Weather and environmental forecasts tailored to you

October 11 2013

Credit: AI-generated image (disclaimer)

Want to know what the weather will be like tomorrow? A simple internet search will provide a forecast, or, more likely, many forecasts. How can you be sure which one is accurate? And what if you also want to know the pollen count because you are allergic, or pollution levels because you worry about your child's asthma? EU-funded researchers are answering

those questions with an innovative online platform providing easy access to comprehensive, accurate, localised and personalised environmental and meteorological information.

'Meteorological information is not only generated in abundance in Europe, but is also to a major extent available on the web. In this sense, it is easy to access this information,' explains Professor Leo Wanner of the Catalan Institute of Research and Advanced Studies and Natural Language Processing Group at Pompeu Fabra University in Barcelona, Spain.

'However, the question of quality is unresolved for any user,' he continues. 'Thus, if one website forecasts the temperature to reach 30 oC the next day in Barcelona, another one 28 C and the third 32 C, two or all three of them must be wrong.'

But the accuracy of meteorological information on the web is not the only issue. For people concerned about more than just the weather - atmospheric dust, chemicals and CO2 emissions, for example, or the count of different types of pollen that they may be allergic to - the challenge is even greater.

'Environmental information is more difficult to access. Public administrations might have access to it, in accordance with environmental legislation, but for businesses and citizens it is often a challenge to find the corresponding data for the geographical area of their interest,' Prof. Wanner says.

In other words, most web-services follow a 'same information for all' philosophy, offering all the information that may be relevant to any user, but not one person in particular. And some offer information relevant to only a default user, almost always a healthy citizen. In the first case the user is expected to be able and willing to browse through all the available

information and decide which is relevant to them, and, in the second case, a user with specific needs will often not encounter the information that they require.

Supported by almost EUR 2.8 million in research funding from the European Commission, a consortium of universities and research institutes in five EU countries have risen to the challenge. Coordinated by Prof. Wanner, the team has developed Europe's most advanced intelligent personalised environmental and meteorological information service aimed at the needs of citizens, companies and public administrations.

Developed over the course of three years in the 'Personalised environmental service configuration and delivery orchestration' (PESCADO) project, the web-based system is designed to provide information specifically relevant to each individual user depending on their profile, preferences and location.

Meaningful data at the click of a button

'The platform communicates with the users to obtain a clear idea of their needs and to understand how it can support them in their decision making; it searches for relevant high-quality meteorological and environmental web sources, merging data from different sources; it interprets the data in the context of the needs of the user; selects the content that it considers important for the user; and generates a textual and graphical bulletin for the user in the language of their preference,' Prof. Wanner explains.

In effect, the PESCADO platform generates a personalised weather and environmental report at the click of a button. To achieve this, the researchers combined cutting-edge technologies in domain-dependent search, uncertainty and confidence metrics, image content extraction

techniques, fuzzy reasoning, and multimodal and multilingual information-generation techniques into a service-oriented architecture.

The backbone of the PESCADO system is a knowledge base that contains all information necessary for intelligent decision support related to environmental data, such as environmental background knowledge, data extracted from environmental services on the web, and user profiles. Individual tasks, such as extracting data, assessing its quality and generating the bulletin for users, are carried out by one or more web-based services.

'In each of the tasks we addressed, a number of challenges had to be met,' the project coordinator explains. 'For instance, the extraction of content from image material such as weather maps has been a major challenge. The development of metrics for the assessment of the quality of the given data, and extrapolation of air pollutant concentrations measured at a specific spot into the surrounding area and taking into account the morphology of the landscape was another. Reasoning over environmental data and the needs of the user, as well as the development of a fast, high-quality multilingual text generator, were also big hurdles we had to overcome.'

In the case of environmental data in particular, there is also the issue of comprehension.

'For example, what does it mean that the ozone concentration reached 170 micrograms per cubic metre for me personally? Especially for people with health problems or allergies who are sensitive to elevated air pollution or elevated pollen concentrations, it is not clear how they should interpret the concentrations they find on the web,' Prof. Wanner notes.

With a clear user interface and personalised and localised output, the

PESCADO system is valuable not only for helping individual citizens plan their daily activities, but also for public administrations looking to keep pollution levels under control and companies trying to comply with environmental legislation.

'European legislation demands that member states and regional governments comprehensively inform the citizens about local environmental conditions in terms people understand. PESCADO is an instrument that could greatly contribute to the implementation of this legislation,' Prof. Wanner points out.

The prototype system currently covers Finland and is available in the English, Finnish and Swedish languages.

Having elicited interest from different public administrations across Europe, Prof. Wanner says the team's goal is now to seek further funding to expand the area of geographical coverage, incorporate additional languages and add more domains such as water-quality data and traffic conditions.

More information: Link to project on CORDIS:

- FP7 on CORDIS - cordis.europa.eu/fp7/home_en.html
- PESCADO project factsheet on CORDIS - cordis.europa.eu/projects/rcn/93834_en.html

Provided by CORDIS