

# Remote Sensing in Context

Data and model exploitation for  
surveillance

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## Summary

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High resolution satellite imagery is increasingly available. While this offers exciting applications in tackling a wide variety of environmental challenges, such data – and machine learning models which leverage it – can pose major privacy concerns.

## Project Description

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Satellite imagery and machine learning are powerful tools that can be used to monitor and understand the environment. They offer great potential for addressing a wide range of environmental challenges, such as deforestation, land-use change, and wildlife conservation. However, the use of these technologies in remote and fragile ecosystems carries significant risks, including the potential for surveillance of Indigenous populations and other remote communities. These communities are among the most vulnerable in the world and have been disproportionately affected by extractive industries and environmental degradation.

The stakeholders involved in such projects include local communities, mining companies, artisanal miners, state actors, satellite/remote sensing companies, and campaigning organisations/groups. Each of these groups has its own interests and concerns, and it is important to take these into account when designing and implementing any project that uses this technology. To ensure the use of these tools are guided by principles of transparency, accountability and respect for human rights, measures such as community engagement, informed consent, and data security should be considered.

## Technology Description

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- High resolution satellite imagery (up to 30cm in some cases)
- Providers like Planet provide an interface/API to this imagery, they have services that allow companies or other organisations to task satellites to fly over specific areas
- Machine learning (object identification and segmentation, classification, etc.) to identify objects or patterns in satellite imagery

## Key Issues

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- Surveillance
- Privacy
- Transparency
- Risk of compromising sources on the ground if datasets are made fully open
- Avenues available for feedback from stakeholders (if any)

## Deliberative prompts

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1

**What uses of satellite images might impinge on the privacy of communities? How might this be practically mitigated?**

2

**Who gets to observe? Who gets observed?**

3

**What activities, other than mining, could this be used for?**

## Datasheet

### Category Details

- |                            |   |
|----------------------------|---|
| <i>Available Data</i>      | <ul style="list-style-type: none"><li>• Satellite datasets<ul style="list-style-type: none"><li>• open access</li><li>• proprietary</li></ul></li><li>• Manually annotated imagery</li><li>• In-situ measurements such as domestic surveys or water quality</li></ul> |
| <i>Analysis Techniques</i> | <ul style="list-style-type: none"><li>• Image classification techniques such as:<ul style="list-style-type: none"><li>• Random Forests</li><li>• Convolutional Neural Networks</li></ul></li></ul>  |



### Groups, Organisations and Affected Individuals

- 1 Local communities
- 2 Mining companies
- 3 State actors
- 4 Satellite and imaging companies
- 5 Campaigning groups and organisations