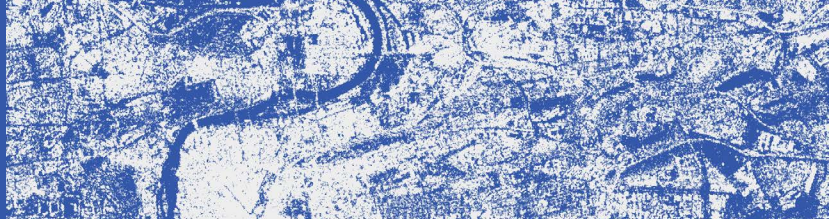

PRESS RELEASE

MARCH 2024

Embed2Scale project kicks off an ambitious geospatial data initiative

The Embed2Scale project of the Copernicus programme for enhanced Earth observation promises to revolutionise geospatial data.

The Embed2Scale project, a pioneering initiative funded by the European Commission's Horizon Europe programme and focused on revolutionising the use of geospatial data within the Copernicus Programme, has officially kicked off. The Copernicus Programme is the Earth observation component of the European Union's space programme.

The launch was announced earlier in January, at a two-day meeting at the European Union Agency for the Space Programme (EUSPA) in Prague. Set to run from 2024 to 2027, the project aims to greatly improve the way vast amounts of geospatial information are managed and used – with the help of foundation models used as data compressors.

The kickoff meeting brought together the project's partners, experts in the fields of Earth Observation, Artificial Intelligence (AI) and Data Science. In-depth discussions during the meeting focused on key aspects of the project, including advanced data compression techniques, core stack architecture, diverse datasets crucial to the initiative's success and the efficient execution of various use cases.

The coordinator of the Embed2Scale project from Martel Innovate, Dr. Angelos Alexopoulos, expressed enthusiasm about the project's potential: "The kickoff meeting marks the beginning of an exciting journey. We explored the intricacies of data compression, discussed the architecture that forms our project's core and laid the foundation for handling diverse datasets. Our collaborative spirit is strong, and we are eager to embark on this ambitious endeavour."

Leveraging embeddings for the management of vast data volumes

The Copernicus programme was launched in 2014 with the deployment of the Sentinel-1A radar satellite and the adoption by the EU of the Copernicus Regulation. The programme now sports seven Copernicus Sentinel satellites in orbit, as well as in situ sensors and numerical models – all of which deliver terabytes of free and open data daily to hundreds of thousands of users.

It is the challenges due to this sheer volume of geospatial data that the Embed2Scale project will aim to tackle. By leveraging AI-based data compression, the partners will seek to enable efficient data exchange, develop decentralised applications, and real-time analytics across sectors such as environmental monitoring, maritime awareness, climate prediction and agriculture.

This approach is different from the current practice of adapting foundation models to each specific application. Instead, the idea is to use foundation models and AI compression techniques to process the geospatial data such as satellite imagery only once. As a result, pre-processed versions of the data, so-called embeddings, will

Funded by the European Union

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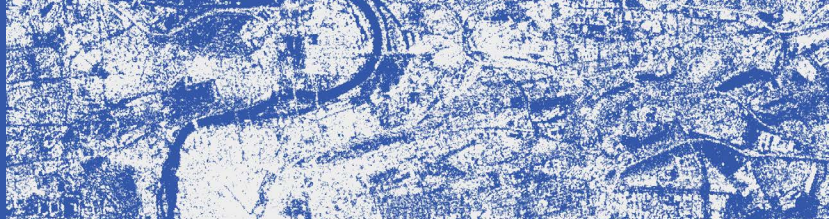
Embed2Scale (Earth Observation & Weather Data Federation With AI Embeddings) project is funded by the EU's Horizon Europe program under Grant Agreement number 101131841. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



be created. These embeddings will be reusable for any Earth observation-related downstream applications.

The main advantage of this approach is that such embeddings will be much smaller than the original data and thus easier to store, discover and share. And, due to the preprocessing, real-world applications will require models that are smaller and faster to train, resulting in more efficient and environmentally friendly use of AI in Earth observation techniques.

Juan Bernabe-Moreno, Director of IBM Research Europe – Ireland and UK labs, said that IBM was thrilled to be working with the Consortium. "At IBM Research, we pioneered Earth Observation Foundation Models (EO-FM) to investigate climate change impacts at a global scale. Within this project, our researchers are collaborating with the Consortium to use EO-FMs as AI-compressors, mitigating latency and energy consumption caused by the transfer of petabytes of data, resulting in responsible AI applications."

Dr. Conrad Albrecht from DLR's Remote Sensing Technology Institute in the Earth Observation Center and Principal Investigator of the Embed2Scale project, stated that Embed2Scale "provides the German Aerospace Center a unique opportunity to form an expert consortium of academic, government, and corporate partners to research and test the latest advances in foundation models for large-scale, federated remote sensing applications. This timely effort aligns with DLR's recent setup of the 'terrabyte' high-performance cluster. Among others, terrabyte processes Earth observation data from the European Copernicus Programme employing state-of-the-art artificial intelligence for environmental monitoring."

Philip Stier, Professor of Atmospheric Physics at the University of Oxford, noted that "climate research is becoming increasingly limited by our ability to store and analyze vast climate datasets. We are excited to work with the Embed2Scale consortium to pioneer novel approaches to tackle this problem."

Drawing on expertise in Earth observation, artificial intelligence, data science and geospatial technologies, the Embed2Scale project will focus on collaboratively advancing the frontiers of geospatial data management and accessibility. By seamlessly integrating within the Copernicus programme, Embed2Scale will aim to enhance the quality of life for Europeans and global population as a whole, through improved information services and innovative approaches to Earth observation.

About Embed2Scale:
Embed2Scale is a 3-year (2024-2027) Research & Innovation project funded by the European Commission's Horizon Europe programme. The Embed2Scale consortium is comprised of 10 esteemed institutions and organisations from 6 European countries: University of Oxford, European Union Satellite Centre, Sinergise, Forschungszentrum Jülich, HisdeSAT, University of Münster, IBM Research, University of Zurich, The German Aerospace Center (DLR), Martel Innovate. This cross-country network leverages the diverse expertise of its partners, encompassing areas such as Earth observation, artificial intelligence, data science and geospatial technologies, to collaboratively advance the frontiers of geospatial data management and accessibility.

FOR MORE INFORMATION ABOUT THE EMBED2SCALE PROJECT:

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