Remote Sensing

Introduction

Welcome to the comprehensive guide on INVISION Remote Sensing. INVISION leverages advanced remote sensing capabilities through a partnership with Planet Labs. This document details the remote sensing variables accessible via INVISION, emphasizing their significance in agriculture, specifically for trials, demonstrations, and commercial applications.

PlanetScope

PlanetScope imagery provides high-resolution, frequent monitoring capabilities that are essential for precision agriculture. Below are the key variables:

Imagery Type	Description	Bands Used	Spatial Resolution	Temporal Resolution	Key Applications
NDVI (Normalized Difference Vegetation Index)	Quantifies vegetation health using red and NIR bands	Red, NIR	3 meters	Daily	Vegetation health, crop monitoring, yield prediction
SAVI (Soil Adjusted Vegetation Index)	Adjusted vegetation index minimizing soil brightness impact	Red, NIR (+ correction factor)	3 meters	Daily	Accurate vegetation monitoring in sparse areas, arid region analysis
EVI (Enhanced Vegetation Index)	Enhanced vegetation index reducing atmospheric and soil influences	Red, NIR, Blue	3 meters	Daily	High biomass sensitivity, reliable under varying atmospheric conditions, detailed vegetation analysis
RGB (Red, Green, Blue)	Captures visible light, similar to human vision	Red, Green, Blue	3 meters	Daily	Visual assessment, communication of field conditions, baseline monitoring

Planetary Variables

Planetary Variables offer specialized insights critical for detailed agricultural analysis and decision-making:

Imagery Type	Description	Bands Used	Spatial Resolution	Temporal Resolution	Key Applications
NDRE (Normalized Difference Red Edge)	Measures chlorophyll content using red edge and NIR bands	Red Edge, NIR	3 meters	Daily	Chlorophyll monitoring, early stress detection, precision agriculture
Biomass	Estimates total mass of living plants	Multi-spectral (varies)	3 meters	Daily	Productivity assessment, nutrient management, sustainable practices

Detailed Explanation of Each Variable

NDVI (Normalized Difference Vegetation Index)

- **Description**: NDVI is a widely used index for quantifying vegetation health by measuring the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs).
- **Importance**: It provides essential information on plant vigor and health, useful for monitoring crop growth, assessing biomass production, and predicting yields.
- **Applications in INVISION**: Used extensively in agricultural trials to monitor crop health and development, helping to optimize resource allocation and improve decision-making.

SAVI (Soil Adjusted Vegetation Index)

- **Description**: SAVI adjusts the NDVI to minimize soil brightness influences, which is particularly useful in areas with sparse vegetation.
- **Importance**: Enhances the accuracy of vegetation monitoring by reducing the impact of soil reflectance, crucial in arid and semi-arid regions.
- **Applications in INVISION**: Valuable in field trials and demo plots located in areas with less dense vegetation, ensuring accurate vegetation analysis.

EVI (Enhanced Vegetation Index)

- **Description**: EVI improves upon NDVI by reducing atmospheric and soil background influences, providing better sensitivity in high biomass regions.
- **Importance**: More accurately captures vegetation details under high biomass conditions and varied atmospheric conditions.
- **Applications in INVISION**: Suitable for detailed vegetation studies and high-yield crops in commercial trials, offering precise vegetation health metrics.

RGB (Red, Green, Blue)

- **Description**: RGB imagery captures visible light, providing images similar to what the human eye sees.
- **Importance**: Allows for straightforward visual inspection of crop conditions, making it easy to communicate field status to stakeholders.
- **Applications in INVISION**: Used for baseline monitoring and visual assessments in all types of agricultural trials, facilitating easy interpretation and sharing of field conditions.

NDRE (Normalized Difference Red Edge)

- **Description**: NDRE uses the red edge and near-infrared bands to measure chlorophyll content, which is a strong indicator of plant health.
- **Importance**: Particularly effective for early detection of crop stress and chlorophyll levels, allowing for timely intervention.
- **Applications in INVISION**: Critical in precision agriculture and high-value crops, used in both demo and commercial trials for early stress detection and management.

Crop Biomass

- **Description**: Biomass estimation from satellite imagery measures the total mass of living plants in a given area.
- **Importance**: Provides insights into crop productivity and health, essential for yield prediction and management.
- **Applications in INVISION**: Key for assessing productivity in large-scale commercial trials and ensuring sustainable nutrient management practices.

INVISION's integration with Planet Labs' remote sensing capabilities empowers agricultural professionals with advanced tools for monitoring and managing their fields. By utilizing a combination of PlanetScope and Planetary Variables, users can gain comprehensive insights into their crops, ensuring better outcomes in agricultural trials, demos, and commercial operations. Embrace the future of agriculture with INVISION and unlock the potential of your fields.

Sources:

- PlanetScope data specifications and product details (Sentinel Hub) (Planet Developer Center) (Planet) (cloudeo AG).
- Planetary Variables information from Planet Labs documentation (Planet Developer Center).

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