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Perspective

# Significant Technology in Remote Sensing of Different Sectors

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## DESCRIPTION

In recent years, there has been an increase in the number of remote sensing datasets acquired by varied air-borne and space-borne sensors with specific features (e.g., spatial, spectral, temporal and radiometric resolutions). The tendency is projected to continue as more open-access remote sensing datasets become available and sensor technology improves regularly. However, there are a few challenges faced by the remote sensing community in using these datasets. The availability of an abundance of airborne and space-borne sensors helps in providing a large variety of remote sensing data. Each of these sensors possesses uniqueness which differs from one another as well as is designed for specialized tasks. Optical sensors scan the earth's surface in a manner that is unlike the one applicable in the case of radar-based sensors. Each of them bears its benefits and limitations. Thus, there exists much research where the combination of optical as well as microwave sensor data is acquired for better evaluation and mapping. This has provided an extra edge to the geospatial information for accurate results.

The explosion of geospatial data has altered our vision of the world and how we interact with it. Big data can be defined as huge volumes of existing geographical data, its variety of origins and forms and expanding diversity and accessibility. Ground surveying, remote sensing, geo-located sensors and mobile mapping are some of the sources of geo-big data. Special inherent and extrinsic properties can be established when it comes to distant sensing big data. Remote sensing of large data has inherent properties such as dynamic state, multi-scale and non-linearity. Remote sensing large data reflects a dynamic condition, as the Earth's surface is always changing. The resolution, time interval, spectral range, angle and polarization are all related to multi-scale characteristics.

Furthermore, because time series data is often nonlinear and noisy, remote sensing big data is nonlinear. Multi-source, high-dimensional and isomer properties, on the other hand, is extrinsic characteristics of remote-sensing big data. The existence of several sensors and spectral/temporal dimensions of satellite data are the reasons for the first two traits.

The structure of available remote sensing data, such as raster or vector, is reflected by the isomer characteristic. The capture, storage, searching, sharing, transferring, analysis and visualization of big data are all challenges posed by these qualities.

While we have sophisticated optical tools for sensing the universe, we lack the computing expertise to automatically turn this objective data into human-centric decisions. To date, humans have designed features, algorithms (e.g., classifiers) and their integration within and across sensors and platforms. In recent years, it has been evident that even the most seasoned professionals are not always capable of determining which set of transformations (features, classifiers and so on) is adequate for a given situation. Thus, managing and analyzing such features are not practical using common software packages and desktop. Computing resources to overcome such challenges, the need for advanced automated techniques and computer vision, is imperative.

## CONCLUSION

Image classification methods are discussed, as they are currently considered to be the most common framework for this problem and have a significant impact on the history of remote sensing. Deep learning, a recent breakthrough in the field of a machine learning community, has shed light on this issue. This thesis builds on these recent advancements to gain a better understanding of how deep learning techniques may be used to construct an automated image classification structure for complex remote sensing datasets on a cloud computing platform. For the specific application of these technologies, the thesis aimed to integrate the best of these technologies into varied datasets. Several satellite data sources, both optical and radar are being investigated.

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