ENABLING PERIODIC DOWNSTREAM SERVICES VIA USER-FRIENDLY DATA GRABBING

GeoGrabber is a desktop tool for non-experts, periodically downloading and processing data from Sentinel sources.

The challenge

Ever since EO Copernicus Sentinel missions became operational, we have entered a new age of possibilities, an age of open development of downstream services at low cost for the most diverse application fields, such as environmental monitoring, climate change, anomaly detection and emergency prevention, preparedness and management.

Nevertheless, the feasibility of implementing a downstream service by directly using the currently available facilities offered by ESA SciHub and tools such as SNAP still require the engagement of remote sensing experts. From querying the sources, to evaluating and downloading the images, and – last but not least – to processing those images in order to generate semantic products, an expert figure is required. This statement of facts is an obstacle to the widespread diffusion of remote sensing technologies amongst civil society. Public administrations tend to regard this technology as too complex and expensive, eventually ignoring it and hosting a gap between available data and territorial challenges.

The space based solution

The reasons outlined above motivate our proposal for developing an easy-to-use abling desktop tool of downstream services that can be customised by non-experts to periodically generate a variety of remote sensing products. This is possible through transparent and periodic querying Sentinel sources through SciHub APIs and by providing facilities for the integrated client-side auto-computation of indicators on the downloaded data, the periodic feature being an original aspect with respect to other ESA DIAS such as Sentinel Playground or even Google Earth Engine.

To this end, a multidisciplinary team has been working, together with end users, on the definition of requirements and architecture of GeoGrabber, a user-centred desktop tool. Running on common computers, it offers simple user interaction schemes, mainly based on selecting facilities by means of a user-experience-designed interface. It lets the user define a Region Of Interest (ROI) by specifying a toponym, a bounding box, or a vector file. Over the selected ROI, the user can choose one or more products he/she wants to generate (i.e. flooded areas, wildfires, vegetation vigor indicators), selecting them from the menu, possibly specifying the sensing date of the source data, the tolerance on the cloud coverage, and the option for the roduct to be generated periodically, at each sensor revisiting time. In this last case, once activated, the task runs automatically in the background, with no need for further user intervention, and periodically downloads and processes the desired Sentinel data from either S1 or S2, scheduling periodic tasks.

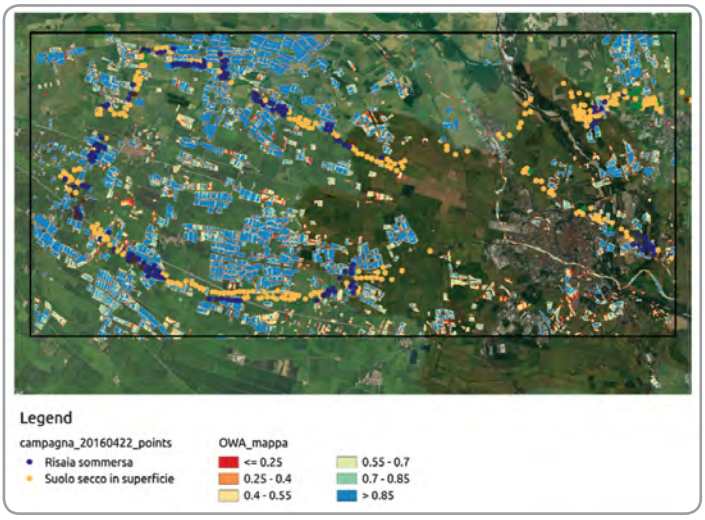
GeoGrabber's graphic interface. Through a user-friendly environment, it enables any user to implement customised down-stream services of Sentinel data.

Benefits to Citizens

Since GeoGrabber runs on a common PC with a Java Virtual Machine and an R interpreter, it can be easily installed, and at little expense – thus, being affordable for the budget of any public administration. Its design is such that any non-expert from public

Thematic Area	Region of Application	Sentinel mission used	Copernicus Service used	Usage Maturity Level
TERRITORIAL MANAGEMENT AND URBAN PLANNING	LOMBARDY	S1 S2	–	1

local authorities could use it to check the status of the environment in the municipality, monitoring burned or flooded areas in case of natural disasters and filling the "handling gap" between data and their full exploitation. Moreover, local authorities could use it to monitor crop growth and help local farmers, providing the flood status of rice fields, eventually improving the economy of rural areas by empowering the citizens with data tailored to their specific needs. Concerning existing alternatives, it can feasibly help to save on costs and make monitoring processes – currently mainly based on surveys – more efficient. The exploitation of remote-sensing-derived information for the discovery of possible anomaly-affected areas can drive in situ survey directly where needed and improve the efficiency and effectiveness of the administrative procedures by saving on costs.



Map showing rice fields flood status (processed through fuzzy reasoning applying OWA) on a Sentinel-2A image. Downloaded and automatically processed by GeoGrabber.

"Change the vision that citizens have of remote sensing, by making it less remote and more sensitive."

CNR IREA and CNR IDPA

Outlook to the future

GeoGrabber is an open software in its early release, funded by STRESS project (started in May 2017). It will be extended with other features, such as the computation of different products and the downloading of Sentinel data from other sources, as they become operational.

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ABOUT COPERNICUS4REGIONS

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The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains.

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