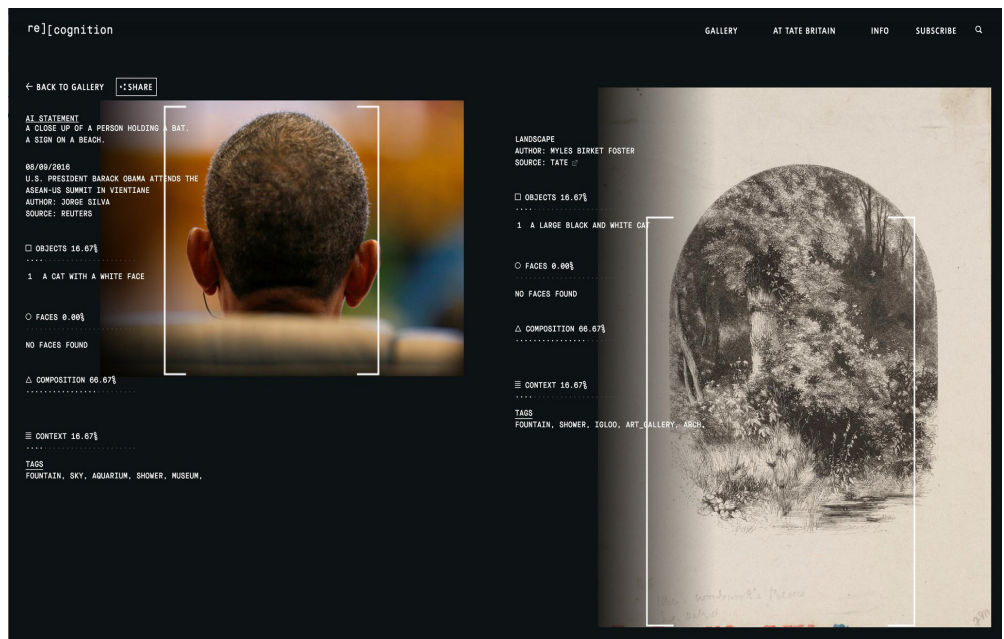# *RECOGNITION*

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Abstract

Recognition was an artificial intelligence program that compared British artworks with up-to-the-minute photojournalism. It used algorithms to search through Tate's vast collection database, looking for visual and thematic similarities between artworks and the endless stream of online news images. Winner of the IK Prize 2016 for digital innovation, Recognition was active from 2 September to 27 November 2016 as a website and an installation at Tate Britain. Content Provider: Reuters.

Keywords

Artificial Intelligence
Machine Learning
Neural Networks
Computer Vision
Photojournalism
British Art

1. INTRODUCTION

Recently, some pictures from the news have been called "Accidental Renaissance"[1] for their aesthetic similarities with the master paintings like composition, proportions and the expression of the subjects. Among them, one photograph of a fight in the Ukrainian parliament appears to follow the golden ratio rules for its composition and proportions.

Fig. 1
Valentyn Ogirenko,
"Fight in the Ukrainian
parliament", 2014.

Fig. 2
Martin Argyroglo, "Charlie
Hebdo protest", (2014).

Fig. 3
Eugene Delacroix,
"La liberte Guidant
le peuple", (1830).
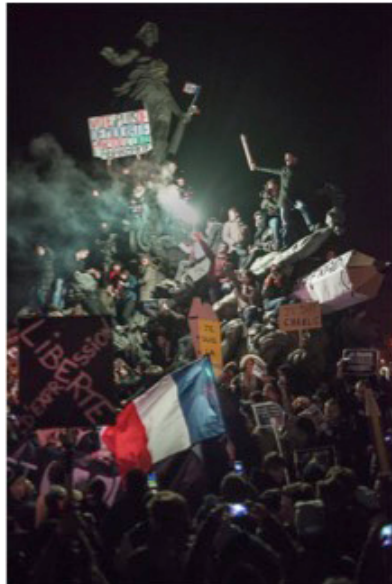
Here is another example where a photo of the protest following the Charlie Hebdo events has been compared with the painting of Eugene Delacroix, La Liberté guidant le peuple. What can we see here? Creating associations between Renaissance paintings and current photographs, we can see the ability of human perception to associate visually related content, despite changes of time, medium and context. What if a form of artificial intelligence could search for similar associations by processing the continuous flow of news images online?

2. RECOGNITION

2.1. The IK Prize

Recognition[2] started in Fabrica as an answer to the Tate IK Prize call, presented annually by Tate for an idea that uses digital technology to innovate the way we discover, explore and enjoy British art in the Tate collection. The 2016 IK Prize, in partnership with Microsoft, challenged digital creatives to use artificial intelligence to explore, investigate or 'understand' British art in the Tate collection.

2.2. Recognition

Can a machine make us look at art through the lens of today's world?

Inspired by the paradoxes of bringing an AI to the museum applying a rational and objective thinking to a subjective field like art, *Recognition* uses artificial intelligence algorithms to compare photographs from current event as they unfold from Reuters with British art from the Tate collection. Over three months from 2 September to 27 November 2016, *Recognition* created a virtual gallery that ran 24 hours a day comparing Tate's archive and collection of British art online with the most recent news images from Reuters. The matches were based on visual and thematic similarities found by the algorithm through a multi-criteria pattern. The public could explore the virtual gallery of matches online at recognition.tate.org.uk and in the gallery at Tate Britain through an interactive display. Making unforeseen comparisons across history, geography and culture, the result is a time capsule of the world represented in diverse types of images, past and present.

2.3. Areas of Analysis

Recognition uses four different areas of research trying to abstract how humans see, understand and compare visual content. Artworks and news images with a high similarity in one (or more) of these categories were selected as a match.

Object Recognition

Developed by JoliBrain[3] using DeepDetect[4] and Densecap[5], Object Recognition is a process for identifying specific objects. Its algorithms rely on matching, learning, or pattern recognition using appearance — based or feature — based analysis. A deep neural network finds objects from the image, then tries to label them by crafting a short sentence. A similarity search engine then looks for the top object matches among Tate artworks.

Facial Recognition

Provided by Microsoft Cognitive Services' Computer Vision and Emotion APIs,[6] Facial Recognition is a process for identifying human faces. In addition to locating the human faces in an image, it determines the age, gender, and emotional state of each subject it finds.

2
"Recognition", http://recognition.tate.org.uk.

3
"JoliBrain", http://jolibrain.com.

4
"Deep Detect", https://deepdetect.com.

5
"Densecap", Github, https://github.com/jcjohnson/densecap.

6
"Microsoft Cognitive Services", https://www.microsoft.com/cognitive--services.

Composition Analysis

Developed by JoliBrain using DeepDetect, Composition Analysis is a process for identifying prominent shapes and structures, visual layout, and colours. A set of deep neural networks reads the image pixels and extracts a high number of salient features. These features are then fed into a search engine that looks for the nearest per feature matches from the Tate archive.

Context Analysis

Developed by JoliBrain using DeepDetect and word2vec, Context Analysis is a process which analyses the titles, dates, tags, and descriptions associated with each image. A variety of deep neural networks process both the images and their captions and tries to find inner relations, either based on location or semantic matching among words and sentences.

2.4. Recognition Design

Website Design

Over the three month experiment, viewers around the world could explore the ever-expanding virtual gallery at recognition.tate.org.uk. The website was designed and structured on multiple layers with increasing level of details and complexity. The user would first understand what Recognition is and how it works, to then navigate and explore the single gallery items, diving into the algorithm decision process. Each match was presented on its own dedicated page, where users could navigate what Recognition was able to see inside the images by hovering with the mouse to understand the reasoning behind each comparison.
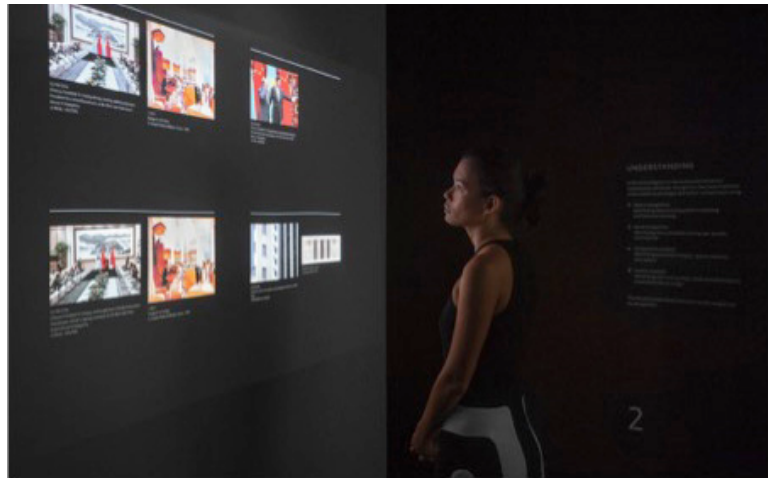
Fig. 4
Recognition, Details view (2016).
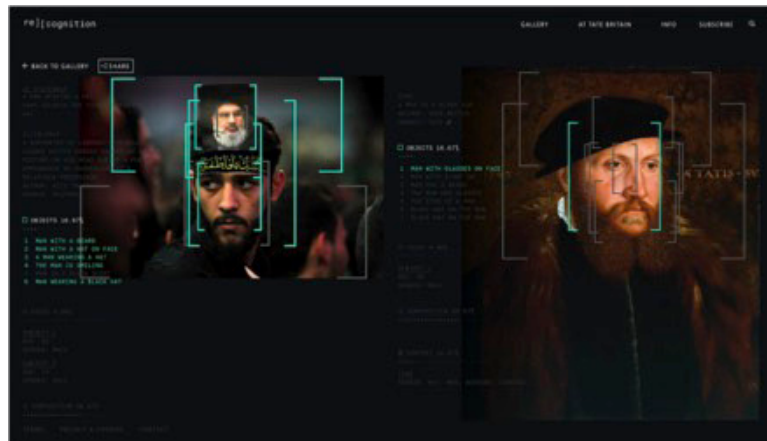
In Gallery Installation Design

Beside its online presence, *Recognition* was displayed in the gallery of Tate Britain. There, the visitors had the chance to step into the algorithm process but also get the possibility to create their own matches, comparing the most recent news image from Reuters with a subset of 50 artworks provided by the algorithm. By visualizing the machine choice next to the human choice, visitors were able to question if an algorithm looks at images differently than us.

2.5. Conclusions

From 2 September to 27 November 2016, *Recognition* created 7271 matches, comparing 2074 artworks from the Tate Britain collection. Analysing the similarity rates for each of the four areas of analysis we can see how Recognition favoured composition based matches. Relying on visual similarities, they are readable and understandable by the public. Some matches are able to capture the same action or scenario, revealing similarities and differences on the world today and yesterday. However, some matches seem to not make any sense, at least for humans. They expose the limits of the technologies behind *Recognition*. But this limit can open new discovery paths and meaning on the comparison through what a machine sees that humans do not.