

Beyond the Universal Art Dataset: Issues and Mitigations of Western Bias in Computational Art Analysis

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Abstract. A growing number of computer vision studies aim to analyze artworks using the largest datasets available. However, these datasets typically align with the traditional canon of western art and thus reflect a western-centric notion of art history. Over the past fifty years, art historians have questioned this canon both in terms of which artworks are included and the way they are labeled and framed. The desire to analyze as many artworks as possible in quantitative studies may thus unintentionally perpetuate western bias. This paper investigates the construction of “universal” art datasets, citing issues in the WikiArt dataset as a starting point for critique. . . .

Keywords: data collection, dataset bias, western art, canon, WikiArt

1 Introduction

Over the past five years, the art datasets used in machine learning applications have grown exponentially larger. The WikiArt dataset has become one of the most frequently-used for training and testing algorithmic tools to automatically categorize artworks [15] [6] [18] [17] [20] [10] [16] [4]. However, WikiArt is largely constructed around the traditional canon of western art, meaning that it excludes a great deal of art from other parts of the world. The non-western art that is included is subject to an understanding of art history that originated in the West. The canon—and large art datasets—should therefore be understood as a social, historical, and ideological construct. The artworks that are celebrated as masterpieces in European cultural heritage collections have been selected by those in power, i.e., by the patronage of the aristocracy, by the collection practices of industrialists, and ultimately by academics who codified these works together in a canon. Researchers cannot therefore assume that art datasets are neutral or objective. This is particularly important for large-scale quantitative research, which may use pre-existing art datasets without qualifying or curating them.

Since the 1960s, art historians have critiqued various aspects of the canon, including its historical exclusion of women and people of color and its use as justification for the cultural superiority of Europeans in a colonized world [12] [14] [19] [11] [3] [7] [13]. In the modern period, the European conception of art

was (or is) understood as globally applicable, a tendency known as universalism [2]. According to postmodern critique, the grand narratives or metanarratives of modernism were constructed in line with local European values, despite their assumption of universality, and can no longer be counted on to explain society and culture in a globalized world [9]. Subsequently, the study of art expanded and so too our understanding of what deserves attention within the discipline’s scholarship. Therefore, the continued use of the traditional art historical canon in the form of universal art datasets can easily perpetuate bias in the study of art history if left unaddressed.

2 Context and Content of WikiArt

In the WikiArt dataset, for example, European and North American art is categorized as historically-situated, individualized and progressive. Non-western art, on the other hand, is primitivized, marginalized, and decontextualized. In other words, artworks outside the western canon are under-represented in datasets like WikiArt and, when they are represented, they are subject to a colonial gaze [8].

The metadata for WikiArt is created via open volunteer editing and moderation. The website states that the information presented on it “is based on wiki principle: free adding and editing the content by anyone who wants to participate. The quality and reliability of information is ensured by consistent moderation of all updates” [1]. The Ukraine-based site does not publicize who manages the project overall, but the editing process is identical to other large wikis like Wikipedia. This means that, though much of the information on the site is detailed and seemingly accurate, it is subject to mistakes and biases, and non-transparent moderation. This does not always produce controversial results. However, it is worth looking a bit closer at one of WikiArt’s style categories, “Naïve Art (Primitivism),” which is listed under Modern Art in the database.

In western art during the modern period, wave after wave of artists reacted against traditional academic styles of painting by turning elsewhere for inspiration. As more non-western artworks were pillaged and brought into Europe due to colonialism, western artists were increasingly intrigued and inspired by the different styles and forms they encountered. Professional artists also began looking to the untaught artists around them. What came to be referred to as “naïve” or “primitivist” art was, therefore, inspired by the artwork of non-western peoples, children, and the mentally ill, all of whom were condescendingly considered less civilized yet purer in their expressive capabilities.

This fetishization of vulnerable and oppressed people was seen in the work of a diverse group of painters who tried to copy the forms of these “primitives” in the nineteenth and twentieth centuries. Artworks by artists like Pablo Picasso and Paul Gauguin have been described by art historians as “Primitivist” in style. This is a fraught term that is often used in a negative sense in contemporary art historical writing, alongside acknowledgment that calling something “primitive” has a long, ugly history in racist and colonialist politics. If a style is described as “naïve,” on the other hand, the term typically implies that the artists them-

selves were not formally trained in an art school and thus created work in styles that do not reflect traditional academic teachings. This is a negatively-tinged classification for work that is also known (not unproblematically) as folk art or outsider art.

With this background information in mind while looking at the works represented in the category “Naïve (Primitivism),” it is clear that the category indeed combines both self-taught artists and trained artists who mimicked self-taught and non-western artists. The style category includes works by Paul Gauguin, Raoul Dufy, Marc Chagall, Natalia Goncharova, and Pablo Picasso. However, it also includes self-taught nineteenth-century American artists like Edward Hicks, Joshua Johnson, and George Bingham and self-taught French artist Henri Rousseau. For the former group of artists, there are perhaps more general style categories they could be classified in. For the latter, there are certainly more respectful terms that could be considered for their work. On another level, however, “Naïve (Primitivism)” should not be considered a cohesive style category, given that the best definition of these terms is “an artwork that is not in the style of traditional western academic painting.” Knowing this background, there is clearly an art historiographic rationale for such a label. However, it does not stand to reason why this would act as a single, stand-alone “style” category for computer vision and machine learning research. By definition, the category concerns context not visual appearance. It demonstrates the extent to which there are overlapping style descriptors for artworks as well as how few works can be boiled down sensibly to one label.

The university discipline of art history arose in the late nineteenth century in tandem with other scientific fields that tried to quantify culture. In doing so, they helped legitimize the view that western art and culture was more developed and therefore superior to the art and culture of the rest of the world. With its early pseudo-scientific taxonomic systems and supposedly objective or neutral parameters by which to measure art, western art historians could justify dismissing the rest of the world as “primitive” and, by extension, justify the colonialization and subjugation of non-western peoples. Western art was conceived as a progressive historical trajectory while the art of other cultures was seen as ahistorical, remaining more or less stagnant through time. As much as the discipline of art history has made strides to abolish these original sins by altering or critiquing the traditional canon, the modernist ideas of progress underpinning it are embedded not only in the canon as a scholarly construct but also in art practice at various points in time. So, the canon and its biases remain difficult to shake.

For most of the computer science research using the WikiArt database, western art is assumed to be universally relevant and exceptional. The biases and pseudo-scientific taxonomies that contributed to what we now hold up as the canon of western art are still very rarely acknowledged outside the fields of art and art history. Seldom are issues of power and representation addressed in the compilation of such databases. However, the way in which artworks are selected, categorized, exhibited, bought, and sold is an inherently political process. No

matter what method of quantitative analysis is employed, the selection of images to investigate is almost always exclusively composed of canonical western paintings.

As detailed above, datasets such as WikiArt present problems not only in terms of which artworks they exclude and how they are categorized but also which media they favor. Three-dimensional artworks, such as sculpture or installation, and durational artworks, such as video, performance, and sound, are difficult to encapsulate in a single image. In the vast majority of art datasets, artworks are represented by a single, two-dimensional images. Of the two-dimensional works included, the medium of painting dominates. Indeed, in many cases painting and art are assumed to be synonymous. This is another, more subtle bias toward western types of art and points to the high status of unique paintings created by a single, named artist within western culture. This medium bias, which doubles as a geographical bias, is rarely acknowledged when datasets like WikiArt are used.

3 Conclusions

How, then, can we mitigate bias in large datasets for computational study of art history? The first challenge in creating or conceptualizing a large art dataset is that projects for mass digitization and the attendant metadata creation have thus far largely been funded by and conducted by western institutions, meaning that there is a decided lack of digital data outside of the traditional western canon. Merely adding more digitized content from outside of this milieu will not, however, solve the problem since there will always be omissions and exclusions.

It may seem counter-intuitive, given that computational tools are so well suited for analyzing large amounts of data, but quantitative studies of art must begin to think smaller, to address local contexts rather than analyze “all” of art history. In order to produce results that are truly relevant for art historians and art historical research today, data needs to be highly curated and researchers have to be sensitive to both the context and the content of the artworks they use. Why are some artworks included and not others? What is the character of the dataset as a whole? Art datasets continue to be used as “just another kind of image data” in computer science research and, it must be acknowledged, art historical insight is not always the end goal. However, for those researchers who care about developing tools that are relevant for the field of art history, these questions need to be addressed.

Quantitative researchers must therefore begin to think locally and understand their data and metadata qualitatively. Despite the Latin roots of the word “data,” it should not be treated as “given” [5]. In a way, all datasets are built on a fiction—a construct—of completeness, correctness, and objectivity. Art datasets, no matter how large or small, are governed by the decisions that make and form them as a whole.

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