

Future Impacts of GeoAI on Mapping

By Steve Snow

We are now living in an age where technology is the backbone of successful mapping organizations. By embracing technology, all parts of the workplace have become more productive.

Geospatial organizations have continually improved production and analysis processes by introducing automation and new technologies. An exciting recent addition to automation has been the introduction of artificial intelligence (AI), deep learning (DL), and geographic artificial intelligence (GeoAI). These new technologies, when paired with human operators, are ushering in exciting capabilities that were previously considered possible only in science fiction.

The term *AI* was first introduced in 1955 by John McCarthy, a computer scientist and professor at Stanford University. The lack of the large and publicly available datasets required to train AI models and lack of computational power caused the field of AI to grow slowly. This started to change with the development and growth of the internet which made large amounts of data publicly available. Additionally, the advent of the graphics processing unit (GPU) has made possible affordable processing and accelerated the development and use of AI.

DL is a subset of AI that mainly uses neural networks that are very similar to the human brain. DL is being used in self-driving cars, speech recognition, robotics, image classification, and other areas that require quick decision-making and pattern recognition.

Why You Should Care

The most interesting development for mapping modernization has been GeoAI, the intersection of geospatial technology with AI and location.

Modernization is an ongoing process. The move from typewriters to computers—and now to GeoAI—didn't happen overnight. There is always a lag before adoption, and the hardest part of adapting to change is overcoming the fear of becoming irrelevant. The fear of being replaced often makes it hard for workers to recognize the opportunities that a new technology brings.

GeoAI provides new opportunities for workers to enhance their knowledge and understanding, making them more competitive in the workplace. By seizing these opportunities, workers can remove the risk of being left behind and advance their job skills. Remote sensing is one area in which this is taking place.

GeoAI in National Mapping and Remote Sensing

It's important to note that mapping through earth observation is a difficult task. Earth observation spans multiple domains: air, land, and sea. One unifying technology is needed for mapping large geographic datasets in national domains. It requires a platform that is highly adaptable to support aviation, topographic mapping, and disaster response, as well as maritime charting of the ocean's bathymetry, water column, and littoral zones. Esri's ArcGIS platform utilizes GeoAI for object detection and classification from both point clouds and raster surfaces derived from remotely sensed data. Many international organizations, such as the International Civil Aviation Organization (ICAO), are bringing GeoAI into mainstream industries.

About the Author

Steve Snow is an industry specialist for mapping, statistics, and imagery at Esri with more than 18 years of experience working in GIS, mapping, charting, and remote sensing. Prior to joining Esri, he was a commissioned engineer officer in the US Army. He was also a corps officer with the National Oceanic and Atmospheric Administration (NOAA), focusing on remote sensing, surveying, and charting for the US National Geodetic Survey Remote Sensing Division and NOAA Office of Marine and Aviation Services. A longtime GIS and remote-sensing professional, Snow focuses on applying remote-sensing capabilities to solve user mapping challenges with the ArcGIS platform.