

CROWD4SDG: Crowdsourcing for sustainable developments goals

CROWD4SDG: Crowdsourcing per gli obiettivi di sviluppo sostenibile

Barbara Pernici

Abstract While a set of measurable indicators has been defined for Sustainable Development Goals (SDG), in some cases the collection of data is problematic. The CROWD4SDG project proposes to support this data collection using Citizen Science. The project is based on three pillars: research for Citizen Science based on new IT tools, research by Citizen Science to facilitate the generation of bottom-up projects, and research on Citizen Science for the development of high-quality Citizen Science projects identifying best practices. The CROWD4SDG project will focus on a set of SDGs, centering on Climate action goals, in particular targeting climate hazards, in combination with SDGs on gender equality, sustainable cities, and rights. The project will exploit also the research results obtained in the E2mC project, which developed an approach to information extraction from social media based on geographic information management, AI, and crowdsourcing in the context of emergency situations after natural disasters.

Abstract *Mentre è stata definita una serie di indicatori misurabili per gli Obiettivi di sviluppo sostenibile (SDG), la raccolta dei dati per valutare questi indicatori è in alcuni casi problematica. Il progetto CROWD4SDG propone di supportare questa raccolta di dati utilizzando la Citizen Science o Scienza dei cittadini. Il progetto CROWD4SDG si basa su tre pilastri: ricerca per la Citizen Science basata sullo sviluppo di nuovi strumenti IT, ricerca con la Citizen Science per facilitare la generazione di progetti bottom-up e ricerca su Citizen Science per lo sviluppo di progetti di Citizen Science di alta qualità con l'identificazione di best-practice nel settore. Il progetto si concentrerà su una serie di obiettivi di sviluppo sostenibile, incentrati sugli obiettivi per il cambiamento climatico, in combinazione con obiettivi di sviluppo sostenibile sulla uguaglianza di genere, sulle città sostenibili e sui diritti. Il progetto si baserà anche sui risultati delle ricerche del precedente progetto E2mC che ha portato allo sviluppo di un approccio per l'estrazione di informazioni dai social media basata sulla gestione delle informazioni geografiche, l'intelligenza*

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artificiale e il crowdsourcing nel contesto di situazioni di emergenza dopo catastrofi naturali.

Key words: Crowdsourcing, social media, SDG, climate change, natural disasters

1 Introduction

The 17 Sustainable Development Goals (SDG) defined by the United Nations¹ were adopted by “all United Nations Member States in 2015, as a call for action by all countries to promote prosperity while protecting the environment”. A set of Measurable indicators² has been defined in association to the SDG goals and their targets, however in some cases the collection of relevant data is problematic and further sources of data are needed. The goal of the CROWD4SDG is to propose to develop new IT tools and methodological approaches using a Citizen Science approach.

Citizen Science has been advocated as a resources for collecting information to assess SDG [4]. In fact, it can improve coverage and frequency of data collection, allow managing spatial variations across a country, and support the veracity of information. Several citizen-generated projects are emerging, and as reported by SciStarter.org, several activities in Europe address also climate issues.

In particular, CROWD4SDG will focus on SDG 13 climate action, and in particular target 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries, with the following indicators: “13.1.3 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies; 13.1.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people; 13.1.2 Number of countries with national and local disaster risk reduction strategies”. SDG 13 will be analyzed in different yearly rounds, focusing each year on a specific combination with another goal: SDG 11 Sustainable cities and communities; SDG 5 Gender equality; SDG 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels, focusing on rights.

In fact, the impact of climate change is not only limited to environmental issues but it has a deep impact on society, as discussed in detail in [2], that discusses how climate change and weather-related disasters impact on gender-based violence and discrimination and inequality.

In CROWD4SDG the goal is both to collect information to assess SDG indicators and also to collect from Citizens proposals for actionable actions to achieve SDGs.

In Section 2, we illustrate the methodological approach of CROWD4SDG; in Section 3, we illustrate the results achieved in a previous project, E2mC, combining

¹ <https://sustainabledevelopment.un.org>

² <https://unstats.un.org/sdgs/indicators/indicators-list/>

different approaches to collect first hand information in the first hours after natural disasters, and finally we conclude with open issues and future developments.

2 The Crowd4SDG approach

The project is based on three pillars:

- *Research for Citizen Science based on new IT tools.* Starting from previous research of the participants in the project, tools for organizing online communities, discussion platforms, and mining information from social media will be enhanced with AI-based modules. In particular, we will focus on facilitating the community participant interactions in large communities and in learning from crowdsourced information to improve data mining.
- *Research by Citizen Science* to facilitate the generation of bottom-up projects will start from the experience of the OpenSeventeen challenges (O17)³, to generate challenges and select interesting projects related to SDGs and guiding the selection of tools to support crowdsourced activities.
- *Research on Citizen Science* for the development of high-quality Citizen Science projects identifying best practices and developing new methodological approaches.

3 Mining social media with the support of AI and crowdsourcing

In the project, in particular in the initial phases, the focus is on climate changes and natural disasters, in particular in urban settings. In this context, the project will be based on the research results obtained in the E2mC⁴ project, using information extraction from social media based on geographic information management, AI, and crowdsourcing in the context of emergency situations after natural disasters. In E2mC, a set of tools have been developed to select and analyze information from social media or contributed through crowdsourcing tools and display them on a WebGIS interface [6], [7].

In particular, social media crawlers have been developed to select information, and in particular images relevant to a natural disaster, from social media [6], using data mining with topic extracting for Twitter posts and mining through triangulation techniques and clustering to extract keywords from one social media such as Flickr and apply them in another source, such as for instance YouTube [1]. Automatic geolocation of images is performed analyzing the text of posts with Natural Language Processing techniques and locations are disambiguated using OpenStreetMap [5]

³ <http://openseventeen.org/>

⁴ <https://www.e2mc-project.eu/>

and the CIME disambiguation algorithm developed in the project [7]. Kernel density analysis can be then performed to define hot spots for an event [9]. In addition to data mining techniques, evaluation of the relevance selected images and the precision of the geolocation can be assessed using crowdsourcing, in conjunction with crowd information evaluation techniques [8].

Starting from the E2mC results, the CROWD4EMS project will emphasize AI techniques, to improve crowd results evaluation [3] and for learning new keywords from crowdsourcing results and for improving the precision of the geolocation of posted images, using also image analysis techniques to extract relevant features to identify useful images.

4 Open challenges and future work

Several research challenges are open in providing AI enhanced tools to Citizen Science projects. In addition to tools availability and stability, it is important to provide a basis for the agile deployment of an environment in case of new emergency events, tailoring the tools to the specific needs of each situation in a very short time.

We will further enhance existing tools with AI and ML mechanisms, in particular to benefit from the information that can be gathered from the crowdsourcing activities. However, we will also need to study some of the issues emerging from the use of such tools in particular in the case of vulnerable populations, following and advancing the guidelines provided in [10], which discusses the use of AI in those contexts.

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