Weather Research project in Quebec: Using machine learning and social narratives from the past and the present to explore changes in vulnerability and resilience over time for weather events

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Abstract:
Funded by FRQ Audace Grant:
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Does a disruptive weather event necessarily imply an extreme weather event? No: sometimes, an ill-timed few centimeters of snow can create more havoc than a massive storm. But what makes an event disruptive? Currently there is definite answer to this question; in general, we know that an event is disruptive only after the disruption has occurred and is being discussed. Ultimately, what makes a weather event disruptive depends on social responses: whether, under these specific circumstances, we are vulnerable or resilient in the face of the event. This can only be grasped, understood, and ultimately predicted by combining social narratives and meteorological considerations.

To achieve this goal, we aim to determine what has made events disruptive in the past (a century ago) and in the present (in the last decade) and how social changes influenced vulnerability and resilience. This breaks with existing paradigms that disruptive events are meteorologically extreme events; instead, disruptive events have an inherently social dimension.

For both past and present, we will use a combination of weather records and of social commentary (from newspaper articles to tweets) to both determine the meteorological intensity of that event as well as the magnitude and type of its impacts. Comparisons between the two sets in the past and in the present will help us identify what social aspects make us more vulnerable or resilient to a particular outcome of a weather event than another, and how those have changed over time. This will allow us to make predictions on what type of weather event may become more impactful in the future considering current societal and climatic changes.

A key aspect will be the use of artificial intelligence, nuanced by social science insights, to detect patterns in the huge dataset of commentaries and weather information that will help reveal the sources of our vulnerability to specific types of events. For these reasons, our team has expertise in meteorology, public perceptions and technical applications, and artificial intelligence.

About the author:

Gordon Burr is a graduate of McGill University in history and Information Studies. Retired as an archivist in 2017, Burr teaches in McGill's School of Information Studies as an adjunct professor and currently serves as the Chair of the Professional Development Committee of the Canadian National Archival Appraisal Board (NAAB). He has been active in the DRAW (Data Research: Archives Weather) project to enable the capture of historical weather data to assist in climate change research since 2015. His areas of research interest are related to online participatory archives, archival outreach, and the engagement of more communities with archival sources utilizing archival literacy.