EPI's book didn't actually come from Landau's hand, even if it was indistinguishable, to virtually all physicists, from Landau's style, and even if it was a darn good textbook, and even if (to my great delight) several of the grad students who studied from it at Moscow State University (we had to test it out on live students, needless to say) went on to win Nobel Prizes in physics, just as Landau himself had.

[From Dave's diary, a few days later]

Yes, recombination of ideas certainly is the name of the game in physics, just as it is in music. Which, hmmm, gives rise to some interesting thoughts …

I wonder if, as an amateur lover of music, I shouldn't now turn my hand to writing a program that could imitate musical styles! Oh, but no—that seems impossible. Doing *science* is basically just discovering facts through straightforward logical reasoning, whereas making new *music* is truly *creative*. Music touches the depths of the human heart, whereas physics is just about objective facts. Maybe I can imitate a style of discovery in science, but artistic creation!? Naw! I could never touch that— true creation requires the magic fire of genius!

We all know that if Einstein had never lived, all his stuff would sooner or later (and probably sooner) have been discovered by someone else (and the same could be said for any other scientist, no matter how great)—but Mozart? Beethoven? Bartók? Nonsense! *Those* guys are truly unique. If any one of *those* genii hadn't lived, our culture would be profoundly deprived of so much! Great scientists may not be a dime a dozen, may not grow on trees, but compared to great composers, they are trivial to imitate, because what they do is so straightforward!

Ah, me—I guess that if I had another whole lifetime to devote to a hypothetical EMI (Experiments in Musical Intelligence) program, I would probably try. Doing that is "my style," after all—but it would be so futile, and it would be such an act of chutzpah! And at the end of my life I surely would have achieved nothing comparable to EPI. In fact, the whole idea makes me chuckle. Imagine that— imagine my alter ego, "Dave Copope" (funny name!), a professor of music here at UC Santa Cruz, struggling away to make an EMI program. Whew! What a joke!

Well, I guess I should thank my lucky stars that

I didn't become a composer, as I had once dreamed when I was a kid, and that instead I entered the far humbler discipline of physics, where I could actually succeed in writing a style-imitating program as good as EPI. Some people have all the luck! Golly!

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Well, thus endeth my allegory featuring the hypothetical Professor Dave Pope. I hope that this story makes it clear that reproducing the "physics style" of a great physicist cannot be done without reproducing the full greatness of that physicist's mind. Doing physics is not just a matter of using certain clever "physics riffs."

In this fantasy, Dave Pope tries to make out, with a kind of "aw-shucks!" self-deprecation, that his program EPI falls far short of capturing the genius of his idol Albert Einstein, but at the same time he "casually" drops the fact that hundreds of Einstein-style articles were easily tossed off by EPI and that they all had roughly the same level of quality, and moreover that they could all fool top-notch professional physicists into thinking they were products of Albert Einstein's mind. Pope also points out (with not very well-hidden pride) that several students of an EPI-written Lev Landau-style text went on to win Nobel Prizes in physics.

All this goes to show that you can't simply write articles "in Einstein style" without there being full-fledged Einstein genius behind them. To be genuinely in Einstein style, an article necessarily has to be an article of world-class genius, and that's all there is to it. Professor Pope's façade of modesty is shown to be false modesty: EPI has indeed effectively captured all the genius of Einstein, Pope's coy self-dismissal notwithstanding. In a word, David Pope protesteth too much.

This lesson can then be transported back to the EMI program and the EMI domain—namely, music. If the real EMI program by the real professor David Cope can really come up with Bach pieces as great as those of J. S. Bach, and can do so regularly, then indeed EMI has captured Bach's genius in full, which means that the works that it produces will be every bit as variegated and every bit as profound and original as those that the mind of J. S. Bach came up with. That is what "capturing Bach style" is all about. Falling short of that is not capturing Bach's true style at all, but just some superficial aspects of it.

Anyone who feels that capturing the artistic style of a genius is merely some kind of easy parlor trick should try it themselves and see if they can come up with new Bach-style pieces that will profoundly move Bach lovers and that will pull the wool over Bach experts' eyes. To do that kind of thing requires capturing not just a little bit of

musical skill and trickery, but the very human soul of the very human creator, and that is why it seems so strange and eerie if indeed this has been done with the aid of only a few thousand lines of computer code.

If and when human creativity in such profoundly artistic domains as physics, mathematics, music, poetry, and literature can be mimicked by a few thousand lines of computer code, folks should sit up and start asking themselves if humanity isn't about to be left in the dust by its own creations. Perhaps for some that would be a highly enticing prospect; for yours truly, it is not.

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Concluding Commentary

Doug Hofstadter, Professor of Cognitive Science at Indiana University in Bloomington

As the article that you have just finished reading marvelously demonstrates, Dave Coco-Pope's computer program EWI is amazing, and I (begrudgingly) admit that it does capture a lot of my style. For example, EWI hit the nail on the head in stressing my staunch belief that doing physics is a profound activity of the human mind—that's my style all over!—and moreover it cleverly imitated my style of using parody to get my ideas across. Probably EWI picked up that stylistic trait of mine from reading my essay "A Person Paper on Purity in Language," which is a parody of a preachy right-wing "language maven" railing against the feminist idea of reforming language to be nonsexist (chapter 8 of my book *Metamagical Themas,* which it was indeed fed as input).

However, I surely don't know how EWI came up with this whole weird fantasy about Dave Pope and his hypothetical program EPI merely by "recombining" aspects of *GEB* and *MT*. Beats me! Nonetheless, it's undeniable that it did so, since Dave Coco-Pope sent it to me, and it was clearly computer printout printed on computer paper, and I'm not one to deny what's right in front of my eyes. And quite frankly, I find EWI's skill a little bit scary, I have to say.

After all, how could EWI, after reading and "digesting" just my two books *GEB* and *MT*, have come up with articles that could pass for mine on topics such as David Moser's bon mots, or a biography of Pushkin in anti-Onegin stanzas? None of those topics are in the least hinted at in either of those books! In fact, I had never even heard of an Onegin stanza, let alone invented the idea of an "anti-Onegin stanza" (like an Onegin stanza, but

with the roles of masculine and feminine rhymes interchanged), when I wrote those books, for instance! For that matter, I had never heard of EMI or of Dave Cope when I wrote those books, either. So how, from reading those two books alone, did EWI get the idea to put ideas about EMI and Dave Cope in my mouth? And how on earth did it know what to have me say about them? It's completely beyond my fathoming, is all I can say. Hats off to Dave Coco-Pope, to his uncanny programming skill, and to its astounding and frightening fruit, the EWI style-imitating program!

But I also have to add: one thing about my writing style that EWI totally but totally missed is revealed by that upside-down triangular graphic display at the article's end. I myself would *never* have used ampersands, for God's sake, in such a display. Yes, using ampersands as a closing flourish runs completely against the grain of my personal article-writing style. I myself would have used *asterisks* (as any of my faithful readers knows)! This rather serious flaw points up the fact that Dave Coco-Pope's EWI program, though undeniably impressive in many many ways, still has a very long way to go indeed before it penetrates to the hidden depths of my (or of any other author's) style of writing. And that, to me, is truly a great relief, because my mind desperately doesn't want to believe that it is that simple. I guess I should thank my lucky stars.

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A Final (and Finally Straightforward) Commentary on "Essay in the Style of Douglas Hofstadter, by EWI" (actually written by Douglas Hofstadter)

by Douglas Hofstadter

On first reading, the preceding essay may seem convoluted and stuntlike rather than serious, but in fact it was written very seriously in reaction to years of thinking about David Cope's famous music-composing program, EMI.

I first encountered Cope's impressive body of work in the mid-1990s, when I was teaching a seminar at Indiana University that I had titled "Hype versus Hope in Artificial Intelligence." As the title suggests, my goal was to debunk many AI projects, and I was particularly skeptical of AI programs that were touted by their inventors as being able to compose music in the style of whoever.

And yet, from the very start, the quality of some of EMI's compositions "in the style of" various composers (such as Bach and Chopin) troubled me. Indeed, it troubled me so much that I felt compelled to study EMI's underlying ideas very carefully, and in addition I got into contact with David Cope and had many conversations with him about his program. I then started lecturing about my reactions to EMI in universities around the United States and Europe, usually with musical demonstrations in which EMI compositions and "real" compositions were played before the audience, without identification, and the audience had to try to figure out which pieces were machine-composed and which ones were human-composed. To my great surprise, I discovered, when I lectured about EMI, that I almost never seemed to be able to get people in the audience to understand why in some ways I felt threatened by EMI, and why I was so upset by the claims that David Cope made for it.

The idea of a computer program that has never experienced a millisecond of human life and its complex emotions, and yet that can compose music that many sophisticated music lovers (including professors in music schools) find to be plausibly describable as "pretty much in the style of X" (where X includes famous composers), is a very baffling one, to say the least. In my essay, in order to make this issue come alive for readers, I adopted an unusual rhetorical strategy—I set up an extended analogy between Cope's EMI and an imaginary AI program called "EPI" (written by an imaginary professor of physics named "David Pope"), which, instead of creating new pieces of music, creates new ideas in physics "in the style of" any given physicist that one wants—Einstein, Newton, or whoever.

In writing this essay (yes, *I* wrote it; EWI did not, for EWI does not exist!), I was hoping that by transplanting the discussion to the very different domain of physics while keeping the grandiosity of the claims at essentially the same level, I might get the reader to see more easily what's so troubling about such claims, and why, if a program like EMI succeeds at all, that fact should be not merely astonishing but also extremely disorienting and even very upsetting.

What made my EPI essay a little tricky, though, is that eventually I got caught up in the momentum of my own analogy game, and decided that it would be fun to pretend that my EPI essay itself had been written by an AI program imitating my writing style. The reason I came up with this amusing twist is that in my lectures about EMI, I had often talked about how hard it would be to write new books or articles in the style of a given author, and so, since I was making a broad critique of Cope's claims about EMI, I thought it would be helpful to bring up this idea as well—and what better way to do it than by asking readers to imagine an AI program that could write (and therefore also think) exactly in my own style?

So I added a second layer of fictionality to my EPI essay. I presented it as being supposedly the product of a David-Cope-style AI program called EWI (which had been programmed by yet another professor—this one a professor of English whom I baptized "David Coco-Pope"). EWI was supposedly capable of rapidly churning out essays by the dozen in the style of any author some of whose work it had "read" (including myself, obviously). This extra level of self-referential playfulness may make the essay a bit dizzying for readers, at least on first reading.

Still, the main point of my EPI/EWI article is quite straightforward: it is simply the comparison between Cope's actual music-composition program EMI and the hypothetical physics-creation program EPI. This provocative analogy will, I hope, lead readers to think long and hard about what EMI can be validly claimed to do. The playful extra level of comparison between EMI and EWI (the fictitious article-writing program) is just icing on the cake, intended to induce smiles. However, I hope that readers will find both comparisons—EPI/EMI and EWI/EMI—not just humorous, but also stimulating and provocative.

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