REFRAMING THE DIGITAL CARTOGRAPHIC FRAME: EXAMPLES FROM THE CYBERCARTOGRAPHIC ATLAS OF CANADIAN CINEMA

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Abstract
The cartographic frame remains broadly perceived as a default feature. Indeed, the framing of a map seems to be derived from objective criteria such as the density of the information mapped, and the geographical extent of the data. This naturalization of the cartographic frame has been redefined with the recent development of digital technologies and virtual globes. In the digital environment the user can indefinitely change the limits of the area appearing in the frame through panning and zooming. This flexibility can also serve to reframe the function of framing in cartography, and to use it as an active element of cartographic narration as illustrated by examples from the Cybercartographic Atlas of Canadian Cinema presented in this paper. This atlas serves as a laboratory to explore new forms of cartographic techniques inspired by cinema, including the jump cut framing function. The jump cut framing function is built on a simple algorithm, which defines automatically the centre of the frame, and the level of zoom based on selected attribute values. This function provides a dynamic interaction and a cinematic effect as illustrated by examples of dynamic maps of Canadian cinema. These examples demonstrate the potential of cinema to inspire alternative ways of rendering geographic information, and to stimulate the development of more narrative forms of cartographic expression in which the data becomes the source of the narration. Other cartographic practices and features, which have, up until now, been taken for granted, remain to be reframed. Many other cinematographic techniques and concepts could be inspirational.

Introduction

In *L'empire des Cartes*, Christian Jacob (1992) developed the idea that atlases are based on a cumulative and analytical logic which is structured by the idea of cutting. In atlases, the world is cut into pieces such as continents, countries, and cities, which disrupts its continuity. This cutting imposes a framing and an assemblage of frames, generating a sense of progression for the user as well as a feeling of slowing down or accelerating (see Castro 2005). Through these notions of framing, assembling, structure, rhythm and progression, Jacob concludes that atlases can be considered as being cinematographic.

Digital atlases and virtual globes are transforming the nature of this cinematographic analogy. On the one hand, these atlases discard any needs for framing and spatial cutting as they provide highly interactive ways of panning and zooming. Any user can now choose a specific area of interest, at a specific level of zoom, representing a specific kind of information. On the other

hand, they also provide authors with powerful tools to render information in a more narrative and cinematographic way through sophisticated forms of animations. Assembling, structure, rhythm, progression and framing are being totally redefined by these new applications while transforming the nature of the cinematographic analogy proposed by Jacob (1992). This paper aims to further explore the new nature of the cinematographic analogy in the context of digital cartography, more specifically through the concept of framing.

To explore these changes and their implications the paper starts with a discussion of the concept of framing in both cinema and digital cartography. The outcome of this discussion is the development and implementation of a new form of cartographic narration: the jump cut framing function. This function is presented in a second section and illustrated through examples from the Cybercartographic Atlas of Canadian Cinema. Finally, this paper concludes by arguing in favour of a closer look at cinematographic techniques and concepts in order to develop new forms of cartographic narratives.

1. Framing in cinema and cartography

1.1. Framing in cartography

Denis Cosgrove (1999, 10) emphasized the importance of framing in cartography as a way of "producing and organizing unity and totality within the space so contained." From his perspective, framing is not only about differentiating between inside and outside the map, it is also about "territorializing, even imperializing." While the cartographic frame contributes actively to the authoritative power of the map, it remains broadly perceived as a default feature: one of the many "*a priori* features of mapping" (Cosgrove 1999, 9). Indeed, the framing of a map seems to be derived from objective criteria such as the density of the information mapped, the geographical extent of the data, some conventional geographic entities (e.g. boundaries of a country), and the purpose of the map. This naturalization of the cartographic frame has been redefined with the recent development of digital technologies and virtual globes.

On the one hand, the naturalization of the cartographic frame has been challenged by the development of virtual globes as the user can indefinitely change the limits of the area appearing in the frame through panning and zooming[1]. On the other hand these new capabilities have reinforced the impression of natural continuity that exists between the world and its cartographic materialization. With digital globes the user can instantaneously cross scales and layers from the very high-resolution local images, to the global materialization of the entire world, and vice-versa in a smooth and continuous manner. In a certain sense these capabilities reinforce the impression that continuity exists between the real world made visible and tangible with high-resolution images and its cartographic materialization through generalized maps and layers (See Caquard and Wright 2008). This process contributes to give the impression that the map resembles a "natural" and objective extension of the world.

This naturalization reinforces the authoritative power of the technological map that has been thoroughly criticized by authors such as Brian Harley (see Edney 1992; Wood 2002). In this

[1] It is important to note here that many mash-ups remain driven by data provided at the administrative level such as the state level. Therefore the base frame of these mashups remains the administrative limits of the data providers.

digital environment challenging the cartographic frame can be reframed as a way of challenging the new form of authoritative power embedded in the continuity system associated to the high resolution images and smooth zooming capabilities. It can also be envisioned as a new means of conveying geospatial stories.

1.2. Framing and editing in cinema

In cinema, framing refers to the ways in which objects and space are organized in a shot. This compositional structure is also known as mise en scene. A film frame is the most basic component of the visual apparatus of cinema and can be organized according to four major elements: (1) distances, which can go from an extreme long-shot to an extreme close-up; (2) level which refers to the level of the camera (e.g. Canted Framing: the frame is not leveled; one is lower than the other, causing objects in the scene to appear slanted out of an upright position – see figure 1); (3) angle which refers to the position of the camera vis-à-vis the objects in the shot (e.g. high or low angle); and (4) shape which refers to the shape of the frame (e.g. masked or iris frames) (Wright 2008a).

These different elements can inspire the definition of the cartographic frame. In cartography, framing refers to the ways in which objects and space are organized on a map. A map frame is the most basic component of the visual apparatus of cartography and can be organized according to four major elements: (1) distance from earth, also known as scale, which can go from a very coarse scale to an extremely fine one; (2) center which refers to the geographic coordinates (X and Y) of the centre of the frame; (3) angle which refers to the position of the angle of visualization (e.g. vertical view or perspective); and (4) shape which refers to the shape of the frame (e.g. rectangle, round). This definition of a frame in cartography reflects the definition of a frame in cinema. The major difference between both frames is their function. As described previously, the frame in cartography is data driven and contributes to the naturalization of the area framed. It is supposed to convey information as efficiently as possible.

Figure 1 – In Touch of Evil (Orson Wells 1958), Detective Hank Quinlan is framed from a low canted angle to heighten his drunken and threatening temperament.

In cinema framing is also used to convey information. For instance, an establishing shot, usually involving a distant framing, can be used to show the spatial relations among the important figures, objects, and setting in the scene. But frame in cinema has other functions. It can be used to convey emotions (e.g. close up to some vital details or facial expressions), and perceptions (e.g. point-of-view shot, a shot taken with the camera placed approximately where the character's eyes would be, showing what the character would see). For instance, in Touch of Evil (1958), Orson Wells frames his character, Detective Hank Quinlan, from a low canted angle to

heighten his drunken and threatening temperament (Wright 2008b) (see figure 1). In cinema, framing contributes actively to the narrative and aesthetic dimensions of the film. It can add dramatic and emotional depth to a shot, can serve a narrative purpose, or simply add to the aesthetic of the film.

Even if in cinema shots can be meaningful by themselves - or funny as illustrated by David Bordwell (2007) - most of the time the frame is part of the narrative, which is tightened through the editing process. Specific stylistic and editing techniques have been developed in cinema to ensure that the story unfolds in a clear and coherent manner. “This editing style, known as the “continuity” system, emerged in the late teens and has since dominated Western film history. It remains the most fundamental system of cinematic construction around the world” (Caquard and Wright 2008). This continuity system involves editing techniques to mask transition between frames. This mask is part of what Tom Conley (2006: 4) calls “a rhetoric of invisibility” that camouflages its mode of construction. This rhetoric of invisibility resonates with the rhetoric of invisibility emphasized by critical cartographers. As argued by Brian Harley, maps are authoritative because they are dissociated from their authors and from their context of production (see Wood, 2002).

In cinema some alternative editing strategies have been developed to challenge this continuity system and stimulate audience reflexivity. Among these strategies the jump cut has been used since the 1960s by filmmakers such as Alain Resnay, Jean-Luc Godard or Michael Snow to violate and challenge the continuity system as well as to explore alternative aesthetic modes (Stam 2000). A jump cut can be defined as, “An elliptical cut that appears to be an interruption of a single shot. Either the figures seem to change instantly against a constant background, or the background changes instantly while the figures remain constant” (Wright 2008a). In a jump cut, “movements are left incomplete, action is presented in a choppy and de-realized manner” and sentences are left unfinished (Caquard and Wright 2008). A jump cut can then be used to de-naturalize a sequence in a movie and contribute to exposing its construction. This editing strategy, combined with a framing strategy, has inspired the development of new ways of using dynamic framing in cartography as illustrated by the following examples from the cybercartographic atlas of Canadian cinema.

2. Framing the Cybercartographic Atlas of Canadian Cinema

2.1. The Cybercartographic Atlas of Canadian Cinema: Introduction

As described previously, atlases can be considered as being cinematographic because of their structure as well as because of their narrative dimension. Denis Wood (1987) has emphasized the importance of atlases for telling stories and stimulating imagination. Dodge and Kitchin (2000) have further explored this dimension in the context of their atlas of cyberspace and their study of cyberfictions. Greenspan and colleagues (2006) have developed geospatial live hypernarratives, an online form of geospatial narrative. In the context of Indigenous mapping, authors such as Turnbull (2007) have emphasized the tight links between space, traveling, and narrative, as well as the importance of the narrative dimension in the representation and communication of spatial experience and knowledge.

This notion of geospatial narrative is embedded in the concept of cybercartography which can be defined as theories and practices reflecting the changing nature of contemporary cartography

under the influence of technology, art, science and society (see Taylor 1997; Taylor 2003). This concept of cybercartography is explored through the production of cybercartographic atlases (https://gcrc.carleton.ca/confluence/display/GCRCWEB/Atlases). These atlases are created with an open source software called Nunaliit specifically developed for this purpose. It provides tools for representing geographic information in a narrative form. For instance, Nunaliit includes audiovisual mapping functions which allows users to trigger sounds organized in a sound database, based on their association to geographical objects (see Brauen 2006; Caquard et al. 2008). It also provides the framework necessary to support the development of new forms of mapping information, as illustrated in the Cybercartographic Atlas of Canadian Cinema (www.atlascine.org).

The overall goal of this atlas is to better understand the influence of cinema in the construction and dissemination of geographic identities. To reach this goal, this atlas maps Canadian cinematographic territories, including the territories of film production (e.g. shooting location), film audience (e.g. revenues of films), and film action. This atlas focuses more specifically on the territories of four contemporary Canadian films characterizing recent Canadian film production: Bon Cop Bad Cop (Eric Canuel 2006), Atanarjuat (Zacharias Kunuk 2001), Ararat (Atom Egoyan 2002), and Long Life, Happiness and Prosperity (Mina Shum 2002). Simultaneously, this atlas serves as a laboratory to explore new forms of cartographic techniques inspired by cinema, including the jump cut framing function.

2.2 The jump cut framing function: description and applications

The jump cut framing function is built on a simple principle: the cartographic frame is defined by the data mapped. A simple algorithm as been developed to apply this principle. This algorithm defines both the centre of the frame and the level of zoom. The centre of the frame is based on the weighted average of the XY coordinates of the data mapped, and the level of zoom is based on the values of selected fields in an attribute table. In this algorithm, the two other components of the cartographic frame defined previously - angle (vertical) and shape (square or rectangle) - remain constant. This function has been coupled with an interactive timeline, in order to provide a dynamic interaction and a cinematic effect as illustrated by three different examples: (1) the weekly revenues of the film Bon Cop Bad Cop in movie theaters across Canada; (2) the comparison between these revenues and the revenues of the film Atanarjuat; and (3) the international success of Atanarjuat at international film festivals.

An action/comedy, Bon Cop Bad Cop (Eric Canuel 2006) earned the title of the most financially successful Canadian film of all time. The action takes place in Canada between the anglophone province of Ontario and the francophone province of Québec. When a body is found hanging on the border sign of those two provinces, Ontario and Québec detectives must overcome cultural and linguistic differences to solve the murder. The jump cut framing function is used to map the center of gravity of the success of this movie over time, defined by the weighted mean of the weekly revenue of the film in movie theaters across Canada (center of the frame), and the total weekly revenue (level of zoom): the higher the weekly revenue, the larger the area mapped and vice-versa. The visual result reassembles a succession of moving frames that slowly zoom on a smaller area (as the overall revenues of the movie is decreasing over time) centered on the border between Ontario and Quebec (see figure 2). This visualization reveals the unexpected convergence between the territories of action in the movie and the center of gravity of its

reception on the cultural, linguistic and administrative border between the two provinces. For this movie, territories of action and territories of reception overlap surprisingly well as revealed through the jump cut function.

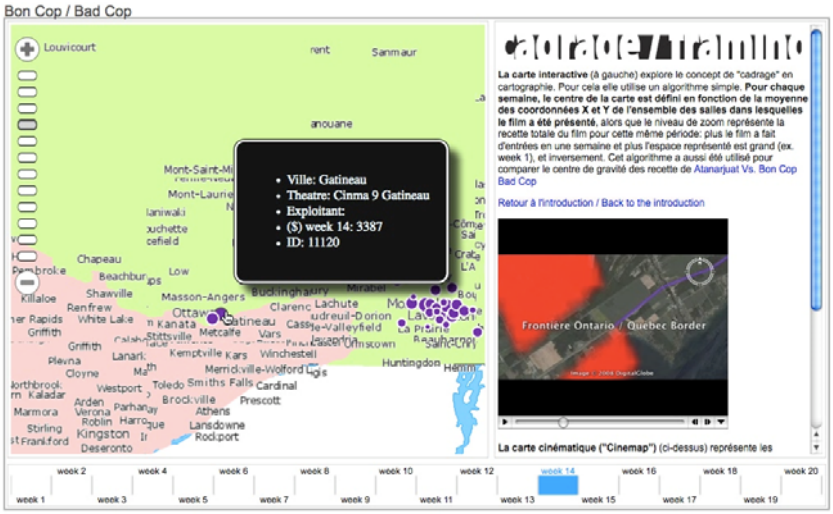

Figure 2 – Screen capture of the convergence between the territories of action of Bon Cop Bad Cop (on the right) and the territories of its audience (on the left) at the border between Ontario and Quebec.

In the second example, the weekly revenues of Bon Cop Bad Cop are compared to the weekly revenues of the movie Atanarjuat (Zacharias Kunuk 2001). Atanarjuat is Canada's first feature-length fiction film acted, written, produced, and directed by Inuit. An exciting thriller set in ancient Igloolik (Northern Canada), the film unfolds as a life-threatening struggle between powerful natural and supernatural characters. The center of gravity of the revenues of both films can be compared through a split screen: One screen for Atanarjuat on top, and the other one for Bon Cop Bad Cop at the bottom (see figure 3). The comparison of these two maps/screens emphasizes the balanced revenues of Atanarjuat all across Canada, and contrasts with the localised success of Bon Cop Bad Cop described previously. It also highlights the fact that the territories of action and of reception do not overlap for Atanarjuat. While the action takes place in Nunavut – in the North East part of Canada – the audience is mainly located in the Southern part of the country. This can be explained by the high density of population - therefore of potential audiences - in the “South” of Canada, in comparison to the very scattered density of population in the North. Furthermore, Northern audiences are underrepresented in this map, as there are alternative film distribution networks in the North, which are not included in the database. In a more conceptual way, this difference between the territories of action and the territories of reception can also be explained by the universality of the story told in Atanarjuat. Even if the story is literally about an Inuit community, it is quite universal as it deals with life struggles and human relationships, which explains its overall international success,

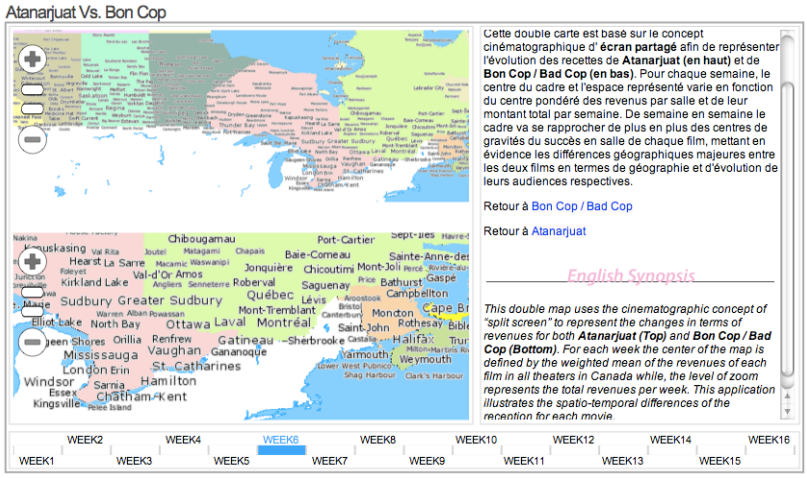

Figure 3 – Screen capture of the comparison between the weekly revenues of Atanarjuat and Bon Cop Bad Cop using jump cut framing and a split screen.

Finally in the third example, the jump cut framing function has been used to map the recognition of Atanarjuat at international film festivals over time. For each month, the framing is defined by the mean XY coordinates of the different festivals where it was presented all over the world (center of the frame), and the monthly number of festivals it participated in (zoom level): the bigger the area mapped, the greater number of festivals that were showing the movie during the selected month. Combined with a stylized background map, the jump cut framing tells the story of the journey of the international recognition of the movie all over the world, starting at a local zoom level over Cannes (France), before revealing the international success of the movie at film festivals a few months later (see figure 4). The storytelling dimension of this map is emphasized by the audio description in Inuktitut - the Inuit language - of each prize the film was awarded at each festival. Through this narrative process, the international success of Atanarjuat first unfolds in a somewhat puzzling way before slowly revealing its global nature.

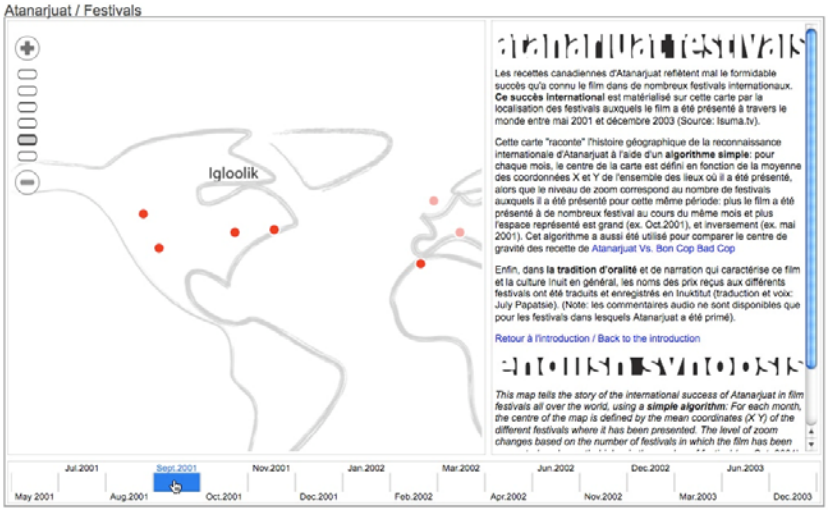

Figure 4 – Mapping the success of Atanarjuat in International film festival using the jump cut framing function and sound clips in Inuktitut. The bigger the area mapped, the greater number of festivals that were showing the movie during the selected month (here September 2001).

Conclusion

These different examples from the Cybercartographic Atlas of Canadian Cinema illustrate the potential of cinema to inspire alternative ways of rendering geographic information. In cartography the question of framing has not received much attention. In conventional cartography this lack of interest has contributed to reinforcing the "natural" dimension of the frame. In digital cartography this lack of interest may seem less problematic at first as the user can indefinitely frame and reframe the limits of maps. Nevertheless, the question of framing in digital cartography remains quite relevant as it can serve to address several issues. It can be used to break the impression of continuity between the reality and its materialization that have been reinforced recently by virtual globes and their smooth way of crossing layers and scales. It can also serve to stimulate the development of more narrative forms of cartographic expression in which the data becomes the source of the narration as illustrated with the jump cut function presented in this paper. Because this function destabilizes the typical practice of cartographic framing, the efficiency of the communication of the message might be affected. However, this function contributes to the bridging between a more narrative approach of mapmaking and the rendering of complex spatiotemporal data. Finally, this jump cup framing function can serve to bring to the forefront, in an unconventional way, geographic similarities and overlaps as illustrated through the example of the mapping of cinematographic territories of the movie Bon Cop Bad Cop. Framing and editing in digital cartography can serve multiple purposes as illustrated in this paper. Other cartographic practices and features which have, up until now, been taken for granted, remain to be reframed. Many other cinematographic techniques and concepts could be inspirational.

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