Estimation and Visualization of the Carbon Footprint of Conference Travels

Duration: 4-6 months
Team: Loki (Inria Lille – Nord Europe & CRIStAL)
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Description
We are in a climate emergency. To avoid global temperatures to rise beyond a critical level, we need to drastically lower our carbon footprint. This problem has been heavily documented by the scientific community for decades, leading to three major reports written by the IPCC (Intergovernmental Panel on Climate Change) in 2022 [1]. Concrete means exist to act, like minimizing plane travels, but research communities keep organising worldwide events that hardly adapt to this factor [2], [3]. Meeting physically provides advantages over online events such as networking during the conference but also in other contexts (lunches, social events), and being fully committed to the conference instead of viewing online videos. In-person events are essential to foster collaborations between scientists, but they must adapt to minimize their carbon footprint.

This internship focuses on designing and implementing an interactive tool that would estimate the travel-related carbon footprint of scientific conferences or large conventions (such as SigGraph, CES, CHI). The goal is to support decision makers in choosing appropriate locations while considering the ecological impact. The tool will visualise estimated carbon costs of travels based on specific destinations using APIs such as Google Flights [4] or Flight Stats [5]. It should visualise data uncertainty efficiently to avoid misinterpretation of the data [6], and provide tools for controlling various factors (e.g., flight time, capacity, attractiveness of the venue, …).

Objectives
- Fetch travel data (primary focus on planes) using existing APIs to efficiently find travels arriving at a given destination
- Estimate the carbon footprint of the travel based on their time schedule and the number of attendees
- Design and implement a tool to interactively choose destinations and visualise incoming flights
- Visualise uncertainty with existing or novel methods
- (optional) improve the type and number of controllable factors

Candidate
The candidate must show interest in Human-Computer Interaction and demonstrate knowledge and skills in data visualization. They need very strong programming skills. Previous experience in fetching data from existing web APIs would be a plus. They will have the opportunity to manipulate and apply related work on data visualization and uncertainty visualization.

References