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MANILA25: SIGIR 2025 Workshop on Information Retrieval for Climate Impact

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Abstract

The MANILA25 workshop is aimed at collaborative agenda setting around the general area of information retrieval for climate impact in general and around adaptation tracking in particular. To this end, the workshop starts by creating a shared understanding of the problem space through invited talks around information needs in climate impact, search and analysis of climate impact literature, adaptation tracking, and resources. It then brings in different perspectives on the four topics through a number of brief "flash" presentations by participants in the workshop. Then, the participants will work to co-develop a research agenda in a small-scale, highly interactive setting.

CCS Concepts

• **Information systems** → **Environment-specific retrieval**.

Keywords

Climate impact, Systematic reviews, Adaptation tracking

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1 Motivation for the Workshop

On the day that we submit this proposal, 2024 is confirmed to be the warmest year on record globally, and the first calendar year that the average global temperature exceeded 1.5°C above its pre-industrial level.[1] Global temperatures in 2024, exceeding historical records, coincided with unprecedented levels of precipitation. From Kathmandu, to Dubai, to Rio Grande do Sul, to the Southern Appalachians, 2024 witnessed a significant increase in the frequency and severity of devastating flood events globally. Of the 16 floods studied by the World Weather Attribution initiative, 15 exhibited a clear link to rainfall exacerbated by climate change [8].

[1] https://climate.copernicus.eu/copernicus-2024-first-year-exceed-15degc-above-pre-industrial-level

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Climate change constitutes a pervasive global phenomenon with profound implications for all aspects of society. The empirical evidence base documenting observed climate impacts is rapidly expanding, alongside a concomitant exponential growth in the broader climate change literature. To effectively synthesize this body of knowledge, systematic reviews and systematic maps offer a rigorous framework for identifying, describing, and synthesizing evidence [11]. These methodologies prioritize transparency, strive for comprehensiveness, and aim to minimize inherent biases [1].

The Intergovernmental Panel on Climate Change (IPCC), the United Nations body mandated to assess the scientific basis of climate change [1], conducts evidence-based assessments of observed climate change impacts. IPCC Working Group II focuses on evaluating the impacts, adaptation needs, and vulnerabilities of climate change across diverse systems. This includes examining impacts on ecosystems, biodiversity, and human societies, considering their vulnerabilities, adaptive capacities, and limitations at local, regional, and global scales [6]. Working Group II explores pathways towards a sustainable future for all, emphasizing the need for equitable and integrated approaches to climate change mitigation and adaptation strategies.

1.1 Appropriateness to SIGIR

The exponential growth in peer-reviewed scientific publications on climate change is pushing manual expert assessments to their limits [1, 2, 7]. Fully using the available knowledge on emerging climate change impacts is key to informing global policy processes as well as regional and local risk assessments and on-the-ground action on climate adaptation [9].

While global policy process may be served well with literature assessments presenting results aggregated on the level of continents or world regions, informing climate adaptation typically requires more highly localized and contextualized information on climate impacts [3]. Tracking the effectiveness and progress of adaptation actions has proven difficult [10] – any attempt to track adaptation progress will need to be capable of rapidly handling large and varied collections of documents, while remaining sensitive to highly localized and contextualized information.

1.2 Complementarity to the Main SIGIR 2025 Topics

Information retrieval (IR) for climate impact naturally connects to main SIGIR 2025 topics such as "Search and Ranking," "System, Efficiency and Scalability," "Natural Language Processing for IR," and "Datasets, Benchmarks, and Evaluation."

The MANILA25 workshop complements the main SIGIR 2025 topics with its focus on climate impact and on the work carried out

by the IPCC Working Group II to develop systematic reviews of the (scientific) climate literature and to use the available knowledge on emerging climate change impacts to inform global policy processes as well as regional and local risk assessments and on-the-ground action on climate adaptation [9].

2 Theme and Purpose

The primary theme of the workshop is IR for climate impact. The purpose of the workshop is to provide a venue for discussing, compiling, and updating a research agenda for IR for climate impact. We will bring together researchers, applied researchers, and practitioners in climate impact, information retrieval, information extraction, and systematic reviews to gain a broader understanding of the information retrieval and extraction challenges faced in climate impact.

We aim to foster collaboration, discussion, and create broader awareness in the IR community of the unique challenges posed by the climate impact domain.

2.1 Scope

The workshop relates to all aspects of IR for climate impact. Research challenges frequently encountered in this domain include:

- Understanding information needs concerning climate impacts, adaptation, and vulnerabilities;
- Current methodologies used for large-scale, potentially dynamic systematic reviews using white literature (in climate science) as well as grey literature;
- Resources in support of IR for climate impact, including test collections, repositories, and technical tools; and
- Successes and failures in the uptake and usage of IR for climate impact.

2.2 Special Theme: Tracking Adaptation

Last year's edition of this workshop focused on identifying the challenges of developing and using scalable systematic review methodologies for aggregating scientific information on climate and climate change to help inform policy-making.

This year, we build on insights gained last year to add a focus on adaptation strategies, which is necessitated by the escalating climate crisis. Here, adaptation refers to "[t]he process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities" [5]. Accordingly, the effective tracking of adaptation initiatives assumes paramount importance. Comprehensive overviews of adaptation efforts facilitate valuable knowledge exchange among communities, enabling informed resource allocation and prioritization of critical needs.

Recent research on generative approaches to information retrieval and natural language processing has opened up avenues to jointly model and optimize complex retrieval-plus-downstream-task pipelines. As part of the special theme, we will examine the potential of sequence-to-sequence learning approaches for adaptation tracking. We will also discuss the challenges and limitations of these approaches and how they can be overcome.

In addition to having an invited speaker who is an expert on adaptation tracking in this area for MANILA25, we will solicit extended abstracts from academia, industry, governmental organizations, and NGO's focused on this area.

3 Format

MANILA25 will be held as a **half-day workshop**. The emphasis will be on agenda setting, not simply a mini-conference but a dynamic sharing of ideas. The workshop will be organized along four areas of interest: (i) information needs in climate impact; (ii) search and analysis of formal and informal literature for climate impact; (iii) adaptation tracking; and (iv) resources to support IR for climate impact.

We envisage the following format to encourage maximum discussion and interaction:

- The workshop will start with an introduction and then four invited talks about the four areas of interest listed above, each of 10 minutes, delivered by colleagues whose work is centered around issues related to these topics (duration: 45 minutes).
- This will be followed by 3–5 minute lightning talks where participants present relevant recent or ongoing work. To this end we will publish a call for extended abstracts of 2–4 pages (duration: 45 minutes).
- These presentations will be followed by a breakout session aimed at formulating more in-depth agendas for each of the four areas, as well as identifying potential tensions and/or dependencies between them (duration: 75 minutes).
- The participants will then get back together to report, and conclude with specific and actionable research agendas for each of the four areas of interest (duration: 15 minutes).

We plan to assemble the summaries of the discussions and the proposed research agendas in a position paper for SIGIR Forum (similar to [4]). We will also encourage our participants (and the broader community) to use the output of the workshop as input for research proposals, grants, and discussions with policy makers.

4 Distinction from Main Conference Topics

As explained in Section 1.2, MANILA25 connects well to a range of familiar SIGIR topics. It brings complementarity in several important ways: (i) the domain – despite their global importance, climate and climate impact are not topics that feature on the main conference agenda; (ii) the community – there is a large community of stakeholders (researchers and practitioners) who are not regular participants at SIGIR but whose perspectives hold significant influence; and (iii) the success criteria – while the SIGIR community's standard metrics and evaluation setups remain applicable in the context of IR for climate impact, the closeness to policy-making and decision-making, and the heterogeneity of potentially relevant materials (ranging from scientific literature to grey literature to indigenous knowledge) come with non-traditional demands for transparency, credibility, and provenance.

5 Program Committee Members

Our program committee will consist of a mixture of colleagues who work on climate impact, systematic reviews, mining adaptations, and information retrieval and information extraction for climate impact.

- Alaa Al Khourdajie (Imperial College London; International Institute for Applied System Analysis)
- Azra Alikadić (IPCC WGII TSU)
- Yugdeep Bangar (IPCC WGII TSU)
- Max Callaghan (Potsdam Institute for Climate Impact Research)
- Renato Calzone (Ilustre Lab, Curaçao)
- Jenberia Getnet Demil (University of Oulu)
- Lesley Frew (Old Dominion University)
- Sanaa Hobeichi (University of News South Wales)
- Ana Lucic (University of Amsterdam)
- Tanwi Mallick (Argonne National Laboratory)
- Veruska Muccione (University Zürich)
- Barbara Pernici (Politecnico di Milano)
- Thilina Rajapakse (University of Amsterdam)
- Harrisen Scells (University of Tübingen)
- Anne Sietsma (Climate Policy Radar)
- Damiano Spina (Royal Melbourne Institute of Technology)
- Andrew Trotman (University of Otago)
- Yangxinyu Xie (University of Pennsylvania)
- Jakub Zavrel (Zeta Alpha)
- Min Zhang (Tsinghua University)

6 Expected Target Audience

The MANILA25 workshop brings together researchers and practitioners from academia, industry, and NGO's to identify and discuss core research problems in information retrieval and information extraction for climate impact in the context of the IPCC Working Group II. The workshop aims to foster community building and agenda setting by bringing researchers from different backgrounds together in a way that rarely happens.

Similar to MANILA24, attendees are expected to include:

- Early-, mid-, and late-career researchers and practitioners in IR; and
- Researchers and practitioners in technology for climate impact in general, and information retrieval and extraction for climate impact and adaptation tracking in particular.

We will advertise our workshop through academic mailing lists and social media channels. We will work with our contacts in the IPCC community to advertise in relevant internal organizational mailing lists.

7 Expected Outcomes

The MANILA25 workshop targets several outcomes. First, we will, collaboratively and informed by presentations and discussions held during the workshop, update the agenda for IR for climate change impacts drawn up after the MANILA24 workshop [4]. In particular, we will seek to add materials and challenges related to adaptation tracking. Second, we aim to set up post-workshop initiatives that help to foster a community of researchers and practitioners around the topic of IR for climate change impacts. Options include joint creation of research artifacts, regular blog posts, meetups, and check-ins.

8 Conclusion

Let's return to the opening statement in Section 1 that the world has failed to avoid crossing the 1.5°C threshold set by governments to avert the worst impacts of global warming. This is a new reality. However, "[f]or the time being, it's just one metric and one year, but researchers say that it nonetheless serves as a stark reminder that the world is moving into dangerous territory — perhaps more quickly than previously thought" [12]. MANILA25 aims to foster a community of researchers and practitioners that contribute to effective information retrieval solutions in support of research and decision-making to help address the reality of climate impact.

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