

# **Ai-Powered Mapping of Land Disturbance Associated with Oil and Gas Resource Development Using Satellite Imagery**

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## **SUMMARY**

Oil and gas resource development in Western Canada (e.g., Alberta, Saskatchewan) has increased substantially over the past decades. Land disturbance associated with oil and gas resource development is caused by activities related to constructing drill pads to contain drilling and well maintenance equipment and roads to access the drill pad. Land disturbed by oil and gas development has the potential to cause increased erosion, stream degradation, habitat fragmentation and alteration, and increase public use of areas that may be environmentally sensitive. This paper attempts to monitor and map the land disturbance resulting from oil and gas resource development in Alberta using satellite imagery. In this study, we proposed a deep learning method that uses the DeepLabV3+ with a MobileNet backbone to detect land disturbance appearing in 5-band RapidEye imagery with a spatial resolution of 5m. Our method takes advantage of three kinds of information, including the objects of interest (roads, well-pads), background landscape (farmland, forest), and spectral range (RGB, Red-Red-edge-NIR, NDVI). Our experiments demonstrated that roads associated with oil sand well-pads can be integrated into a single task. The land disturbance detections should be handled separately between forest and farmland backgrounds. The detection results obtained using RGB images outperforms that obtained using the NDVI images.

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