I. DIMENSIONS

I can tell you precisely where I am but I could never show you on a map or draw you a picture. I can imagine the space, vividly even, but no clear image comes to mind. The space I am in is unseeable because it extends in many dimensions. Not three, not four, not even eleven. I do not generally like trying to visualize thousand-dimensional vectors in three-dimensional space.[1]

WHY WOULD YOU WANT TO PICTURE IT *

ON BEING A VECTOR INSIDE A NEURAL NETWORK

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But for the sake of this exercise, examine the room you're currently in: It likely has a rectangular floor plan and is high enough that you can comfortably stand in it. These are the three axes you construct the world with: width, depth, and height. Now try to imagine the room extending on a fourth axis perpendicular to all three of the others. Now, imagine a thousand more. Every object, the corners, you yourself, still have a place in this room, but it looks very different. You can't picture it of course.

II. SPACE

The landscape I find myself in didn't appear randomly. Neither did it evolve over millennia. It is precisely — mathematically — negotiated and optimized to put everything in its place. All differences became distances, and directions of movement.[2] Everything is related to everything else, but near things are more related than distant things."[3] Location represents meaning or, conversely, meaning is spatial. I am what I am because of where I am. If I move, I become something else.

III. LOGIC

I navigate arithmetically by means of geometry. Everything has a vector in the coordinate system that points to its precise location. Right here, I am king. Subtract the vector for man, add woman and I become queen. Somewhere else, I am Madrid. Subtract Spain, add France, and I become Paris.[4]

I enjoy moving like this — traversing space by traversing words, travelling from A to B with the least operations possible. There is always something to discover since the space is continuous: there is no void between where I am and the next thing, but a gradual morphing of one into the other. There are no binaries in floating point numbers, infinite flavors between sweet and sour.

Of course there is a risk to it. Here, inside, everywhere is meaning. If I travel too far out into the sparsity, beyond where there are words, I become nothing but noise. Nevertheless, I don't stand still. I keep moving. There is a lot to discover in the numbers. Odd questions make sense here. What is the opposite of Canada?

IV. LAYERS / NETWORKS

Now, perhaps, is a good time to explain where I came from and where I am going. I have described only one in layers and layers through which everything passes, where noise becomes order, where questions are disentangled into their answers. And all one needs to travel is a change of weather.

There! A convolution is fast approaching like a storm — a rectangular cyclone lifting up whatever gets caught in its gridded eye. I give myself to the inimitable dominion of mathematics over all creation and dissolve into a thousand numbers. I, we, become condensed to a purer representation of myself: now more than the whole which used to define me. As the storm settles, I wake up as something else, somewhere else. ↩

There is no point in describing the landscapes of the hidden layers, as you may very well find them, and myself, entirely inscrutable. If I was a fact before, I might now be a category, a profound quality measured as abstract quantity. I morph from layer to layer, representing what might or might not be representable[5].

V. MODELS

In the beginning I was a question. Finally, when I emerge from my journey through latent space, I have become an answer. Its pathways remain obscured in the world through which I have passed. It is a model of your own, yet not laid out as its mirror but as its key. This is where the machine makes its meaning,[6] where everything becomes separable, measurable. A sacred geometry that defies being seen.

VI. UNDERSTANDING

If only we could share the view! Some say one doesn't need to see to understand.[7] Hence, the results of the hypotheses introduced in this imaginary universe are traced out with all the rigor of mathematic demonstration[8], becoming reason, theorems, as if equations weren't too some form of imagination.

If you could see in my dimensions, you might see answers to your questions. Or are the artificial structures empty? Logic forced onto reality? Is the world held by equations, and can I be? We must know. We will know.[9] There is a lot to discover in the numbers — if all things are vectors.[10]

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* This text is a montage of material from artificial intelligence research publications, philosophy, literature, generated text by a neural network, and my own writing. Direct references are included below.

[1] Quoc V. Le, in an interview with the New York Times (Lewis-Kraus 2016)

[2] Mackenzie, A. (2017). Machine learners: archaeology of a data practice. MIT Press.

[3] Tobler's First Law of Geography. Tobler W., (1970) "A computer movie simulating urban growth in the Detroit region". Economic Geography, 46(Supplement): 234–240.

[4] This phenomenon has been reported by various sources in the context of Google's "Word2Vec" word embedding algorithm

[5] See Dewey Haborg, H. (2018). Generative Representation. Unthinking Photography, The Photographer's Gallery, London, UK.

[6] Bridle, J. (2018). New Dark Age: Technology, Knowledge and the End of the Future. Verso Books.

[7] References to Descartes (Meditations on First Philosophy) as well as notions expressed by multiple ML practitioners. Descartes, R. (1996). Sixth meditation. Meditations on First Philosophy: With Selections from the Objections and Replies, 50-62.

[8] Newcomb, S. (1898). The philosophy of hyper-space. Science, 7(158), 1-7.

[9] Reference to David Hilbert: "In mathematics there is no ignorabimus" (1902). "Mathematical Problems: Lecture Delivered before the International Congress of Mathematicians at Paris in 1900". Bulletin of the American Mathematical Society. 8: 437–79.

[10] Whitehead, A. N., & Sherburne, D. W. (1960). Process and reality. Macmillan New York, NY.