Keywords:
#AI, #plant #species, #identification, #api, #biodiversity, #mobile, #citizenobservatory, #EOSCinPractice

Supporting cross-disciplinary research in natural sciences

An EOSC in Practice Story on Pl@ntNET, a Citizen Observatory and AI-based plant identification solution.

The project involved

Cos4Cloud (Co-designing Citizen Observatories Services for the EOS-Cloud) is a European Horizon 2020 project funded under Grant Agreement no 863463. The project aims at boosting citizen science technologies. In particular, it addresses one of the biggest challenges in citizen science: the **quality of data**, as well as maintaining the citizen observatories used to collect this data. Cos4Cloud is tackling these challenges by developing thirteen technological services.

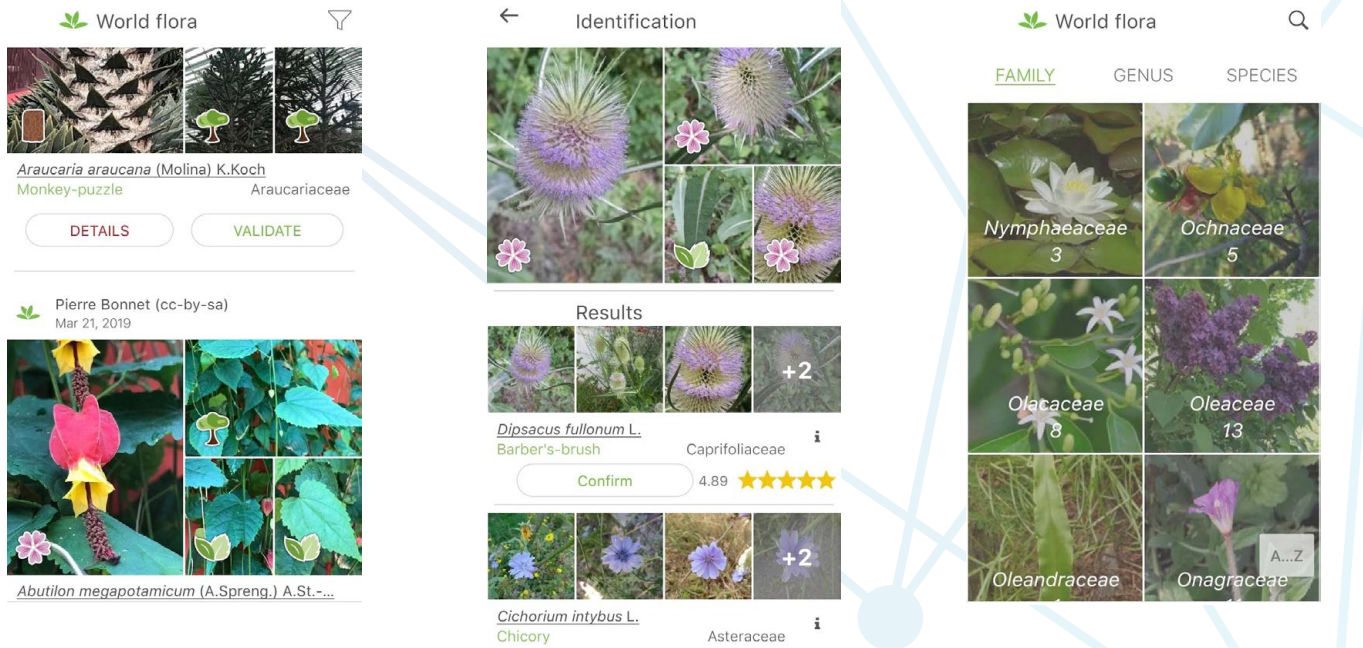
The Challenge

This story derives from a market need identified by the service provider. There are thousands of applications in the natural sciences field who were asking for an automated plant identification system within their own applications. Examples include apps that need plant identification systems because they use this information to study the properties of soil and its quality, or because they need to identify specific agricultural practices or promote biodiversity. There are different types of services that build on plant identification which is therefore horizontal to the needs of many related communities. The developers of such apps need to access plant information easily to include this in their research or commercial workflow. The challenge of providing this service mainly lies in the very high diversity of plant species to be identified and in managing the large number of queries and connected users without destabilising the system.

The solution

The proposed solution is called Pl@ntNET, a citizen observatory and AI-based Platform designed to monitor plants biodiversity and help identify plants via pictures. It is organised in different thematic and geographical floras operational via a search engine.

One of the tools developed from this service is a mobile app for final users that allows browsing plant species, seeing images and voting people's observations. In addition, Pl@ntNET has developed a visual



Pl@ntNET mobile app overview

The EOSC Future project is co-funded by the European Union Horizon Programme call INFRAEOSC-03-2020 - Grant Agreement Number 101017536

identification engine as a web service in the Cos4Cloud project framework. This web service allows citizen observatories, startups or companies to integrate Pl@ntNet's visual identification tool into their own solutions by using an API. The identification service is updated monthly based on new data produced, shared and validated by the network of registered participants. Pl@ntNet mainly concerns wild plants that have propagated spontaneously in the natural environment, but also cultivated plants of agronomic and horticultural interest. The visibility and use of this platform has accelerated since February 2013, after deployment on mobile devices. Since 2013, the number of daily users has doubled every year, reaching more than 400,000 users per day at some peaks in 2021.

The users

The user community of Pl@ntNet consists of

(1) the **citizen and citizen scientists** who are interested in identifying and knowing more about plants, and

(2) **developers** of applications and software for plant identification, gardening, biodiversity management, agroecology or other related fields.

The service provider

The solution is provided by a consortium of French research organisms piloted by Inria, the French national research institute for digital science and technology. As a technological institute, Inria supports the diversity of innovation pathways: from open source software publishing to the creation of technological startups. With its regional centres, Inria has a presence at leading research university campuses, throughout the regions of France and the country's industrial and entrepreneurial ecosystems for digital technology.

Why do I need EOSC?

Pl@ntNet identification service already existed before its publication on the EOSC Portal Catalogue and Marketplace. However, providing Pl@ntNet via EOSC has brought these benefits:

» Further visibility and credibility at European level
» Possibility to reach a new audience, i.e. European research projects and scientific community

You can Access Pl@ntNet identification service on EOSC Portal Catalogue and Marketplace here.

The impact on society

Pl@ntNet's effect on society is to facilitate the interest and participation of multiple users in science and support dissemination of results and knowledge sharing in the fields of environmental education, agroecology and gardening.

Across disciplines

The types of data that can be collected and shared via Pl@ntNet encompass various natural science fields, such as agriculture, environment and biodiversity that were in need of a plant identification service to complement their research workflows and tools.

Future developments

In its future versions, Pl@ntNet will include the possibility to identify plants from pictures where more species are depicted together, one near the other. At the moment instead the service only recognises one plant at a time. In this way it will be possible to let the service identify plants that are photographed by robots or drones, important for precision agriculture.

Sustainability for an EOSC in practice

Creating a sustainable service is one of the requirements for EOSC future development. In this specific case, the service was already created and sustained by the service provider through the following main funding sources:

» Donations are collected from the users of the service. Last year, more than €200,000 were collected via donors that spontaneously wish to support the service which is free to use. Such donations are solicited via promotional campaigns
» The research consortium hosting Pl@ntNet directly supports it financially
» Participation in European research projects is the third financial source.

The idea is to keep the current funding model. An additional lever for the overall sustainability will be given by the integration of this service with the other services that have been developed under the Cos4Cloud project.

Useful material related to this story

» Video description of P@ntNet
» Pl@ntNET FAQ list

Want to learn more about the other services being developed by **Cos4Cloud**? Read here

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