Illustrations to Photographs: Using computer vision to analyse news pictures in Dutch newspapers, 1860–1940

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Most digital humanities projects are based on the analysis of text. However, in our increasingly visually orientated world, it has become clear that we should also devise ways to analyse visual material. In the last couple of years, the Royal Library of the Netherlands (KB) has made important steps in this emergent field. Delpher, the interface that provides access to the KB's digital collections, gives users the opportunity to search for images with captions in its database of digitized newspapers. The KBK-1M database, which holds all the images published in the KB's digitized newspapers, provides researchers with the opportunity to analyse the visual material of this collection in a viable way.

In my paper for DH2017 I will present the preliminary results of my researcher-in-residence project at the KB (six months starting May 2017). My project applies a new computer vision technique to sort the images of the KBK-1M database according to the way in which they were reproduced (engraving/half-tone), thus shedding a new light on an important transitional phase in the history of the visual culture of the news.

The visual representation of news events is generally connected to the technological progress of photography (Bardoel and Wijfjes, 2015). The so-called half-tone revolution of the early 1880s, enabling the massive reproduction of photographs in print media, is seen as forming the basis for our current visual news culture. From a media archaeological perspective, several historians of nineteenth-century media have challenged this technocentric narrative (Gitelman and Pingree, 2003). Hill and Schwartz (2015: 3) propose a contingent history of "news pictures" as a separate "class of images," which does not solely focus on photographic technologies, but on the discourse surrounding them. In relation to this theoretical development, several studies have demonstrated that photography was not the first medium used to visually represent the news. From the early 1840s, illustrated newspapers disseminated news pictures on a massive scale and developed a discourse of objectivity, based on eyewitness accounts, which would be adapted and used for photographs later in the century (Keller, 2013; Gervais, 2010; Barnhust and Nerone, 2000; Park, 1999).

If we accept that the perceived objective nature of news pictures is not based on the affordances of a certain technology but on the discourse(s) of objectivity surrounding a specific medium, it follows that the turning point between the use of illustrations and photographs as the preferred medium to visually represent the news is a critical moment in the history of modern visual news culture. Most commonly, Dutch researchers have presented this point as a watershed, located at the publication of the first photograph of a news event in a newspaper (Kester and Kleppe, 2015). However, case studies from a media archaeological perspective suggest a relatively long transitional period in which illustrations and photographs coexisted and competed as authentic, objective visual representations of the news (Keller, 2013; Steinsieck, 2006). It remains unclear precisely when photography achieved its pre-eminence and why this happened: why did newspapers stop using illustrations to represent the news when they had done so for many decades?

The early reliance on case studies to describe the transitional phase is understandable, as in pre-digital times, a distant reading of the large number of images published in newspapers was all but impossible. My project will shed more light on this important debate by analysing news pictures in Dutch newspapers on a large scale. Using the power of the Dutch supercomputer Cartesius, I will apply the technique of a recent project of Fyfe & Ge (2016) to the images in the KBK-1M database. Fyfe set out to study how computer vision and image processing techniques could be adapted for large-scale interpretation of British Victorian illustrated newspapers (Fyfe, 2016). Using MATLAB, Ge devised a method to analyse two so-called low-level features of images: the pixel ratio, the number of low-intensity pixels divided by the total number of pixels, and the entropy level: the amount of information contained in the image. By juxtaposing these two features, they were able to sort the images of the illustrated newspapers according to the technique used for their reproduction. Half-tones, used to reproduce photographs, exhibit both a high pixel ratio and a

high entropy level, while engravings, used to reproduce illustrations, display lower pixel ratios and entropy levels (Ge, 2016). Fyfe has shown that this technique can also be used to identify other categories of images. Maps, for example, exhibit lower pixel ratios and entropy levels than detailed illustrations (Fyfe, 2016).

At DH2017 I will present the first results of my project. By analysing the low-level features of images in the KBK-1M database, I will be able to show when Dutch newspapers started to printed both illustrations and photographs on a large scale. In addition, the period when they competed as objective visual representations of the news can be identified. In doing so, my project introduces a digital humanities approach to the relatively theoretical field of nineteenth-century visual culture studies.

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