

Comprehensive ML research on geophysical applications for accelerating natural capital discoveries for the energy transition

Xcalibur Smart Mapping

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Accurate and precise data ensures an efficient exploration and a responsible and scientific management of the natural capital that is to be unlocked around the globe.

With our airborne surveys, our team of geologists and geophysicists map the surface and subsurface at country scale. Such an amount of data demands exhaustive processing and quality control. Therefore, the R&D team at Xcalibur has been researching new ML developments to enhance and extract the most out of our geophysical data to accelerate natural capital discoveries. Likewise, this team has been studying each process of the company to outline areas that could benefit from specific solutions for automation and enhancement of the results and products. Xcalibur's machine learning solutions are integral and multidisciplinary.

The R&D team identified room for improvement within the levelling during processing of the magnetic, gravimetric, and radiometric data and built a tool based on Gaussian Markov Fields calculated with Nested Laplace Approximations to extrapolate local information and level the data faster without losing geological significance. The tool has greatly reduced the time needed to process the geophysical data and assures that the interpolations preserve spatial continuity.

Using the enhanced processed data, the R&D team has focused its efforts in developing tools to make more efficient the geophysical and geological interpretation. The team is implementing convolutional models for pattern and firm segmentation to speed up and automatize feature identification including geological structures and bodies.

This tool standardized part of the interpretation that previously required meticulous hours-long work from a professional. The end goal of these improvements as well as working closely with the geoscientists to standardize data modelling is to have a better set of resources to produce favorability maps that guide country-scale natural resources exploration.

With the availability of standardized and reliable data, our team is working to implement more complex and data-hungry models such as Generative Adversarial Networks which narrow prospective areas down to maximize the chances of success.