

# Kandinsky Mobile: Abstract Art-Inspired Interactive Visualization of Social Discussions on Mobile Devices

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## ABSTRACT

*Kandinsky Mobile* is a mobile device-based interactive artwork that generates and displays the social discussion landscape associated with a social media *anchor post* using a collection of colorful *circles* and *concentric circles*. It draws inspiration from the famous abstract geometric art forms of Russian painter Wassily Kandinsky (1866–1944). Intuitively, a circle and a concentric circle represent a social comment and a collection of comments in a discussion thread, respectively. The artwork aims to facilitate user-friendly and effective understanding and visualization of large volumes of comments associated with an *anchor post*.

### ACM Reference Format:

Castillo Clarence Fitzgerald Guntang and Sourav S Bhowmick. 2021. *Kandinsky Mobile: Abstract Art-Inspired Interactive Visualization of Social Discussions on Mobile Devices*. In *Proceedings of the 29th ACM International Conference on Multimedia (MM '21), October 20–24, 2021, Virtual Event, China*. ACM, New York, NY, USA, 3 pages. <https://doi.org/10.1145/3474085.3478542>

## 1 INTRODUCTION

An early champion of abstract painting, Russian painter and art theorist Wassily Kandinsky (1866–1944) is known for his “lyrical style and innovative theories on nonfigurative art”. Geometrical elements took on increasing importance in his painting – particularly the circle. This is characterised in several of his works such as *Circles in a Circle* (1923)<sup>1</sup>, *Several Circles* (1926)<sup>2</sup>, and *Heavy Circles* (1927)<sup>3</sup>. Kandinsky believed that the circle was the most peaceful shape and represented the human soul. He associated shapes and colors with musical notes and rhythms<sup>4</sup>.

Social media sites (e.g., *Facebook*, *YouTube*) allow an individual or an organization to upload post, images, or videos (we referred to it collectively as *anchor post*) for public consumption (e.g., <https://www.youtube.com/watch?v=1pB0-nHF8Jc>). Such anchor post may attract hundreds of comments from many commentators (i.e., users) over time discussing various issues related to it leading to social conversations (i.e., discussions) among them. The interactive artwork called *Kandinsky Mobile* presented in this paper is

<sup>1</sup><https://www.philamuseum.org/collection/object/51019>

<sup>2</sup><https://www.guggenheim.org/artwork/1992>

<sup>3</sup><https://www.nortonsimon.org/art/detail/P.1953.216/>

<sup>4</sup>[https://www.southeastern.edu/acad\\_research/programs/writing\\_center/pick/backissue/volume34/assets/elbers.pdf](https://www.southeastern.edu/acad_research/programs/writing_center/pick/backissue/volume34/assets/elbers.pdf)

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MM '21, October 20–24, 2021, Virtual Event, China

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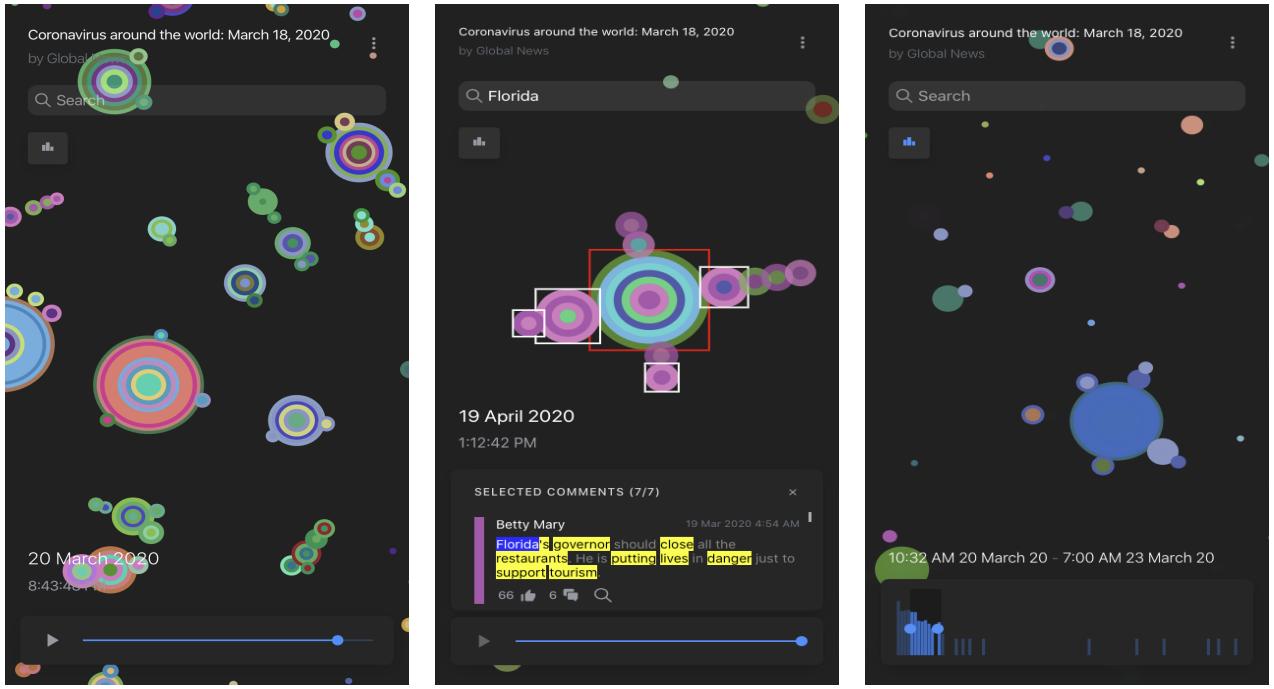
ACM ISBN 978-1-4503-8651-7/21/10.

<https://doi.org/10.1145/3474085.3478542>

inspired by *Kandinsky circles* to visualize this social conversation landscape. Specifically, we use the mobile phone interface as the canvas to visualize social discussions associated with an anchor post as a collection of colorful *circles* and *concentric circles*. Each social comment is represented by a colored circle. Replies to a comment are visualized as concentric circles with the *original comment* (i.e., comment which directly responds to an anchor post) being the innermost circle. The colors are used as identifiers of the commentators. In summary, in our artwork we associate circles and colors with social comments and social users.

*Kandinsky Mobile* is motivated by the time-consuming and cumbersome nature of comprehending a large number of comments in a social discussion by browsing them. Majority of the social media sites provide primitive support for comprehending these comments. They do not allow a user to visualize a bird’s-eye view of the conversation landscape, highlighting discussion threads that have garnered considerable attention and interactions between various comments and users. Furthermore, they do not allow visualization of evolution of discussions over time, keyword search on the discussion threads, or visualize comments that are topically similar in content to a comment-of-interest. Given that mobile devices are the most popular ways for people to access social media platforms, *Kandinsky Mobile* is realized using such devices as canvas to address these limitations by extending the desktop version [4].

The unique characteristics of mobile devices introduce several challenges for developing such an artwork on it [3]. Owing to the need for portability, mobile devices generally have small-sized screens, which make it difficult to present artwork containing many circles and help users to navigate them. Besides, when one interacts with touch screen mobile phones, the habits are drastically different from when one operates with desktops. In fact, the combination of a small size of mobile devices and touchscreen interaction lead to the need for *fat-thumb friendliness* [5]. Though most mobile devices are equipped with multi-touch screens to support content manipulations by multiple fingers, thumbs remain the most popular input method [5]. That is, most users rely on single-touch and most use their thumbs as the only input method. Consequently, when the interaction with an artwork is limited to a finger touch and not a cursor, the size of the touch targets as well as the space between elements (i.e., circles) need to be carefully designed. The greater the area, the lesser chance of a user for touch error. Hence, it is critical to design the artwork by considering that most users are using their thumbs. Furthermore, when the rest fingers are grasping the device, the range of motion available to the thumb is more limited, thus limiting the area of the canvas (i.e., screen) the user’s thumb can reach. This poses another challenge for the layout positioning of touch targets (e.g., circles) in the screen to ensure accessibility by users. Lastly, due to the limitations in size and weight, mobile



**Figure 1: Screenshots of *Kandinsky Mobile* (Best viewed in color).**

devices normally have reduced processing capacity. Hence, heavy computation needs to be avoided.

## 2 THE ARTWORK

The presented artwork consists of a visual interface in a mobile device (called *Kandinsky canvas*) that interactively displays the social conversation landscape of a selected anchor post in the form of circles and concentric circles (Figure 1, left). The canvas is generated on-demand that addresses the aforementioned characteristics of mobile devices and how users interact with them (e.g., small screen, fat thumb friendliness). It consists of the anchor post information card, the search bar, the Kandinsky circles, the timeline control slider, and the current timestamp. The anchor post information card displays the post title and author. The search bar allows a user to perform keyword search. The Kandinsky circles display circles and concentric circles representing comments and their replies (if any). The timeline control slider allows a user to visualize and control the current timestamp which dictates and filters which comments are to be displayed when the artwork is in *Play Mode*. This artwork is built using *Ionic 4*.

A user can interact with the artwork as follows. (a) When the artwork is launched, the user is directed to the *post menu selection page* to set the anchor post of interest. After which, *Kandinsky Mobile* first extracts the associated comments with the post from the social media platform's API. Once the data has been extracted and prepared, the user is directed to the default *canvas page*. The Kandinsky canvas is empty initially. (b) Clicking the *start triangle button* of the timeline control triggers the *Play Mode*, after which *Kandinsky Mobile* starts to incrementally draw one circle at a time on the canvas representing the extracted comments of the anchor post sorted in chronological order. Gradually, concentric circles are

drawn on the top-level comment's center. *Peripheral* concentric circles are also shown with close proximity to some concentric circles, representing subset discussion threads within the parent's discussion thread [4]. (c) Clicking on a concentric circle displays the contents, the author names, the like counts, and the respective dates the comments were published (Figure 1, middle). Topics (e.g., "Florida", "tourism") within the textual content are identified and highlighted in yellow. There are also colored bars drawn on each comment item representing the comment's *normalized* like count. (d) Upon clicking on the *bar-chart button*, the *spectrum mode* is activated. All concentric circles are immediately displayed and the timeline player controls are replaced with a bar-chart visualization representing the number of comments published over time (Figure 1, right). This provides insights about changes to the anchor post's intensity of discussions since the date the first comment was published. Adjusting the range of the time frame of the spectrum filters highlights comments published within the time frame. (e) Clicking on "*See similar comments*" will affix the selected comment at the top of the canvas while the list of similar comments is listed below. On the canvas, comments that are not similar to the reference comment are made less visible, and matching similar comments are focused by rendering a white boundary box around it. (f) Lastly, one can perform keyword search on the artwork. When a keyword (e.g., "Florida") is entered in the search bar, Kandinsky circles that contain comments matching the keyword are highlighted and surrounded with a white boundary box. Selecting one of the highlighted concentric circles displays its comments and highlights the matching keywords in blue (Figure 1, middle).

A demonstration video of the presented artwork can be viewed at [https://youtu.be/ay\\_0LpRRBQE](https://youtu.be/ay_0LpRRBQE).

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