Hot Spots in the Square

Reclaiming and Relocating the Commons through the Mapping of Relative Heat Differences in an Urban Outdoor Space

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Research Problem: How can we make relative temperature differences visible to the naked eye, and why is this important in the Newfoundland context? A distinct characteristic of outport Newfoundland communities is common space. Rooted in the medieval open-field system, the Commons is shared public resources open for anyone to use. Our project aims to unveil the potential for the Commons within the outdoor urban infrastructure of Churchill Square by locating relative heat differences—that is, we wanted to find out which areas in the Square provided a bit of warmth during the long, cold winter. Locating these “hot spots” lets us imagine the possibility of public congregation or reclaimed community space.

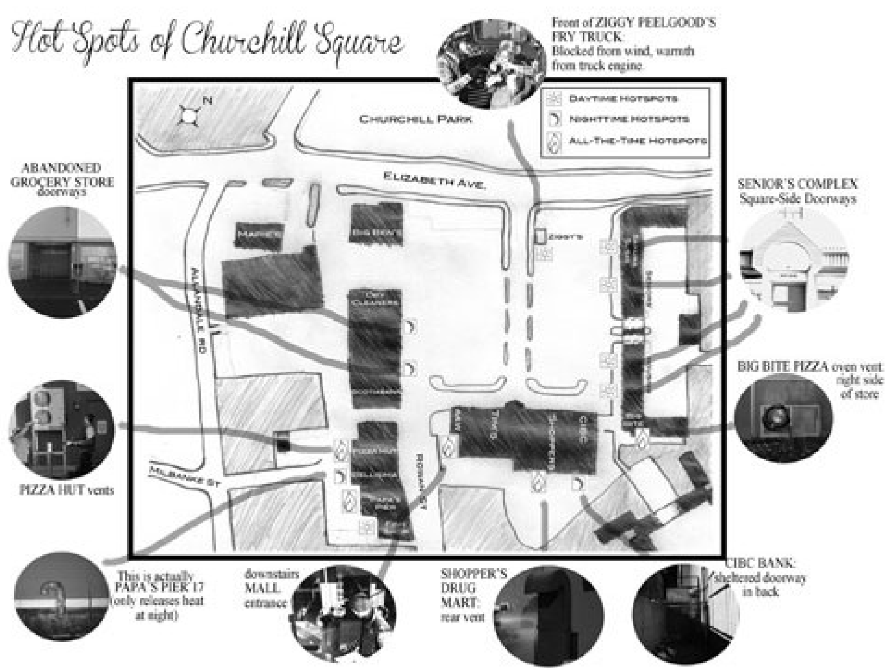
Methodology: To measure heat increases and locate these hot spots, we used a thermal flashlight built using instructions on http:///www.publiclab.org. This flashlight uses a non-contact infrared sensor to measure heat differences. Temperatures above and below pre-programmed—using Arduino software—levels are indicated with a red light reading for high temperatures and a blue light reading for low temperatures. Middle-range temperatures are green.

Because of vast daily temperature fluctuations in St. John's, and how outside temperatures would affect heat changes within the hotspots, we operationalized our temperature measurements by using a mathematical equation that can be used when the temperature is between +17°C and -13.4°C, which is based on a mis-reading of the extreme highs and lows of December temperatures in St. John's on the Government of Canada climate website. Despite this misreading, outside temperatures (OT) during our field work fell into this range.

The equation we used was to set our thermal flighlight during each field work session was:

$$\textit{high temperature setting/red output} = -.03508(OT + 1.5)^2 + 10$$

Main findings: We did three different field work sessions, both day and night, in various weather conditions. Our flashlight had red readings at the following spots:



LITERATURE REVIEW AND PROBLEM BACKGROUND

Newfoundland Folklorist Gerald Pocius (1991) identifies The Commons as a distinct feature of Newfoundland outport communities. Drawing on his ethnographical work on Calvert, on the Southern Shore, Pocius writes that this form of land division, “exhibiting the vestiges of the medieval open-field system, ” (p. 124), meant that a prominent characteristic of the landscape of the outport community is land not owned by any particular person but is used by whomever needs it at any article time. This includes common grazing lands, where animals owned by various people intermingle, agricultural land which changes hands every season, or berries and fish, which require skill to acquire but are equally open for any resident to have his or her hand at. Pocius writes that even if land is known to be owned by a particular family, if unused it will uncontroversially be taken up for use by someone else, “so as not to be 'wasted'” (p. 134).

Using this notion that immediately uninhabited space has the potential for waste and should be open for community reclamation at any point in time, we sought to map a nearby urban area, Churchill Square. Churchill Square was of particular interest to us because a “town square” is usually a pedestrian area for community gatherings surrounded by small shops. Churchill Square does have an array of small shops and restaurants, seemingly more diverse than other shopping areas in St. John's. However, in lieu of public space, has a paid parking lot with small areas denoted for food-vending trucks. Although, given the geographical features of St. John's that create inhospitable weather conditions, perhaps a town square would be inappropriate, locally. Therefore, we aimed to map the invisible thermal infrastructure of Churchill Square.

This urban mapping project builds on renewed academic interest in public spaces, especially in urban areas from critical urban geographers, cultural theorist, and artists who claim that we should rethink what these spaces are and have come to be. There is also growing public discourse on public spaces stemming from issues of increasing homeless people on streets, a crisis of common areas in cities, increasing commercialization/privatization of public spaces, violence against women in public spaces, and security technologies in these spaces (Mitchell, 1996). Our project is largely informed by the idea that the city is something in the 'making' (Simone, 2011), and that urban spaces are constituted by the subjects and socialites of the people who live in it and as an assemblage of human and non-human interactions (Amin 2008; Latour & Hermant 1998). That is, we can configure how the urban is experienced/done and we can ‘do’ public spaces in diverse ways. Using the flashlight to measure heat differences, we located and mapped hotspots in the Churchill square area of St John's. These hotspots we believe expand the community use of the Churchill square area. More importantly and from a social justice perspective, it allows privately owned infrastructure to be used in diverse ways by a broader spectrum of people, particularly for shelter and warmth.

METHODOLOGY

To locate the invisible thermal infrastructure of Churchill Square, we built a thermal flashlight using instructions from http://publiclab.org, a non-profit online community that develops open source tools and techniques for research. The thermal flashlight tool uses a non-contact infrared sensor to measure the temperature; the temperature reading is displayed in colour via an LED light according to programmed, using Arduino software, categories of high (red), medium (green), and low (blue).

CASING

How the thermal flashlight casing is designed has implications for how the thermal flashlight can be used. We used a firelog, 18 inches in length, 2 inches in diameter, and 2 pounds in weight, as the (base) for our thermal flashlight. The heat sensor and temperature output light were wired to a breadboard which was attached to one end of the log (see Figure 1), and with the battery pack and the circuit board were attached to the sides of the log. The electronics were protected using part of a 2L pop bottle, which was held in place by screws (see Figure 2). The transparent pop bottle was made opaque with duct tape to provide a directionality of the temperature reading light. Finally, our duct tape covering was painted with pink hearts to disrupt the any masculine interpretations of the design (Van Ooost, 2003) (see Figure 3). This design proved to be very useful in our fieldwork because of the ability to measure temperature ranges at much farther reach than if we used an alternative casing.

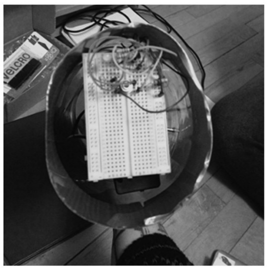


Figure 1

Figure 2

Figure 3

TEMPERATURE CALIBRATION

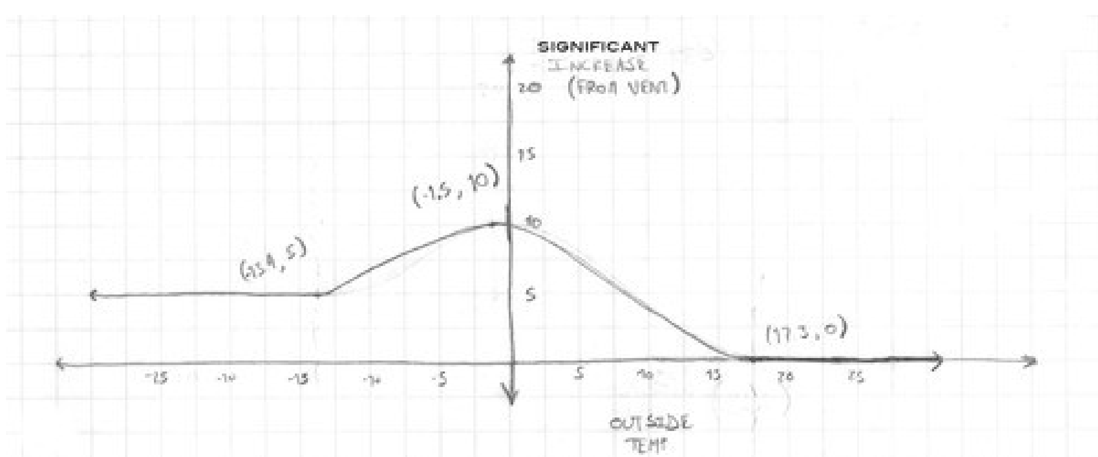
The red (high) setting, which served as a indicator of a hot spot, was operationalized using the following equation: hot spot = $-.03508(\text{Outside Temperature} + 1.5)^2 + 10$

This equation was used because we wanted to use our thermal flashlight to locate outdoor spaces which offered a significant increase in temperature. That is, we would be using it to measure *changes* in temperature, rather than just measure a constant. As such, we intended to calibrate our thermal flashlight depending on the current ambient temperature and measure significant temperatures increases above that. However, we recognized that depending on the current temperature, heat vents, or outdoor shelters, might not offer a constant increase in temperature—i.e. the same heat vent would be unlikely to increase the temperature by 10 C in both 0 C and -10 C weather. We therefore had to anticipate what possible increase in temperature could be offered by a hot spot that would also be a significant increase in temperature. We developed a function to operationalize this idea.

Our function is based on climate statistics and previous fieldwork. We determined that a hotspot would be designated according to a significant increase in temperature as it is possible within the bounds of daily average temperatures in St. John's during the month of December. Since temperatures fluctuate commonly in St. John's, we had to consider a wide range of temperature changes. We thus developed the following piecewise function, where OT is the outside temperature, and SI is a significant increase.

$$\begin{cases} \text{IF } OT \leq -13.4^{\circ}C & \Rightarrow \quad SI = OT + 5^{\circ}C \\ \text{IF } -13.4 < OT < 17.3 & \Rightarrow \quad SI = -0.035308\,(OT + 1.5)^2 + 10 \\ \text{IF } OT \geq 17.3 & \Rightarrow \quad SI = 0 \end{cases}$$

A hotspot would thereby be designated by any area offering a temperature increase at or above the 'significant increase.' The sub-functions are derived from the assumptions that (1) below the average extreme minimum temperature of -13.4 C, a significant increase in temperature would likely be no more than 5 C, that (2) any space which offers a 10 C increase when the ambient temperature is equal to the average daily temperature of -1.5 C is worth documenting, but the increase offered by this space will likely be less as the outside temperature is farther from -1.5 C, and that (3) no significant increase in temperatures is likely above the extreme maximum temperature of 17.3 C. This formula can be visualized using the following graph:



Accordingly, we would measure the outdoor temperature, use the formula to determine what significant increase in temperature would designate a hotspot on that given day and thereby calibrate our thermal flashlight according to the following:

$$\begin{cases} \text{IF } OT \leq -13.4^{\circ}C & \Rightarrow SI = OT + 5^{\circ}C \\ \text{IF } -13.4 < OT < 17.3 & \Rightarrow SI = -0.035308(-OT + 1.5)^2 + 10 \\ \text{IF } OT \geq 17.3 & \Rightarrow SI = 0 \end{cases}$$

Exact temperature calibrations can be found in the Field Notes Appendix.

THE SPECTACLE

Data collection and field work was done as a group around the Churchill Square area. Because were seekers of heat, we developed an urban-lumberjack motif. Our flashlight casing was constructed a firelog as a base (see Figure 4), and we wore urban-lumberjack costumes (see Figure 5). Because most of our field work was at night, there was often no other people in the space to incite a spectacle-like reaction. While doing daytime field work, we garnered little significant reaction from other Churchill Square patrons, who mostly averted their eyes and walked on. We did however receive free fries from the Ziggy Peelgood's Truck, which were measured as *hot* (See Figure 6).

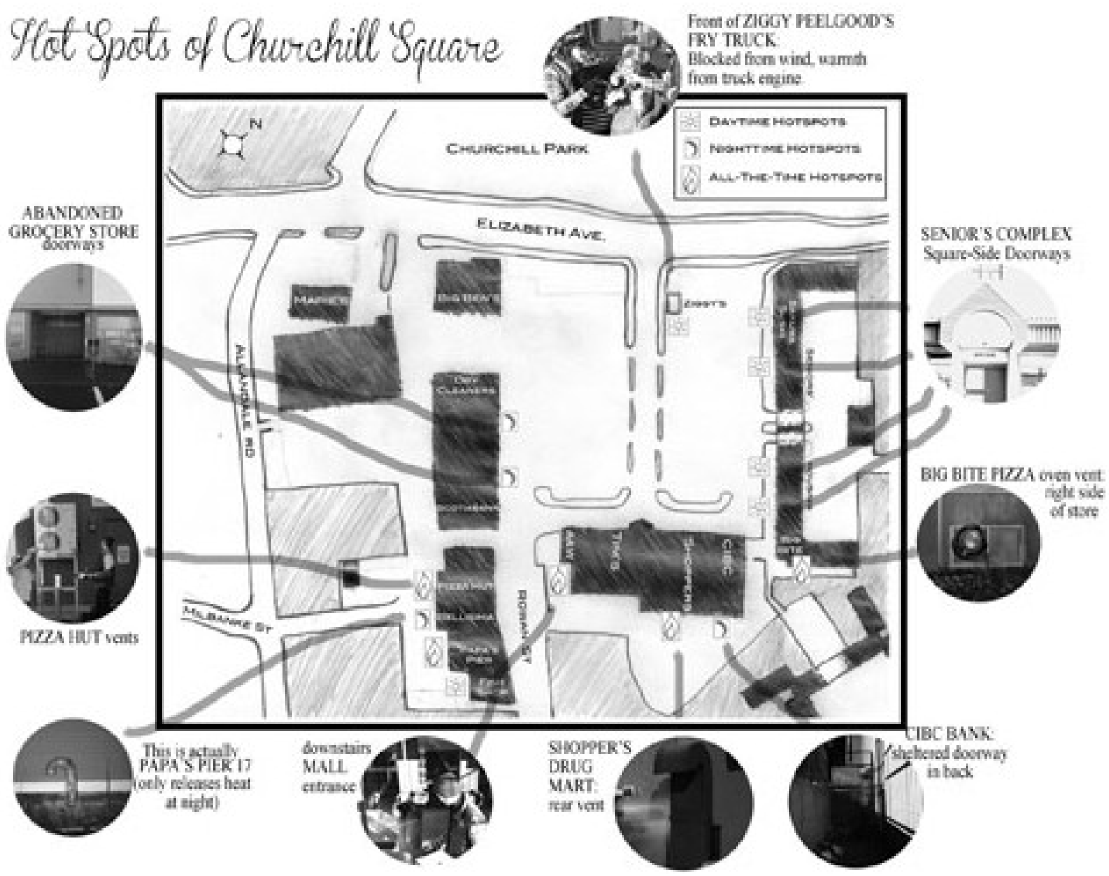
Figure 4

Figure 5

Figure 6

FINDINGS

Hotspots were located and test both during the day and night, categorized as such and mapped.



DATA DISSEMINATION

Our maps were printed into a zine with the purpose of our project explained on the front (see Figure 7) and our methodology briefly outlined on the back (see Figure 8). These zines were distributed to interested restaurant patrons in Churchill Square and to clients of a nearby university free-ride service, were left in a newspaper stand in Big Ben's pub, scanned and put on facebook, given to residents in a nearby apartment building, and discreetly placed in a visitor's information pamphlet stand inside the Churchill Square mall (see Figure 9).

Figure 7

Figure 8

Figure 9

Two public research notes were made on http://publiclab.org One was the map, the zine, and the project in general. The second was a detailed account of how we developed the temperature-calibration equation.

LIMITATIONS OF THE PROJECT

LACK OF DATA VISUALIZATION

A great useful feature of the thermal flashlight is its ability to create data visualization wherein the temperature changes are able to be painted onto the surface of the measured area. We were able to produce such an image (see Figure 10) during our test-run period. These original thermal camera test shots were produced in a dark area. We were unable to reproduce such conditions in the field, and all the spots that were determined as hotspots were highly lit. The data in the field did not translate into the photographs. For example, our picture of the vent below the *Belissimo's* only showed green when we had red readings around the vent (see Figure 11). Other pictures showed large outside areas as red because of the light input, which could read as hot (see Figure 12). We tried to control for these light sources by first using a binder (see Figure 13), then constructing and using a large cardboard light-blocker. However, the hot spots were often lit by two or more light sources. We also recognize that these limitations were in part due to our lack of mastery of photography technology in the limited time we had access to our borrowed NikonD700.


Figure 10


Figure 11


Figure 12


Figure 13

Other environmental factors limited our use of the camera as well. Heavy rain deterred us doing field visits as we were borrowing an expensive piece of camera equipment for which Juls had signed liability. As well, strong winds would shake the camera during long exposures and render the pictures blurry. Finally, we had to return the camera before the completion of the project.

However, we found that when our site visits became focused on collecting data (identifying and mapping hot spots) rather than photograph production, our data was quicker to obtain and as well richer. We were able to quickly map large areas. We were also able to finally collect daytime data, producing an important dimension to the project.

OPERATIONALIZATION OF TEMPERATURE

The temperature operationalization limits were accidentally taken from two different month columns, which no one realized until today. However, outside temperatures fell into the limits of our equation parameters, and the equation was still able to easily be used. The validity of the equation, however, in light of this error, is under current review.

NOTES ON FEMINIST TECHNOLOGIES

Our technology and its findings are feminist because they do not seek to be technological fixes. For instance, in doing this project we found panhandlers/homeless people at the square. However, we do not see our project/ our its finding of locating hot spots as a solution to these social issues. Yes, the spots may provide a safer warmer spaces for these populations of the use them. However, it is not the solution. Solutions can and should be be produced by the people for whom the solutions are for.

The findings of our project is feminist in the sense that it does not stipulate who or how the hotspots that we have identified might be used. In doing so it aligns with the feminist tenets of democratic/participatory use of technology and its findings. We acknowledge that there are diverse ‘publics’ out there who may have better ideas of how to use these hotspots depending on their context. Thus, the broader implications of the technology and the hot spots identified involves the people who will use them.

As feminist and urban historians have pointed to us, public urban spaces have never been fully inclusive despite their publicness in the sense people having unrestricted access. For instance, in the greek city states, public spaces- called Agora; meaning ‘gathering place’ were the preserve of rich educated males. (Graham & Aurigi 1997; Mitchell 1996). While such exclusivity premised on race, gender and class may not play out explicitly in urban public spaces today, it is important to note some people may be excluded from using these spaces (i.e panhandlers for home these spaces characterize their daily activities) as a result of geographical factors (low temperature). The use of the hotspots by such a population works against excluding them from public outdoor activities in the winter. The project and its findings are feminist in the sense that they seek to achieve non-exclusionary public spaces.

LOOKING TO THE FUTURE

This project is a visual re-imagining of Churchill Square by rendering visible invisible thermal infrastructure. However, in the field, this re-imaging is difficult in light of frequent surveillance and private property signage (see Figure 13). The researchers foresee difficulties in overcoming this barrier, and recommend further research in this area. One idea is a community mapping of such signage, as well as a critical discourse analysis of the sign imagery and text. Furthermore, due to the failures of the urban lumberjack motif, the researchers propose a mummers motif (see Figure 14) for further data collection spectacle. The thermal flashlight could be affixed to an ugly stick (see Figure 15). The purpose of this would be to evoke Newfoundland traditional outport imagery as part of the reclamation of the traditional Newfoundland commons land allocation. Furthermore, mummering serves a symbol for the traditional outport disruption of the public and private.