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HYPSO WEB PORTAL

Abstract

The NTNU SmallSat team launched its first research satellite, the HYPSO-1, in January 2022. HYPSO-1 is equipped with a hyperspectral imager, and its primary mission is to detect indications of phytoplankton, which can harm fish and disrupt aquatic ecosystems in oceans, coastal areas, and lakes. HYPSO-1 has acquired and downlinked over 1800 hyperspectral data cubes since its launch. Accessing remote sensing data has been available for over two decades now, but its increasing complexity and its sheer quantity make it challenging for end-users. In January 2014, the Dutch Elixir node organized a workshop titled "Jointly Designing a Data Fairport" that resulted in the formulation of the FAIR guide principles to make data Findable, Accessible, Interoperable, and Reusable. These guidelines are becoming part of the requirements for designing data products. However, accessing and analyzing remote sensing data remains challenging for many because of the multiple steps involved. Easy access to satellite data and reducing the steps for its use is essential to increase its adoption by the end-users, which for HYPSO-1 consists mainly of scientists, researchers, and analysts in marine biology, oceanography, and agriculture.

In this paper, we investigate how to design and implement a user-friendly web portal that follows the FAIR principles. We will evaluate how well some known web portals follow these principles, such as the NASA Ocean Biology DAAC, Sentinel Hub, NASA Worldview, and the EUMETSAT User Portal. Based on the evaluation and the literature, we will present the HYPSO web portal as an example of how the FAIR principle can be implemented and incorporated into a web portal. The evaluation indicated the advantages and disadvantages of each website, and the relevant advantages served as a basis for the web portal design. Focus is put on an intuitive UI design that presents the user with minimal information, but with the option to go into detail as desired. Multiple design iterations were implemented after collecting feedback in workshops with a diverse set of users including data analysts, biologists and operators, to ensure the usability of the design. Various filters allow the user to home into data acquisitions with the desired properties, these include time- and location-based filtering as well as filtering by tags. A Python package for basic data handling and generation of data products helps the user to get started. The web portal will be released to the public within 2024.