WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

Assessing pixel versus object-based image classification and potential use cases

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Pilbara region, Western Australia (Sentinel-2 imagery)

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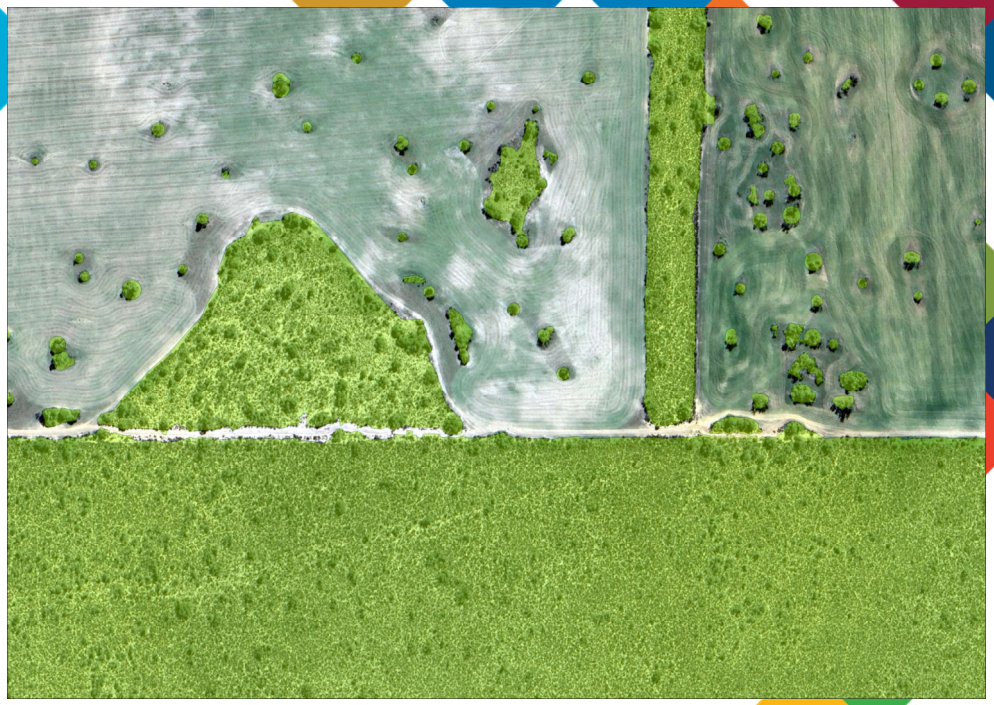
What is Image Classification?

- Image classification uses machine learning to learn from labeled training data.
- It categorizes images into predefined categories based on their visual content. It involves categorizing and assigning labels to pixels or objects within the image.
- There are many classification algorithms available, broadly broken down into supervised or unsupervised methods.
- Selection depends on data size, complexity and accuracy required.



Why Image Classification?

Becoming increasingly prevalent amongst the spatial and remote sensing community due to the ease of extraction, which previously would have been a largely manual task.

However, as more methods become available, it is difficult to ascertain which method would be the best solution to a particular classification task.

This work investigated the differences between pixel and object-based supervised classification, and which scenarios would benefit from one method over the other.

Pixel-based classification

Pixel-based classification examines the pixel values of the imagery and classifies each pixel as determined by the pixels within the training sample.

Straightforward approach that works well with uniform imagery

Has limitations

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Object-based classification

Object-based classification examines the clusters of pixels, and how the cluster size, shape and colour reflect those within the training sample.

Useful when there are distinct regions or when classifying larger features

Allows for more context

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Findings

Yearly change assessments of a specific area would best benefit from object-based classification as the objective of the task is to assess the change of the objects.

Developing a classification to suit many isolated areas within a region would be better suited for pixel-based classification as the training data would include the range of pixels found within the region, regardless of shape and size of pixel clusters as they may change.

In conclusion, when selecting a classification method for a specific task, it is essential to consider the task's objective, as no single method works universally for all scenarios.

Additionally, whichever classification method is selected, the quality of results relies heavily on a quality training sample dataset.

The most relevant SDGs related to the presentation and theme of this session

1st relevant SDG

2nd relevant SDG

3rd relevant SDG

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Thank You!

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