GEE Post-processing Documentation

Overview

This documentation outlines a post-processing workflow for classifying satellite imagery obtained from deep learning models in Google Earth Engine (GEE). The goal of this process is to refine the classification output obtained from deep learning by incorporating additional data sources and applying further analysis to enhance the accuracy and usability of the results.

Process Steps

1. Ancillary Data Masking

- **Input Data**:
  - Deep learning classification output (`f2015`) obtained from satellite imagery.
  - Additional layers: `settlement` , `road_network` , `legal` , and `builtup` .
- **Mask Creation**:
  - Combine multiple layers (`settlement` , `road_network` , `legal` , and `builtup`) using the `blend()` function to create a comprehensive mask.
  - Apply masking to the classification output using the `mask()` function.
  - Refine the mask using `selfMask()` to remove any unwanted pixels.

```
var mask = settlement.blend(road_network).blend(legal).mask().selfMask();
var f2015 =
ft_2015.mask(mask.unmask().not()).selfMask().rename('2015').set({'Year':
'2015'});
```

2. NDVI Calculation

- **Basemap Selection**:
  - Load the Planet basemap provided by NICFI (Norwegian International Climate and Forest Initiative).

```
/// PLANET BASEMAP
var planet = ee.ImageCollection("projects/planet-
nicfi/assets/basemaps/africa")
                  .filterDate('2015-01-01', '2015-12-31')
                  .map(function(image){return image.clip(galamsey_aoi)})
                  .median()
```

- **NDVI Calculation**:
  - Calculate the Normalized Difference Vegetation Index (NDVI) from the satellite imagery bands.
  - Define a threshold to distinguish between vegetation and non-vegetation areas.

```
var ndvi = planet.normalizedDifference(['N','R']);
var ndvi_mask = ndvi.gt(0.3).not().selfMask();
```

3. Refinement of Classification Output

- **Vegetative Mask Application**:
  - Apply the vegetative mask derived from NDVI calculations to (`f2015`).
  - This step further refines the classification by removing noise and inaccuracies related to vegetation.

```
var 2015_footprint = f2015.updateMask(ndvi_mask)
```

Detailed Explanation

Mask Creation

The initial step involves creating a mask to refine the classification output (`ft_2015`). This mask is generated by combining various layers such as settlement areas, road networks, and legal boundaries. By blending these layers and applying masking, we ensure that only relevant areas are retained in the classification output. The `selfMask()` function is then utilized to ensure that only valid pixels within the mask are retained, thereby eliminating any potential artifacts or inconsistencies.

NDVI Calculation

After preparing the mining footprint output, the next step involves loading Planet basemap to provide additional context to the analysis. In this workflow, the Planet basemap provided by NICFI is utilized. Following basemap selection, the NDVI is calculated from the satellite imagery bands. NDVI is a widely used index for quantifying vegetation cover, making it suitable for distinguishing between vegetated and non-vegetated areas. By defining a threshold value, typically based on empirical or domain-specific knowledge, the NDVI output is converted into a binary mask, where vegetation pixels are differentiated from non-vegetation pixels.

Refinement of Classification Output

Finally, the vegetative mask derived from the NDVI calculations is applied to the classification output (`f2015`). This step serves to further refine the classification by

removing any remaining noise or inaccuracies associated with vegetation cover. By overlaying the vegetative mask onto the classification output, areas erroneously classified as vegetation can be corrected, leading to a more accurate representation of land cover types.

Conclusion

This post-processing workflow enhances the accuracy and usability of the classification results obtained from the deep learning model. By integrating additional data sources, such as ancillary data and NDVI calculations, and applying targeted analysis techniques, the classification output is refined to better reflect small scale minning patterns. This documentation provides a detailed guide for implementing the post-processing workflow in Google Earth Engine, facilitating the generation of quality small scale mining footprint.