

Green Sense

HEALTHY



DRY

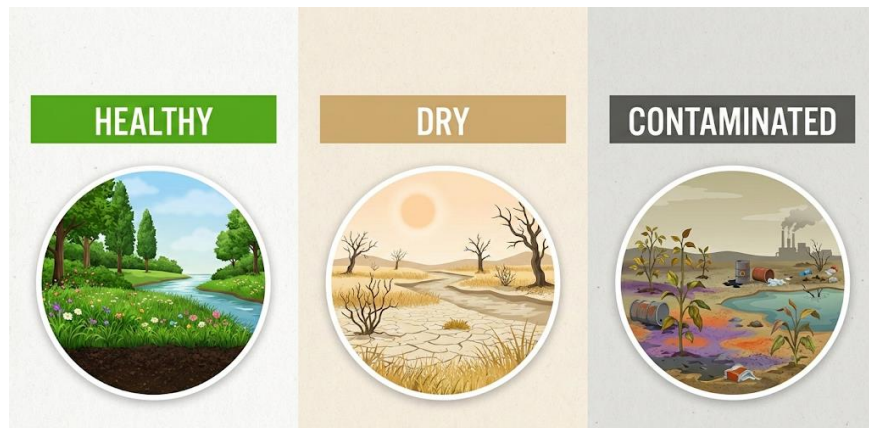


CONTAMINATED



Validation of Dataset

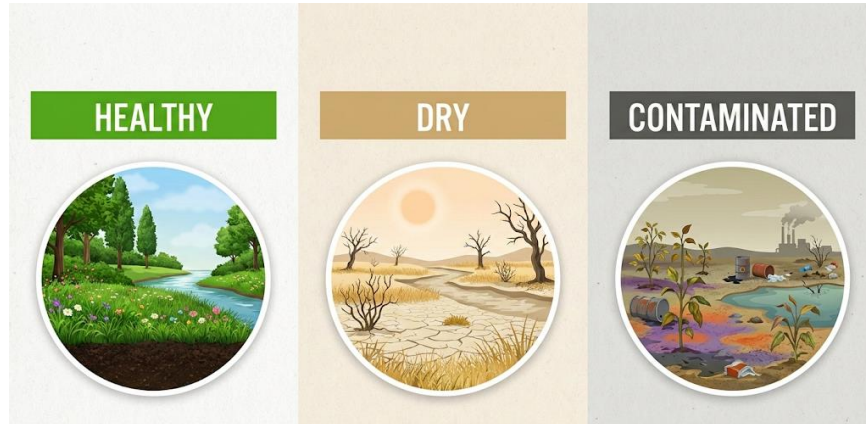
Validating the perceptual quality of generated images is essential to ensure that the synthetic street view dataset remains visually realistic and that its assigned labels remain trustworthy



Human Inspection

For each category out of the optional classes, there was a human inspection. All images were inspected by humans, and 100 images were chosen that match a street view and look realistic to the human eye. These selected images were then treated as correctly labeled examples for that category.

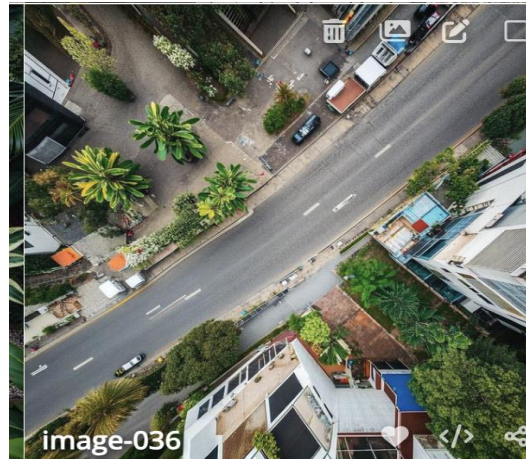
<https://ibb.co/album/wyWYfF?page=4&seek=7JTZKYxD>



Human Inspection - Bad Dried



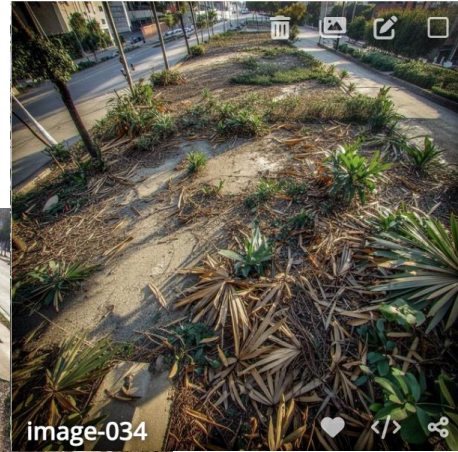
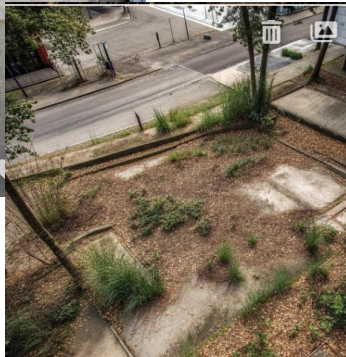
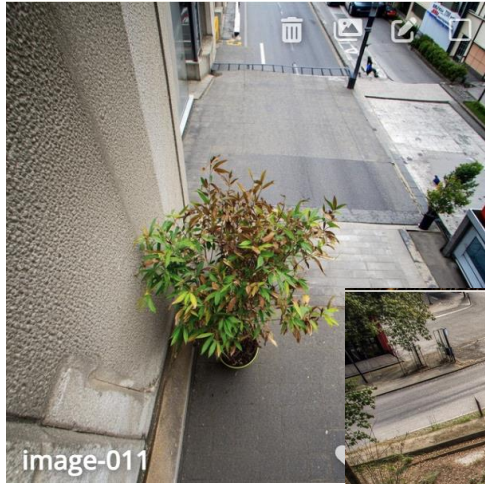
<https://ibb.co/album/wyWYfF?page=4&seek=7JTZKYxD>



Human Inspection - Good Dried



<https://ibb.co/album/wyWYfF?page=4&seek=7JTZKYxD>



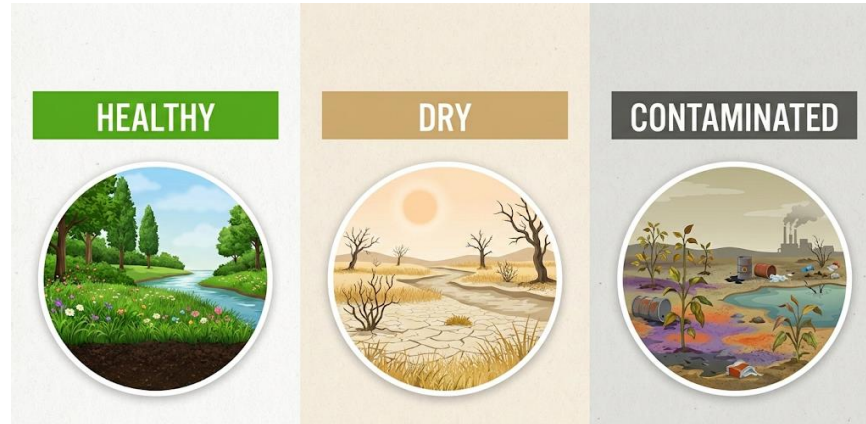
Prompt for generative with FIBO

Generate a new photo of the same location as the uploaded image. Use the same street, ground, objects, textures, and environment — nothing should change except the camera angle. Move the camera far back and raise it to approximately 30 meters (100 feet) above the scene. The camera angle must not be eye-level - instead, use an oblique bird's-eye viewpoint, looking down at the scene from a diagonal, elevated angle (not straight top-down). Zoom out significantly so the environment becomes wide and expansive. Do NOT composite or insert the original image. Do NOT replace the scene. Only change the camera viewpoint.

NIQE

NIQE (Naturalness Image Quality Evaluator) is a no-reference image quality metric that scores how natural and undistorted an image looks, without needing the original image. It compares statistical features from the input image to those from high quality natural images.

A lower NIQE score means better visual quality.



SCORE

Examples:



NIQE SCORE

Examples:



NIQE SCORE

Examples:



NIQE SCORE

Examples:



NIQE SCORE

Examples:



NIQE SCORE – Average

Generated
Images
NIQE

8.55

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Original
Images
NIQE

10.70

Performance metrics of benchmark's models

Model	Accuracy	Precision	Recall	F1-Score	Cohen's Kappa	ROC-AUC
EfficientNetB7	99.75%	99.75%	99.75%	99.75%	1.00	1.00
ResNet101	99.49%	99.49%	99.49%	99.49%	0.99	1.00
VGG-19	99.24%	99.24%	99.24%	99.24%	0.99	1.00
ResNet50	98.98%	99.00%	98.98%	98.98%	0.98	1.00
DenseNet201	98.22%	98.24%	98.22%	98.23%	0.97	1.00
MobileNet	95.69%	95.81%	95.69%	95.70%	0.94	0.99
VGG-16	95.43%	95.43%	95.43%	95.43%	0.93	0.99
Inception ResNetV2	94.92%	94.96%	94.92%	94.93%	0.92	1.00
XCception	92.13%	92.13%	92.13%	92.12%	0.88	0.98

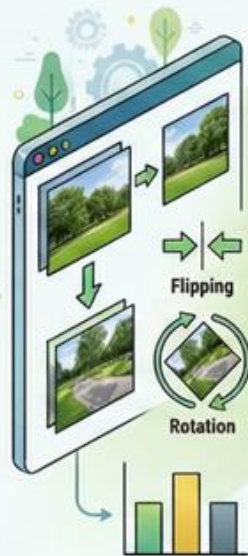
A step-by-step process for building a machine learning model that uses transfer learning to assess green space quality (Healthy, Dried, Contaminated).

1. Data Collection & Classification



1. Data Collection & Classification

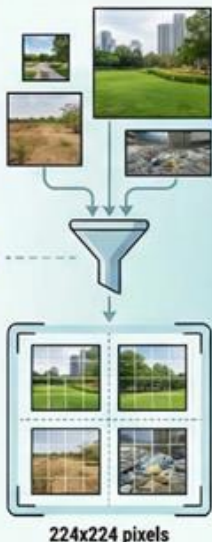
944 images were collected and manually classified into three categories.



2. Data Augmentation & Balancing

To fix class imbalance, image augmentation techniques like flipping and rotation were applied.

3. Preprocessing & Standardization

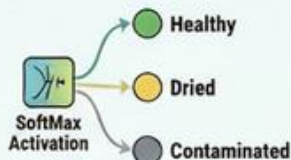


3. Preprocessing & Standardization

All images were resized to 224x224 pixels to match model input requirements.

6. Output Layer

A SoftMax activation layer produces the final probability for each of the three classes.



5. Custom Classification Head

New, trainable Dense (fully connected) layers were added on top of the frozen base.



4. Feature Extraction Base

A pre-trained CNN model with frozen weights acts as the feature extractor.

7. Model Training

The model was trained using an Adam optimizer, updating only the custom layers' weights.

8. Smart Regularization



Early Stopping
Stops training when validation performance plateaus.



Learning Rate Reduction
Reduces learning rate when progress stalls.

8. Smart Regularization

Early Stopping and learning rate reduction were used to prevent overfitting and improve performance.

RESNET50 - RESULTS

Classification Report:

	precision	recall	f1-score
Healthy	0.9851	0.9851	0.9851
Dried	1.0000	1.0000	1.0000
Contaminated	0.9851	0.9851	0.9851

VIT - RESULTS

Classification Report (Test):

	precision	recall	f1-score
Healthy	0.9844	0.9403	0.9618
Dried	0.9420	1.0000	0.9701
Contaminated	1.0000	0.9851	0.9925