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**Digital Tools for EUDR Compliance and Risk Benchmarking**

**Documentation**

Sep 15, 2025

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# Repository GeoCitizen

**Repository:** [GeoCitizen](https://github.com/nicolevasos/GeoCitizen)  
**Category:** Geospatial Tools, Risk Analysis, EU Deforestation Regulation (EUDR) Compliance  
**Technologies:** Python, JavaScript, GeoPandas, WHISP, FarmVibes.AI, Google Colab

### Overview

The GeoCitizen repository encompasses the work from the internship project titled "Digital Tools for EUDR Compliance and Risk Benchmarking." The project aims to:

* Develop a farmer-friendly tool, SELF-EUDR, based on the GeoCitizen platform, enabling smallholder farmers to assess deforestation risks.
* Benchmark deforestation risk analysis platforms like WHISP and FarmVibes.AI, evaluating their transparency, usability, and consistency.

### Key Components

* **SELF-EUDR Prototypes:** Interactive tools designed to assist smallholder farmers in understanding and complying with the EU Deforestation Regulation.
* **Benchmarking Framework:** A comprehensive evaluation of WHISP and FarmVibes.AI platforms, assessing their effectiveness and user-friendliness.
* **Notebooks:** Jupyter notebooks demonstrating various functionalities, including data processing, analysis, and visualization.
* **WHISP Dashboard:** A customized dashboard developed in JavaScript, providing an interactive interface for risk analysis.
* **Documentation:** Detailed guides and documentation supporting the use and understanding of the tools and frameworks developed.

### Objectives

* **Empowerment:** Equip smallholder farmers with accessible tools to assess and mitigate deforestation risks.
* **Transparency:** Provide clear and understandable evaluations of existing risk analysis platforms.
* **Reproducibility:** Ensure that all analyses and tools are reproducible, fostering trust and reliability in the results.

### Future Directions

While the internship project laid a strong foundation, several enhancements are planned for future development:

* **Integration:** Incorporate additional Earth Observation data, such as vegetation health and land cover change, into the SELF-EUDR tool.
* **Automation:** Develop automated workflows for real-time risk assessment and reporting.
* **User Feedback:** Implement mechanisms for collecting user feedback to continuously improve the tools and platforms.

# WHISP Dashboard

**Repository:** [WHISP-Dashboard](https://github.com/nicolevasos/WHISP-Dashboard)  
**Category:** Interactive Web Dashboard  
**Technologies:** HTML, JavaScript, CSS, D3.js, Leaflet.js  
**Deployment:** Live Demo

### Objective

The WHISP Risk Analysis Dashboard is an interactive web-based tool designed to visualize global environmental risk data. It enables users to explore deforestation risk plots and related environmental indicators through dynamic filtering by country and administrative levels. The dashboard supports custom dataset uploads, providing a flexible platform for analyzing spatial data.

### Key Features

* **Dynamic Filtering:** Users can filter data by country and administrative levels to focus on specific regions.
* **Interactive Visualizations:** The dashboard includes maps, pie charts, bar charts, and summary indicators to represent data effectively.
* **Custom Data Upload:** Users have the ability to upload their own datasets for personalized analysis.
* **Responsive Design:** The interface is designed to be user-friendly and responsive across various devices.

### Setup Instructions

1. **Clone the Repository:** Download or clone the repository to your local machine.
2. **Open the Dashboard:** Navigate to the index.html file and open it in a web browser to launch the dashboard.
3. **Upload Custom Data:** Use the provided interface to upload your own datasets in supported formats (e.g., CSV, GeoJSON).

### Example Workflow

1. **Select Region:** Use the filtering options to choose a specific country or administrative region.
2. **View Visualizations:** Explore the interactive maps and charts that display environmental risk data for the selected region.
3. **Upload Data:** If desired, upload your own dataset to overlay custom information onto the existing visualizations.
4. **Analyze Results:** Utilize the summary indicators and visualizations to analyze the environmental risk data.

### Results

The dashboard provides:

* **Interactive Maps:** Visual representation of environmental risk plots.
* **Charts and Graphs:** Pie charts and bar charts illustrating various environmental indicators.
* **Summary Indicators:** Key metrics that provide an overview of the environmental risk status.
* **Custom Data Integration:** Ability to overlay user-uploaded datasets onto the existing visualizations.

### Insights

* **Enhanced Data Accessibility:** The dashboard makes complex environmental data more accessible and understandable through interactive visualizations.
* **User Empowerment:** By allowing custom data uploads, users can tailor the analysis to their specific needs and interests.
* **Improved Decision-Making:** The visual and interactive nature of the dashboard aids in better understanding environmental risks, supporting informed decision-making.

### Future Enhancements

* **Advanced Data Analysis Tools:** Incorporate additional analytical tools to provide deeper insights into the data.
* **Enhanced User Interface:** Improve the user interface for a more intuitive and seamless experience.
* **Mobile Optimization:** Ensure the dashboard is fully optimized for mobile devices to reach a broader audience.

# Notebooks

## SAM2GEO

This notebook demonstrates how to generate object masks from point prompts using SAM2. It's designed to assist smallholder farmers in identifying and delineating specific land features, such as crops or deforested areas, within satellite imagery. The approach is particularly beneficial for users with limited technical expertise, as it simplifies the segmentation process.

### Key Features

* **Point-Based Segmentation:** Utilizes single-point prompts to identify and segment objects within images.
* **Interactive Interface:** Compatible with Google Colab, enabling users to run the notebook in a browser without local setup.
* **Visualization:** Displays segmentation results directly within the notebook, facilitating immediate analysis.
* **GPU Acceleration:** Optimized for GPU usage to enhance processing speed and efficiency.

### Setup Instructions

1. **Access the Notebook:** Open the notebook in Google Colab using the provided link.
2. **Enable GPU Runtime:** Navigate to Runtime → Change runtime type → Select GPU as the hardware accelerator.
3. **Install Dependencies:** Execute the following command to install necessary libraries:
4. **Run the Notebook:** Follow the step-by-step instructions within the notebook to perform segmentation tasks.

### Example Workflow

1. **Load Image:** Import the satellite image you wish to analyze.
2. **Define Prompt:** Click on the image to specify a point that represents the object of interest.
3. **Generate Mask:** SAM2 processes the prompt and outputs a segmentation mask highlighting the identified object.
4. **Review Results:** Examine the mask to assess the accuracy of the segmentation.

The notebook provides visual outputs that showcase:

* Original images with overlaid segmentation masks.
* Comparative views of different segmentation results based on varying prompts.
* Performance metrics indicating the effectiveness of the segmentation.

### GeoJSON to CSV Conversion for WHISP Data

### Objective

This notebook demonstrates how to convert spatial data from GeoJSON format into a CSV file containing geolocation information. The process utilizes the WHISP API to retrieve geospatial data, which is then transformed into a CSV format for easier integration with other tools and platforms. This conversion is particularly useful for smallholder farmers and stakeholders who require tabular data for further analysis or reporting.

### Key Features

* **Integration with WHISP API:** Retrieves geospatial data based on user-defined queries.
* **GeoJSON to CSV Conversion:** Utilizes GeoPandas to convert GeoJSON data into a structured CSV format.
* **Google Colab Compatibility:** Designed to run seamlessly in Google Colab, requiring minimal setup.
* **Customizable Parameters:** Allows users to define specific queries and parameters to tailor the data extraction process.

### Setup Instructions

1. **Access the Notebook:** Open the notebook in Google Colab using the provided link.
2. **Install Dependencies:** Execute the following command to install necessary libraries:
3. %pip install geopandas requests
4. **Run the Notebook:** Follow the step-by-step instructions within the notebook to perform the data extraction and conversion tasks.

### Example Workflow

1. **Define Query Parameters:** Specify the area of interest and other parameters to query the WHISP API.
2. **Retrieve GeoJSON Data:** Use the WHISP API to fetch geospatial data based on the defined parameters.
3. **Convert to DataFrame:** Load the GeoJSON data into a GeoDataFrame using GeoPandas.
4. **Export to CSV:** Convert the GeoDataFrame into a CSV file containing the relevant geolocation information.

### Results

The notebook provides a downloadable CSV file containing:

* Geolocation coordinates (latitude and longitude).
* Additional attributes associated with each geolocation.
* Structured data ready for analysis or integration with other platforms.

### Insights

* **Simplified Data Access:** Facilitates access to geospatial data in a tabular format, making it more accessible for analysis.
* **Enhanced Integration:** The CSV format allows for easy integration with other tools and platforms that may not support GeoJSON.
* **User-Friendly Interface:** The use of Google Colab ensures that the notebook is accessible and easy to use for individuals with varying levels of technical expertise.

### Future Enhancements

* **Automated Data Updates:** Implement functionality to automatically update the CSV file with the latest data from the WHISP API.
* **Advanced Data Filtering:** Introduce more advanced filtering options to allow users to extract more specific subsets of data.
* **Web Interface:** Develop a web-based interface to allow users to perform the conversion without needing to interact with the code directly.

Run this snippet and select the area of interest. Use the draw tools on the left hand-side to draw a polygon on the map.

**Note:** If no geometry is drawn, the default bounding box (-117.6029, 47.65, -117.5936, 47.6563) will be used. The bbox values can be modified according to the AOI (Area of interest).

## Automated Sentinel-2 Inference with S2DR3

This notebook demonstrates how to automate the inference process of Sentinel-2 imagery using the S2DR3 model. The goal is to enhance the spatial resolution of Sentinel-2 images from their original 10m, 20m, or 60m pixels to a finer 1m resolution. This enhancement is particularly useful for applications requiring detailed spatial information, such as land cover mapping and precision agriculture.

### Key Features

* **Automated Inference:** Streamlines the process of applying the S2DR3 model to Sentinel-2 images, reducing manual intervention.
* **High-Resolution Output:** Transforms lower-resolution Sentinel-2 bands into high-resolution images, improving detail and accuracy.
* **Google Colab Compatibility:** Designed to run seamlessly in Google Colab, requiring minimal setup.
* **Visualization:** Provides visual outputs to assess the quality of the super-resolved images.

### Setup Instructions

1. **Access the Notebook:** Open the notebook in Google Colab using the provided link.
2. **Install Dependencies:** Execute the following command to install necessary libraries:
3. %pip install s2dr3
4. **Run the Notebook:** Follow the step-by-step instructions within the notebook to perform the super-resolution tasks.

### Example Workflow

1. **Input Sentinel-2 Image:** Provide the path to the Sentinel-2 image you wish to enhance.
2. **Apply S2DR3 Model:** The notebook applies the S2DR3 model to the input image to enhance its spatial resolution.
3. **Visualize Results:** Examine the output images to assess the improvements in spatial detail.

### Results

The notebook provides visual outputs that showcase:

* Original Sentinel-2 images.
* Enhanced images after applying the S2DR3 model.
* Comparative views highlighting the improvements in spatial resolution.

### Insights

* **Improved Spatial Detail:** The S2DR3 model effectively enhances the spatial resolution of Sentinel-2 images, providing more detailed information for analysis.
* **Efficiency:** Automating the inference process reduces the time and effort required to process multiple images.
* **Accessibility:** The use of Google Colab ensures that the notebook is accessible and easy to use for individuals with varying levels of technical expertise.

### Future Enhancements

* **Batch Processing:** Implement functionality to process multiple Sentinel-2 images in a batch, further streamlining the workflow.
* **Advanced Visualization:** Introduce more advanced visualization techniques to better assess the quality of the super-resolved images.
* **Integration with Other Tools:** Develop methods to integrate the enhanced images with other geospatial analysis tools for comprehensive analysis.

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