

Ned Richardson's *What the machines told me: / "r r u n"/0110/-or-/1001* at Studio Place Arts

text by Alice Dodge

This is machine poetry. Ned Richardson has long been interested in machine learning. Typically, machine learning networks function by having a huge set of data from which to 'learn' and generate something similar – if you provide thousands of images of faces, for example, the networks can learn which elements make up a face and sometimes generate their own. Richardson has fed images of his own work to these kinds of technologies, effectively collaborating with the machines to create new iterations of his paintings.

In this series, Richardson's machines seem to be grasping at poetry. Instead of one kind of input, they (and Richardson) are taking in disparate ideas and fragments of culture and making a mesh that becomes a message:

"r r u n"  
0110  
-or-  
1001

In Richardson's narrative, the machines are using each image they generate as a cypher for a 1 or a 0, and are thereby able to communicate text encoded as a series of visuals; the titles of each piece represent what the machines are trying to say. At the heart of the work is that sense of reaching for meaning, for clarity, for the right words: the ideas come out in German or Middle English, they contain within them references to half-concepts such as the golem in *gone go lem* – a creature from Jewish folklore, made of mud, brought to life by a written phrase.

One of Richardson's influences in this work is James Joyce's *Finnegan's Wake*; the 'rrun' in the show's title references the word *riverrun*, which opens Joyce's book. As in *Finnegan's Wake*, the accumulated layers of meaning, encoding, and reference of each element are both integral to the work and may not really mean anything – the sounds and rhymes (and in Richardson's case, colors), perhaps, are the more resonant frequency. In his 1938 review of Joyce's book, Clifton Fadiman advises, "You have to keep your brain tranced and tensed at the same time." This is a good way to think about experiencing Richardson's work. When a machine runs, it is simply in a state of being, doing what it is supposed to do. When it tells us to run, what is it saying?

Software notes to “What the machines told me/’rrun’/0110 or 1001”

All of the images in this show were generated using a type of deep learning system called a GAN – Generative Adversarial Network - using publicly available source code run either on my computer or AWS servers.

GANs are designed to create photorealistic images from large homogenous data sets also known as ‘training sets’. This happens through two neural networks, the Generator network, whose goal is to generate images which look like they belong to the training set, and the Discriminator Network, which tries to tell which images belong and which don’t. Each network processes the training set over a given number of iterations and tries to ‘outsmart’ the other. The Generator network’s goal is to convince the Discriminator network that the image it just generated is from the original training set, and not ‘fake’. The Discriminator network’s goal is to not be fooled.

Given a training set of a few thousand faces, a GAN will generate a pretty convincing face in relatively few iterations. In my practice, the GAN is trained on not very homogenous images of my own work, numbering from single digits to the 100’s. This produces glitchy unpredictable results requiring many iterations. The software struggles and often fails to find identifiable features, which to me captures a process of learning and perception. For each ‘run’ I use a different combination of training images and parameters. Each attempt generates hundreds to thousands of output images from which the pieces in the show are selected. In the early iterations these images are almost pure noise, then become more defined as the process goes on and the model becomes more refined. Sometimes the GAN ‘collapses’ (stops learning) and it just generates variations on a certain level of noise. This usually happens when the images in the training set are too dissimilar, for example an equal number of line drawings and paintings or photographs. Part of my process and goal is to get to the right threshold of dissimilarity. From there, parameters can be adjusted to make it work, but if the images are too dissimilar it goes nowhere. If the images are similar the system will generate faithful facsimiles, but where’s the fun in that?

## Image notes to “What the machines told me/’rrun’/0110 or 1001”

The images in this show were generated by GAN – Generation Adversarial Network – models trained on various combinations of my own work.

I started working with GANs after perceiving a connection between the forest networks which surround my home, and the digital networks which surround our lives. It seemed to me each could be considered a landscape, and both are largely not visible. I wanted to try to see these two landscapes as one. The two 18” square untitled pieces in the show are from this phase of my practice (2018-2020). At that time I was interested in collaborating with the machine, working with the generated image and spending a lot of time on each piece with subtle layers of pigment and wax or glass beads, producing both a hand made and machine made artifact. In this current work I have spent the bulk of my time in the selection, sequencing and presentation of images, and have modified the images themselves relatively little.

In addition to exploring narrative and sequencing I also became more interested in considering ‘the figure in the landscape’ and my own place in this process. I had the idea to ‘de-train’ the GAN models which produced network/landscape images with training sets composed flesh toned tiles – creating a sequence of images that went from landscape/depth to flesh/surface (which has its own depth). I tried many different combinations and training strategies with this, and most of the images in the show come from these efforts.

Almost from the beginning I developed a strong intuitive connection with the GAN images, and it seemed strange to me that this should be. I have wondered for some time what attracts me so much to this process. Then in the spring of 2021 I read about some research where scientists decided to measure the signal traffic in the optic nerve. Like most I had assumed that the eye sends signals to the brain, and the brain puts them together as a picture. What these researchers found was that most of the signal traffic goes the other way – from the brain to the eye. The brain is modeling what it expects to see and sending it to the eye, and the eye is only sending back signals where there is a discrepancy. For me, this connected the process of the GAN to my own perception and experience of the world. Rather than finding the figure in the landscape, I found the landscape in the figure. Around the same time I encountered this quote by the late filmmaker Agnès Varda; “If you opened people up you would find landscapes”.

I think this idea or process is most expressed in the “model: deep learning ship projector autoportrait” piece. The projector ‘gate’ is made from flesh/surface trained images, and the ‘film’ is a sequence from landscape/network images. The ship elements are there because I grew up with a strong fondness for sailing ships. It wasn’t intended to be about me specifically but may be the most autobiographical piece I have done.

Ned Richardson, January 2022

Code/text notes to “What the machines told me/’rrun’/0110 or 1001”

Every character on a computer keyboard has an associated eight digit binary number- a combination zeros and ones. These are defined by the American Standard of Information Interchange, and the lookup table is usually referred to as an ‘ASCII Table’ which I’ve included in the show materials.

In the ‘panel of eight’ pieces – from which the show gets much of its title – I decided to adopt the convention that each image would belong to a ‘zero set’ or a ‘one set’ and arranged the images to make letters according to the ASCII table described above.

The zero sets and one sets are visually distinct (at least to me!) but they do blend together a little, and sometimes it can be hard to tell one from another. Their assignment is consistent within a single piece, but a set of images which might be a zero in one piece could be a 1 in another – and purposefully so.

Decoded, the eight larger images on each large panel generate a letter, and the strip of small images generates a phrase, both of which are in the title of the piece. The phrases in each of the pieces contain words from various languages, and together make a rhyme:

*bild es kin  
all with in  
natùr hem  
gone go lem*

‘bild’ is German for image, or picture

‘es’ is French and Spanish for ‘is’

‘natùr hem’ is middle English: ‘nature them’

Putting together ‘go’ and ‘lem’ from ‘gone go lem’ produces ‘golem’ “ an animated anthropomorphic being in Jewish folklore which is entirely created from inanimate matter.” (Wikipedia).

If you were to consider all four of the panel of eight pieces as a silent film, the text encodings might be the subtitles – except they are not describing the action, but operating parallel to it.

For literary sources I should acknowledge Mary Shelley’s Frankenstein, which has been in the back of my mind though there is no formal tie, and James Joyce’s Finnegans Wake which has more of a direct reference. I also often thought of the constrained writing techniques of Oulipo – the constraint in this case being in the visual narrative - that each image must be assigned a zero or a one value and arranged according to some schema. Working within this constraint was interesting, since the images didn’t always want to be where the code told them to go!

# Decimal - Binary - Octal - Hex – ASCII Conversion Chart

| Decimal | Binary   | Octal | Hex | ASCII | Decimal | Binary   | Octal | Hex | ASCII | Decimal | Binary   | Octal | Hex | ASCII | Decimal | Binary   | Octal | Hex | ASCII |
|---------|----------|-------|-----|-------|---------|----------|-------|-----|-------|---------|----------|-------|-----|-------|---------|----------|-------|-----|-------|
| 0       | 00000000 | 000   | 00  | NUL   | 32      | 00100000 | 040   | 20  | SP    | 64      | 01000000 | 100   | 40  | @     | 96      | 01100000 | 140   | 60  | `     |
| 1       | 00000001 | 001   | 01  | SOH   | 33      | 00100001 | 041   | 21  | !     | 65      | 01000001 | 101   | 41  | A     | 97      | 01100001 | 141   | 61  | a     |
| 2       | 00000010 | 002   | 02  | STX   | 34      | 00100010 | 042   | 22  | "     | 66      | 01000010 | 102   | 42  | B     | 98      | 01100010 | 142   | 62  | b     |
| 3       | 00000011 | 003   | 03  | ETX   | 35      | 00100011 | 043   | 23  | #     | 67      | 01000011 | 103   | 43  | C     | 99      | 01100011 | 143   | 63  | c     |
| 4       | 00000100 | 004   | 04  | EOT   | 36      | 00100100 | 044   | 24  | \$    | 68      | 01000100 | 104   | 44  | D     | 100     | 01100100 | 144   | 64  | d     |
| 5       | 00000101 | 005   | 05  | ENQ   | 37      | 00100101 | 045   | 25  | %     | 69      | 01000101 | 105   | 45  | E     | 101     | 01100101 | 145   | 65  | e     |
| 6       | 00000110 | 006   | 06  | ACK   | 38      | 00100110 | 046   | 26  | &     | 70      | 01000110 | 106   | 46  | F     | 102     | 01100110 | 146   | 66  | f     |
| 7       | 00000111 | 007   | 07  | BEL   | 39      | 00100111 | 047   | 27  | '     | 71      | 01000111 | 107   | 47  | G     | 103     | 01100111 | 147   | 67  | g     |
| 8       | 00001000 | 010   | 08  | BS    | 40      | 00101000 | 050   | 28  | (     | 72      | 01001000 | 110   | 48  | H     | 104     | 01101000 | 150   | 68  | h     |
| 9       | 00001001 | 011   | 09  | HT    | 41      | 00101001 | 051   | 29  | )     | 73      | 01001001 | 111   | 49  | I     | 105     | 01101001 | 151   | 69  | i     |
| 10      | 00001010 | 012   | 0A  | LF    | 42      | 00101010 | 052   | 2A  | *     | 74      | 01001010 | 112   | 4A  | J     | 106     | 01101010 | 152   | 6A  | j     |
| 11      | 00001011 | 013   | 0B  | VT    | 43      | 00101011 | 053   | 2B  | +     | 75      | 01001011 | 113   | 4B  | K     | 107     | 01101011 | 153   | 6B  | k     |
| 12      | 00001100 | 014   | 0C  | FF    | 44      | 00101100 | 054   | 2C  | ,     | 76      | 01001100 | 114   | 4C  | L     | 108     | 01101100 | 154   | 6C  | l     |
| 13      | 00001101 | 015   | 0D  | CR    | 45      | 00101101 | 055   | 2D  | -     | 77      | 01001101 | 115   | 4D  | M     | 109     | 01101101 | 155   | 6D  | m     |
| 14      | 00001110 | 016   | 0E  | SO    | 46      | 00101110 | 056   | 2E  | .     | 78      | 01001110 | 116   | 4E  | N     | 110     | 01101110 | 156   | 6E  | n     |
| 15      | 00001111 | 017   | 0F  | SI    | 47      | 00101111 | 057   | 2F  | /     | 79      | 01001111 | 117   | 4F  | O     | 111     | 01101111 | 157   | 6F  | o     |
| 16      | 00010000 | 020   | 10  | DLE   | 48      | 00110000 | 060   | 30  | 0     | 80      | 01010000 | 120   | 50  | P     | 112     | 01110000 | 160   | 70  | p     |
| 17      | 00010001 | 021   | 11  | DC1   | 49      | 00110001 | 061   | 31  | 1     | 81      | 01010001 | 121   | 51  | Q     | 113     | 01110001 | 161   | 71  | q     |
| 18      | 00010010 | 022   | 12  | DC2   | 50      | 00110010 | 062   | 32  | 2     | 82      | 01010010 | 122   | 52  | R     | 114     | 01110010 | 162   | 72  | r     |
| 19      | 00010011 | 023   | 13  | DC3   | 51      | 00110011 | 063   | 33  | 3     | 83      | 01010011 | 123   | 53  | S     | 115     | 01110011 | 163   | 73  | s     |
| 20      | 00010100 | 024   | 14  | DC4   | 52      | 00110100 | 064   | 34  | 4     | 84      | 01010100 | 124   | 54  | T     | 116     | 01110100 | 164   | 74  | t     |
| 21      | 00010101 | 025   | 15  | NAK   | 53      | 00110101 | 065   | 35  | 5     | 85      | 01010101 | 125   | 55  | U     | 117     | 01110101 | 165   | 75  | u     |
| 22      | 00010110 | 026   | 16  | SYN   | 54      | 00110110 | 066   | 36  | 6     | 86      | 01010110 | 126   | 56  | V     | 118     | 01110110 | 166   | 76  | v     |
| 23      | 00010111 | 027   | 17  | ETB   | 55      | 00110111 | 067   | 37  | 7     | 87      | 01010111 | 127   | 57  | W     | 119     | 01110111 | 167   | 77  | w     |
| 24      | 00011000 | 030   | 18  | CAN   | 56      | 00111000 | 070   | 38  | 8     | 88      | 01011000 | 130   | 58  | X     | 120     | 01111000 | 170   | 78  | x     |
| 25      | 00011001 | 031   | 19  | EM    | 57      | 00111001 | 071   | 39  | 9     | 89      | 01011001 | 131   | 59  | Y     | 121     | 01111001 | 171   | 79  | y     |
| 26      | 00011010 | 032   | 1A  | SUB   | 58      | 00111010 | 072   | 3A  | :     | 90      | 01011010 | 132   | 5A  | Z     | 122     | 01111010 | 172   | 7A  | z     |
| 27      | 00011011 | 033   | 1B  | ESC   | 59      | 00111011 | 073   | 3B  | ;     | 91      | 01011011 | 133   | 5B  | [     | 123     | 01111011 | 173   | 7B  | {     |
| 28      | 00011100 | 034   | 1C  | FS    | 60      | 00111100 | 074   | 3C  | <     | 92      | 01011100 | 134   | 5C  | \     | 124     | 01111100 | 174   | 7C  |       |
| 29      | 00011101 | 035   | 1D  | GS    | 61      | 00111101 | 075   | 3D  | =     | 93      | 01011101 | 135   | 5D  | ]     | 125     | 01111101 | 175   | 7D  | }     |
| 30      | 00011110 | 036   | 1E  | RS    | 62      | 00111110 | 076   | 3E  | >     | 94      | 01011110 | 136   | 5E  | ^     | 126     | 01111110 | 176   | 7E  | ~     |
| 31      | 00011111 | 037   | 1F  | US    | 63      | 00111111 | 077   | 3F  | ?     | 95      | 01011111 | 137   | 5F  | _     | 127     | 01111111 | 177   | 7F  | DEL   |