Art & AI without Programming

Mattis Kuhn, August 2020.

By operating with sensual artifacts, art can provide us with access to the abstract technology of artificial intelligence. In this article, using concrete examples, we will look specifically at ways of combining art and AI without having to program.

Abbildung 1: Johanna Reich: *Face Detection*, 2018. © Johanna Reich.

In recent years, many artistic projects have emerged that work with or address Machine Learning[1]. The two current overarching subcategories here are *generation* and *classification*. Generation refers to the synthesis of data, classification to the analysis of data. Generation is (at least from my point of view) more difficult to apply in several respects. In general, the possibilities for artistic exploration are quite limited when only existing code can be used. Even if programming skills are available, it is difficult to create something aesthetically pleasing that is not just an approximate copy of what already exists.^ [ML algorithms improve in the training process by striving to minimize the error they themselves have made. That is, they compute differences between their computed values and target values and try to minimize these differences. *Art* and *minimized differences* do not unite well spontaneously. Accordingly, in the area of generated art we see mainly artifacts which resemble other artifacts. Of course, there is also successful generated art.]. Classification, on the other hand, can be realized to a limited extent without programming knowledge.

In its simplest form, classification is a basal and necessary survival skill that even simple organisms are capable of in order to differentiate between various phenomena. Of course, most organisms lack higher levels of abstraction, categories, and concepts such as we use to create orders in the world and form identities. Through techniques such as machine learning, we transfer these capabilities in a reduced manner to machines, enabling them to generate and establish orders and differences in the world, as well as to point out or challenge them.

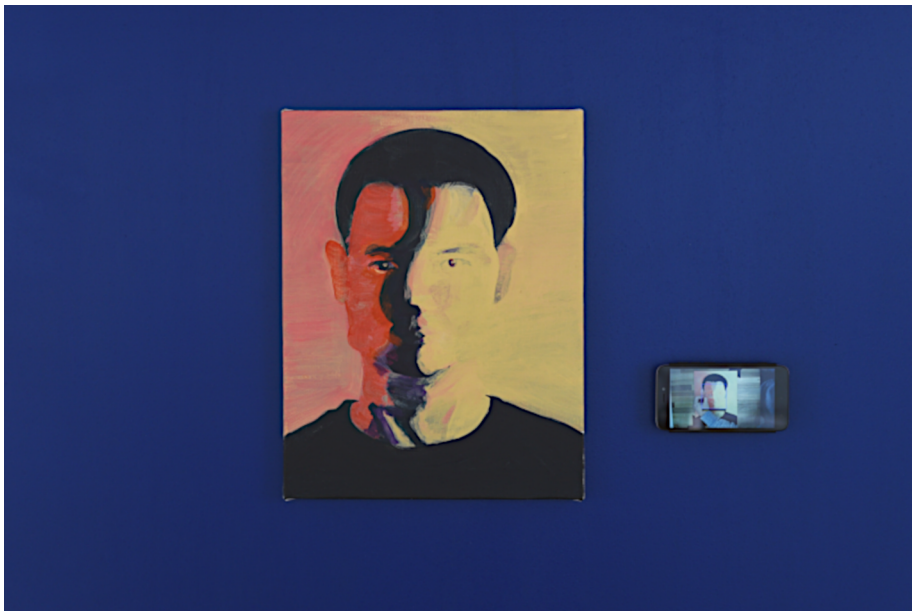

Abbildung 2: Shinseungback Kimyonghun: *Nonfacial Portrait 02*, 2018. © Shinseungback Kimyonghun.

One of the most common classifications is facial recognition. All somewhat newer smartphones enable this function. For her work *Face Detection*[2] Johanna Reich used a cell phone camera to mechanically recognize faces in lumps of clay. To do this, she shaped the lumps of clay until they were classified as faces. The artist duo Shinseungback

[1] In the following, the term "Machine Learning" (ML) will be used instead of the term "Artificial Intelligence", since all the works presented here and also the majority of industrial applications belong to this subcategory (learning based on big data) of AI.

[2] Johanna Reich: *Face Detection* (2018), http://johannareich.com/mies_portfolio/face-detection.

Kimyonghun took the opposite approach with their work *Nonfacial portrait*[3]. They commissioned several painters to create portraits of people. The paintings were also permanently analyzed with a cell phone camera during the creation process, but the painters had to ensure that no face would be recognized by the camera at the end of the process.

Abbildung 3: Adam Harvey: *CV Dazzle* Look 1, 2010. Hair by Pia Vivas. Model: Jen Jaffe. © Adam Harvey.

In his work *CV Dazzle*[4], Adam Harvey presents makeup tips that we can use to make ourselves unrecognizable to face recognition algorithms. In doing so, he also shows us which features are highly relevant to the corresponding algorithms: for example the oval shape of the face, the relations between eyes and ears, nose and mouth, and a basic symmetry. Possibilities of deceiving these algorithms are, for example, hiding the root of the nose or an eye, applying high-contrast shapes to the skin or disturbing the symmetry of the face.

In his work *HyperFace*[5] he takes the opposite approach and creates patterns of square elements that for the human eye have nothing to do with our faces, but are classified with

[3] Shinseungback Kimyonghun: *Nonfacial portrait* (2018), http://ssbkyh.com/works/nonfacial_portrait.
[4] Adam Harvey: *CV Dazzle* (2010-present), https://ahprojects.com/cvdazzle.
[5] Adam Harvey: *HyperFace* (in progress), https://ahprojects.com/hyperface.

a high probability as faces by facial recognition algorithms. The idea behind this is to print these patterns on textiles, make clothes out of them and thus distract from one's own face. *HyperFace* also shows us that the cognitive processes of machines work differently than those of humans. What matters is not the visual appearance (as we see it), but the pattern it contains. Likewise, the concrete materiality (e.g. lump of clay or textile) is irrelevant for the algorithmic classification.

Of course there are not only special algorithms for recognizing faces, but also more general algorithms that can recognize other phenomena such as flowers. *Flower*[6] is another work by Shinseungback Kimyonghun on machine interpretation of images. They used an algorithm developed by Google (accessible via the Google Cloud Vision API). They used this to analyze images of plants and, in an iterative process, deformed the images as long as their content was still classified as a flower with at least 90 percent certainty. It becomes clear that local structures are of high importance, whereas the image is not handled as an overall impression and can be correspondingly incoherent on a larger scale. On the other hand, in this and other works[7] they not only question the reduction of machine perception and classification, but also the human behavior of classifying and thinking in clearly definable categories.

Abbildung 4: Shinseungback Kimyonghun: *Flower 01*, 2016-17. © Shinseungback Kimyonghun.

The most essential ingredient for creating computer vision algorithms based on deep neural nets are the images with which these algorithms are trained. Only what they have seen and classified in the training process, they can later classify correctly.^ [This is somewhat simplified. It applies to methods of supervised learning with labeled data. Of course, the trained algorithms can also deal with unknown data (in this case images), therein lies their strength. However, this unknown data must be at least similar enough to the training data that both can be connected via their abstractions.] Accordingly, it is important to address this component. Although not further addressed in this text, it should be mentioned that there are some artistic projects that exist primarily or exclusively in the form of data sets, e.g., collections of images.[8] In these works, questions about inequality

6 Shinseungback Kimyonghun: *Flower* (2016-17), http://ssbkyh.com/works/flower.

7 For example, in the work *Animal Classifier* (2016), http://ssbkyh.com/works/animal_classifier/.

8 Some examples: Anna Ridler: *Myriad (Tulips)* (2018), https://annaridler.com/myriad-tulips. Mimi Onuoha: *The*

and the limits of digitization and formalization – meaning what do we want and what are we capable of implementing in machines – play an essential role. A (practical) exploration of these questions is worthwhile even without later training an actual algorithm with this data set.

All the works presented so far are good examples of ourselves living in an environment of increasing computation, interactively adapting and connecting with the machines. By merging and separating, we shape and define the machines but also ourselves. The current capabilities of machine learning or AI in general are limited. But also we perceive only a part of reality with our senses and cognitive processes. Technical artifacts such as machine learning applications are well suited to confront human characteristics, behaviors, etc. in an objectified form and thus to reflect them. It seems to make sense to look at or explore these processes from an artistic perspective.

(Translated with www.DeepL.com/Translator (free version). Slightly corrected by the author.)

Library of Missing Datasets 2.0 (2018), http://mimionuoha.com/the-library-of-missing-datasets-v-20. Caroline Sinders: *Feminist Data Set* (2017-present), https://carolinesinders.com/feminist-data-set/.