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Development of a web-mapping application for storytelling with animations and guided interactions

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Abstract:

Dynamic maps offer different possibilities for map makers to convey the story and for readers to explore it, compared to static maps. However, scholars have identified issues with animated maps or dynamic visualizations that can increase the cognitive load of map readers. (Garlandini & Fabrikant, 2009) (Spanjers et al., 2010) (Cybulski, 2021) (Yang, 2021)

To address this, researchers suggest that interactivity and user control could enhance understanding or learning and reduce cognitive load in animations. (Andrienko et al., 2000) (Slocum et al., 2001) (Tversky et al., 2002) (Harrower, 2007) (Roth, 2021)

However, while there are web-mapping applications that include interactive animations, the gap is that many of them are not designed with a focus on animations and do not aim to provide guidance throughout the entire utilization process until the user discovers the resolution of a narrative.

To fill this gap, a web application is developed that can use global temporal datasets and aims to provide a new approach to designing web applications based on animated maps. The application aims to stimulate learning, user engagement, and control without breaking the linearity of a story and increasing the cognitive load of the users when visualizing large datasets. Therefore, basic interactions will be required to maintain the flow of the story and increase interest in exploring the dataset.

This application generates a chain of different types of animations triggered by guided interactions, giving the impression of a single animation with a unique story. Camera animations, resembling tours or globe spinning, and temporal animations are developed to function synchronously for dramatic effects that aim to engage the users and emphasize the places with significant changes over time extent. Despite the animation course that will be influenced by the interactivity and implication of the users, the resolution will remain unchanged.

This application is developed with ArcGIS Maps SDK for JavaScript and it is organized in sequences that progressively offer more interaction opportunities and provide more information. It incorporates the voice of the author through emphasized events and areas on the globe and text blocks in the user interface for storytelling and guidance. Interacting with highlighted areas on the globe will play new temporal animations for the same dataset, but visualized on a different spatial extent. Guiding blocks will be displayed until the user has explored all the highlighted features and reaches the end of the animation chain.

This web application is designed to generate different user behaviors when interacting with animations. These could be reflected in the total time of use, the number or order of interactions, and the time with no interactions. Ultimately, this offers opportunities for further research to register and analyze these events and usage details in the application and determine the efficiency of this method.

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