# Of Machines Learning to See Lemon

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**Artists' statement**

This work highlights the distinctive way computers recognise objects and draws a contrast between objects and their physical attributes and how these are assigned values by a computer vision system.

An installation "Of Machines Learning to See Lemon" was presented at the London Design Festival 2018 (image above). As part of our process to investigate machine learning image classification algorithms we created a website leveraging the public MobileNet model (a speed optimized version of the ImageNet project, a dataset of over 15 million high-resolution images collected from the web and labelled by humans.) This website uses a mobile, or computer camera to return both what it thinks is in the image, and the percentage probability that this thing is a lemon. This investigative project can be seen here: learningtoseelemon.netlify.com

Computers see things very differently to humans. We use the term 'see' here to indicate the way digital technologies using computer vision increasingly perform some of the functions of the human visual system but in a distinctive way. For example, an automated image recognition algorithm, although it is rooted in the search for the neural 'algorithm' of human visual object recognition works on the basis of what it has been previously exposed to. It can only 'see' based on what it has been programmed to see. The ability of a computer to correctly identify a lemon thus depends on the number, quality, and accuracy of examples in the data class 'lemon' it has processed. The elision of this difference in visual processing conceals where training images come from, who has generated them, and in what context. It is also increasingly clear that computational image recognition is a process subject to the cultures, biases and prejudices of the particular situations in which it is developed. This work was developed in the context of an exhibition at London College of Communication in September 2018. The exhibition explored the twin contemporary technological characteristics of complexity and speed. The image above is illustrative of the way computer vision technologies work to recognise objects by assigning values to attributes. In this case attributes of colour and shape. As the algorithm gets closer to its intended target, a lemon, these attributes become more recognisable to the human eye. We have chosen lemons as the example for this work so as to evoke the long history of lemons in European still life painting and thereby highlight the very different values at play between human and computational 'seeing'. The work is also intended to explore the fragility of computer vision systems, particularly when they may mis-recognise an object. This problem is currently addressed using a data first approach, which maintains that more data automatically equals greater accuracy without questioning the possible bias of image provenance.

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**About the Authors**

John Fass and Alistair McClymont are an artist duo based in London. Their work explores the interface between society, technology and nature using many different media and settings.

**Alistair McClymont** holds a BA in Fine Art from Hull School of Art and an MA in Sculpture from the Royal College of Art. His work is a continuing process of discovery and experimentation, ranging across a variety of materials and practices. Each piece follows the last in a continual journey of investigation into cultural and physical phenomena.

**John Fass** holds a BA in Photography, film, video and animation from WSCAD, an MRes in Information Environments from LCC, and a PhD from the Royal College of Art. His work is concerned with revealing hidden social and political structures, and with the participative exploration of human experiences.

Together their work is underlined by a search for what it is to be human. This might be our position in time and space on a grand scale, or singular observations on subjects that fascinate them. Each piece takes a small subject area and breaks it down into something understandable and perhaps beautiful. At times artworks take the form of direct demonstration, or experimentation: phenomena are removed from the world and reduced to their essence. At other times the artworks are formed by phenomena: the sculpture, or image is created by a process that is out of their control and the final work points to that process. Underlying all the work is a deep concern for beauty and reason.

Most recently they have created work around the topics of machine learning and computer vision, social uncertainty, and emergence in natural systems.

They have exhibited nationally and internationally, including at the V&A, London; Ars Electronica, Linz; Moderna Museet, Stockholm; Bozar, Brussels; FACT, Liverpool; STUK, Leuven, and Bauhaus Stiftung, Dessau.