TerraMappers

DETECTING DEFORESTATION

DEFENDING DIVERSITY

The Team

Kesava Prasad Arul

Data

Inken Grüner

Machine Learning

+

Business Case

Zain Amir Zaman

Data

+

Design

Baturalp Güven

Data

+

Machine Learning

The Need

CLIMATE AND BIODIVERSITY IMPACT

PROBLEM COMPLEXITY AND SPECIFICITY

DATA ACCESSIBILITY

EDUCATION AND MONITORING

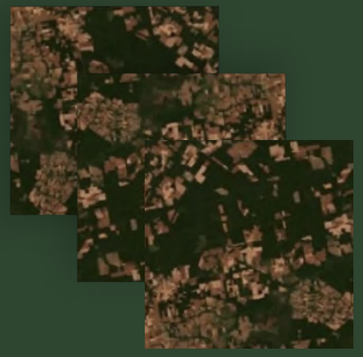
The Data

GOOGLE EARTH ENGINE

Sentinel 2H - RGB/MSI

ESA World Cover - Cloud

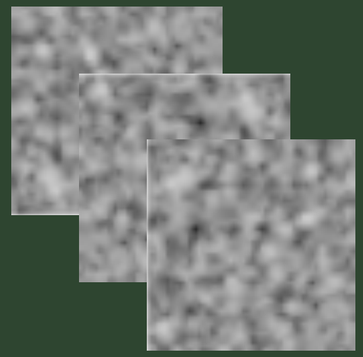
Sentinel 1A - SAR



COPERNICUS.EU DATAEO

Sentinel 1A - SAR

Sentinel 2 - Mosaic



RADD+ PRODESDETER

Localized forest alerts


```
{
"lat": "60.1885N",
"long": "13.82245E",
"alert_code": 2,
"timestamp": 1714288256
}
```


BR-DWGD

Daily climate data

Classification

SAR Data

U-Net with Temporal Attention Encoder

Prediction

0	0	0
0	1	1
1	1	1

Ground Truth

0	0	0
0	1	1
1	1	0

Compute IoU

Yes!

Classification

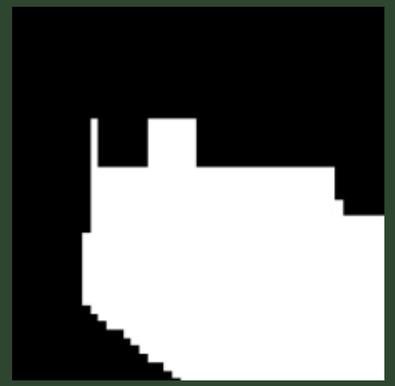
Classification

SAR Data

U-Net with Temporal Attention Encoder

Prediction

Ground Truth



Compute IoU

Yes!

Classification

Classification: Metrics and Results

Metrics	Performance(%)
IoU	46.6
Precision	67.4
Recall	58.5

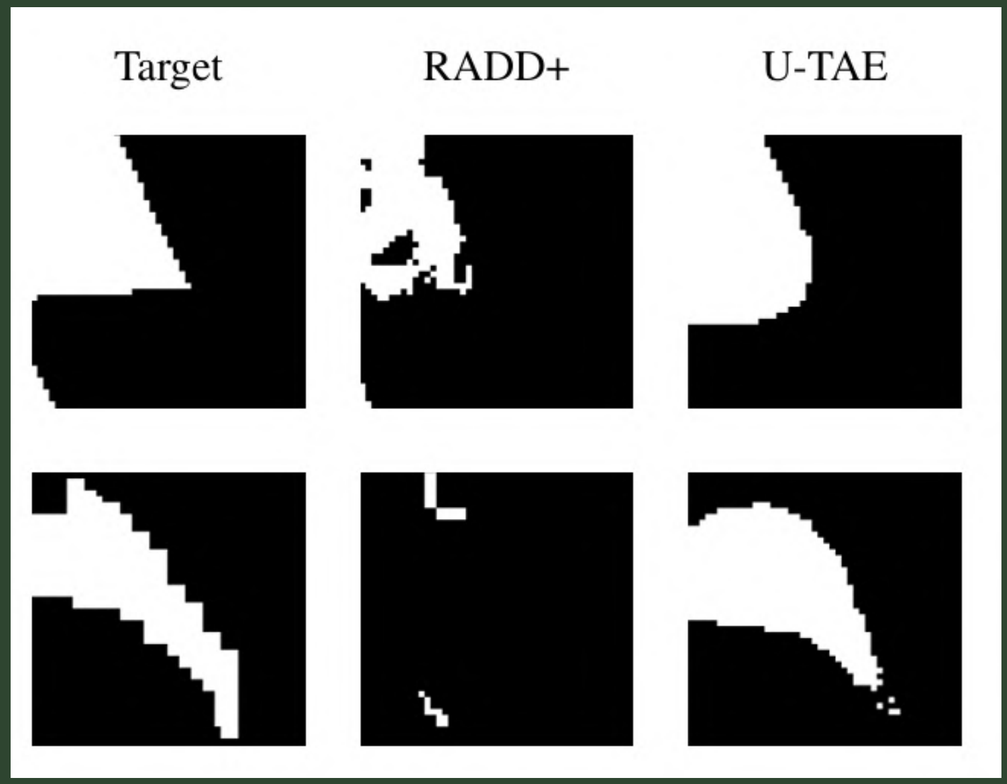


Image Segmentation

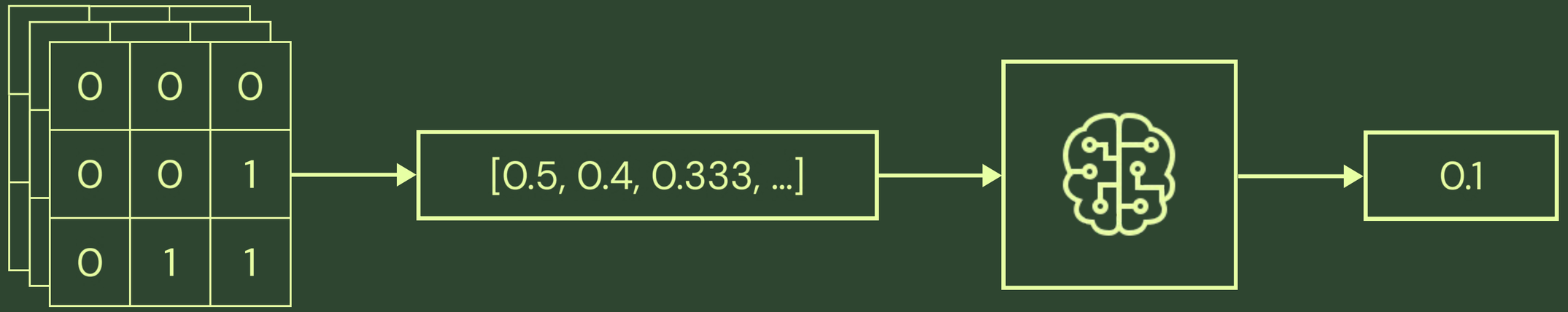
Satellite Images

U-Net with Temporal Attention Encoder

Segmentation Mask

Prognostics

Deforestation Development



Segmentation Masks of Time Series Data

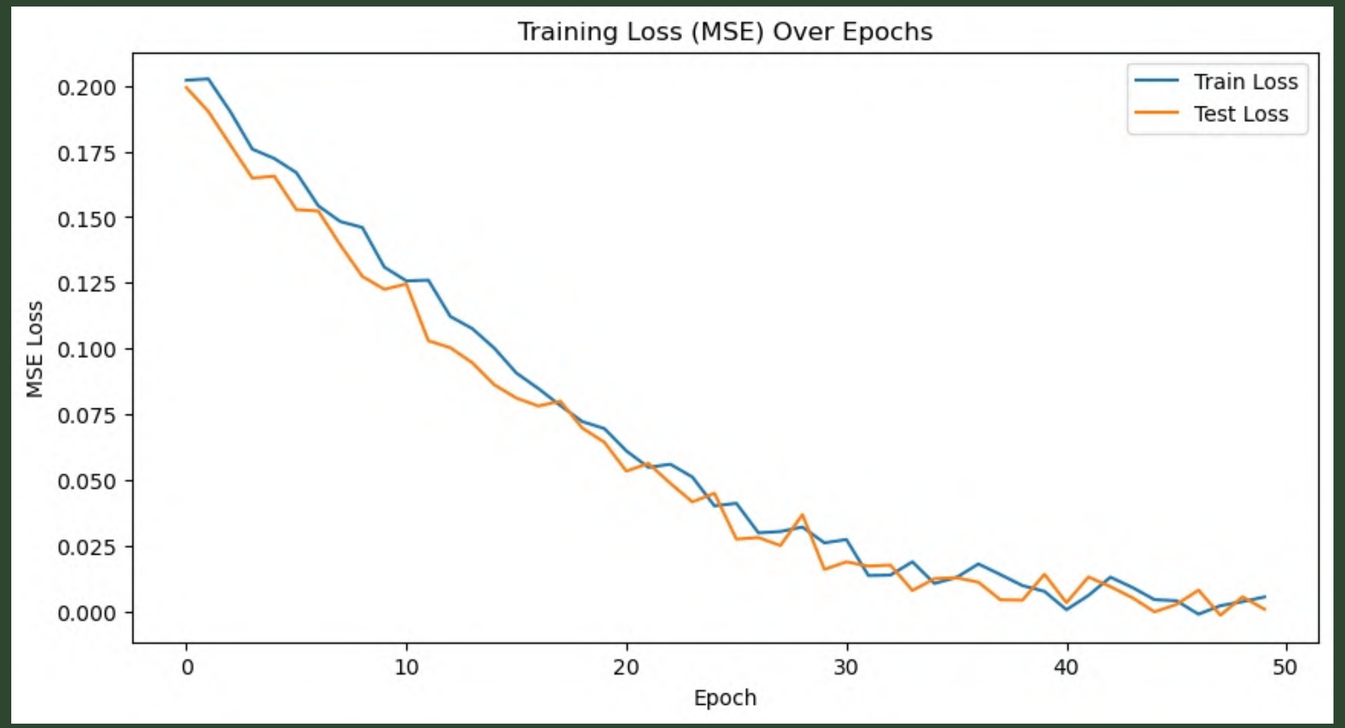
Forest Percentages

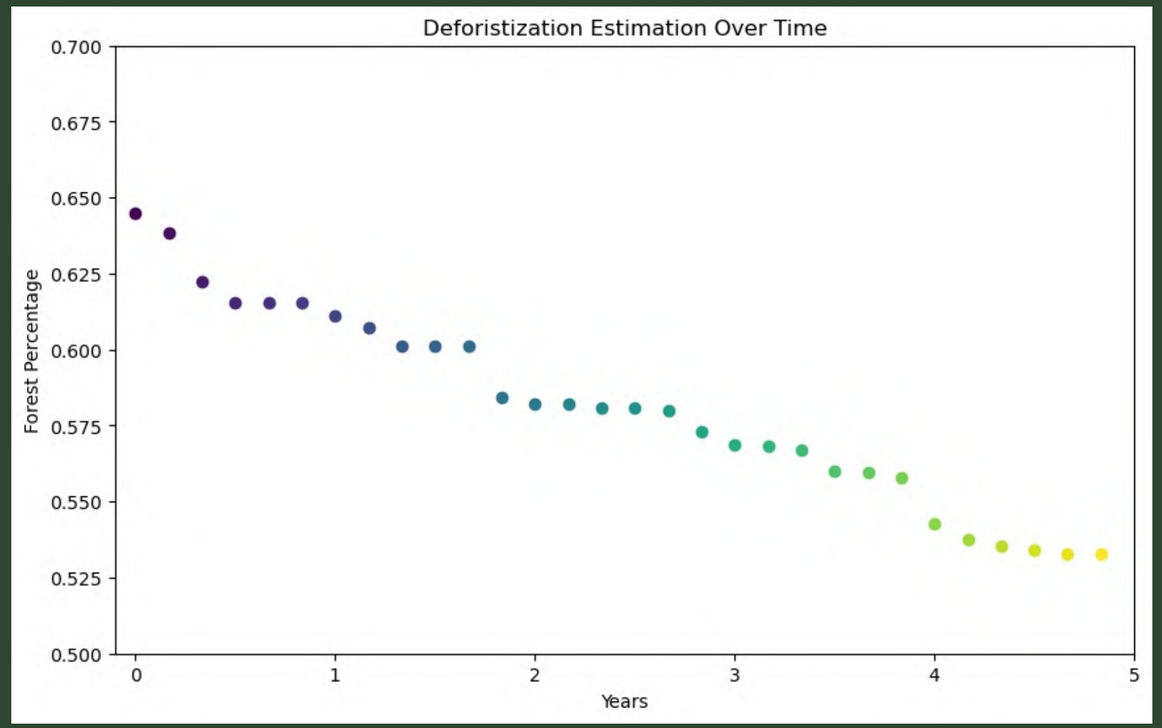
CNN Sequence Prediction Model

Prediction

Prognostics: Results

Deforestation Development

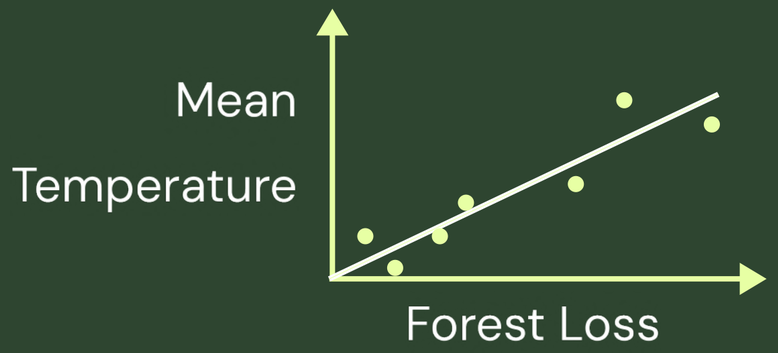




Prognostics

Climate Impact Prediction

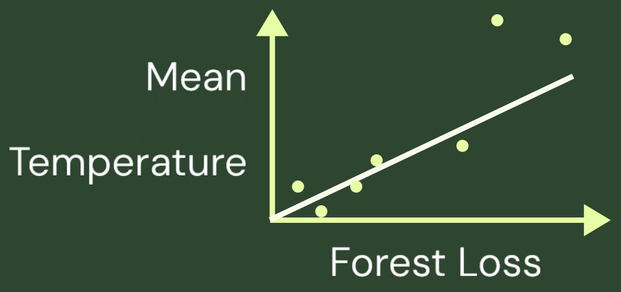
Predicted Forest Coverage Loss → Linear Regression Model → Prediction of Temperature Change

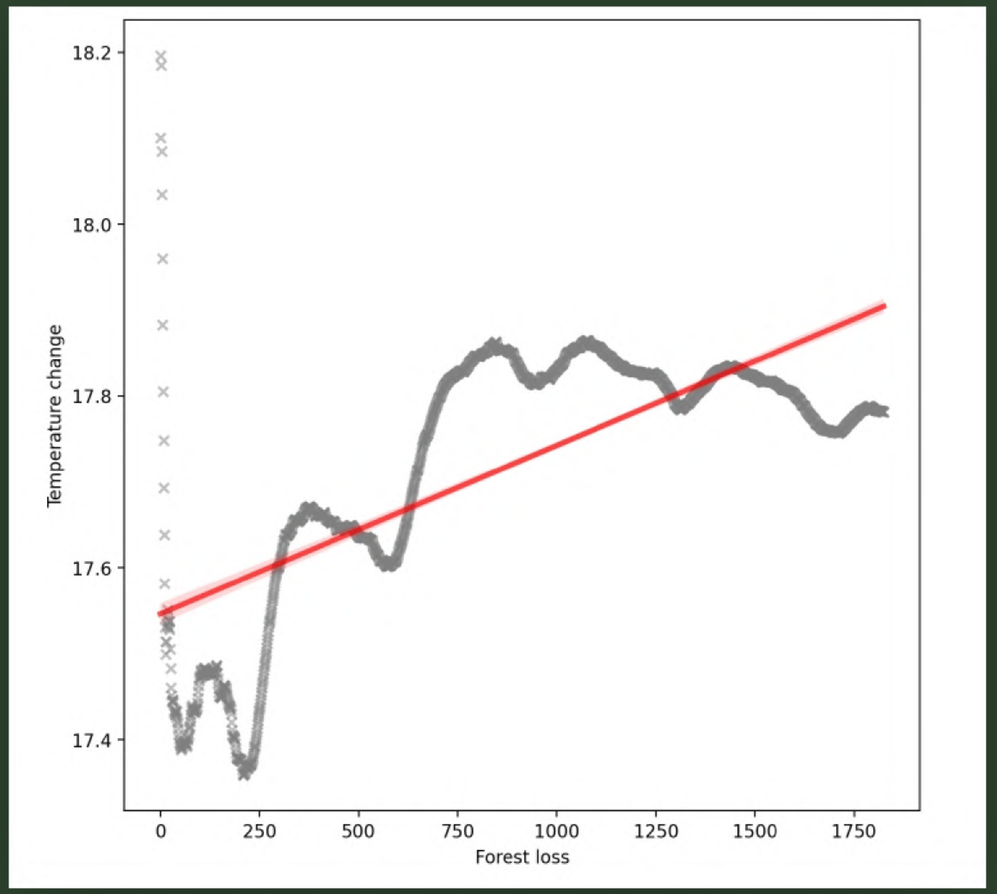


Prognostics

Climate Impact Prediction

Predicted Forest Coverage Loss → Linear Regression Model →





Solution Prototype

THERMAL AND CLIMATE REGRESSION ANALYSIS

LINEAR REGRESSION

FUTURE FOREST COVERAGE PREDICTION USING MASKS

CNN

SEGMENTATION AND DEFORESTATION MASKING

AUTO-ENCODERS

ATTENTION

USER INTERFACE
VISUALIZATION

DATA ENGINE

GOOGLE EARTH ENGINE

SENTINEL 2H – RGB/MSI

ESA WORLD COVER - CLOUD

SENTINEL 1A - SAR

SENTINEL 2 - MOSAICS

COPERNICUS.EU DATAEO

RADD+
PRODES
DETER

DATA SOURCES

Use Cases

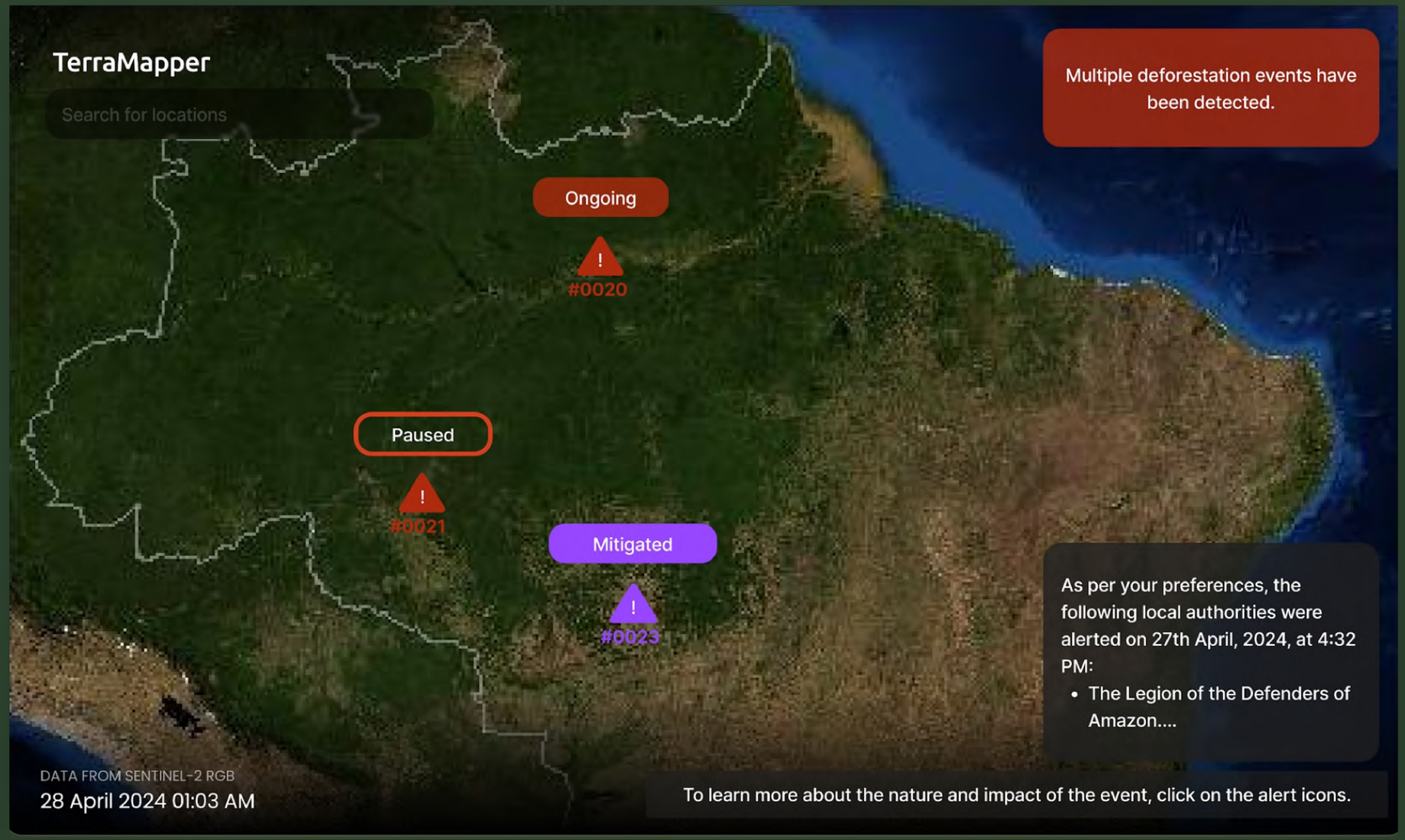
PUBLIC EDUCATION AND ADVOCACY

CORPORATE RESPONSIBILITY AND ETHICAL SOURCING

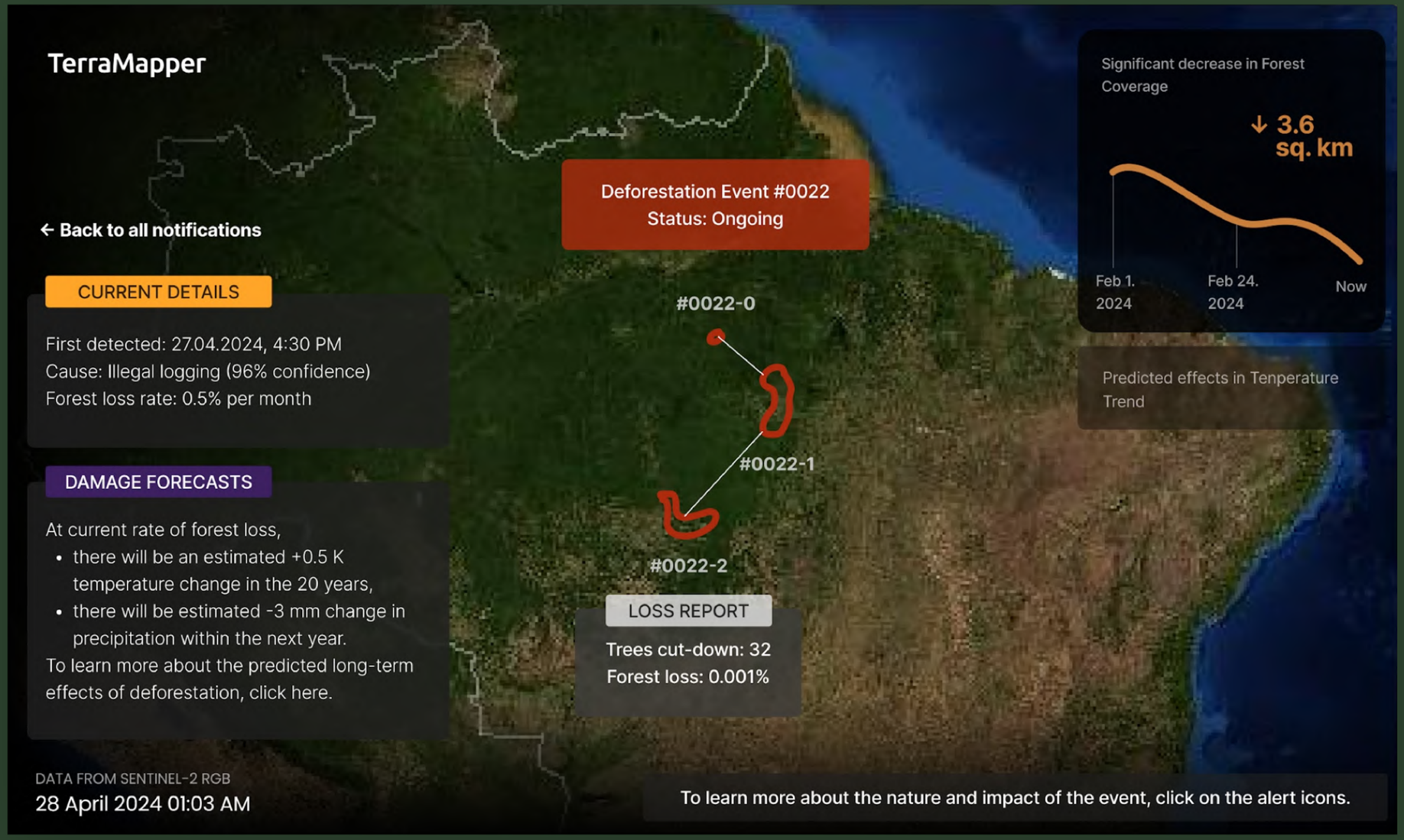
EFFECTIVE MONITORING AND RESPONSE BY AUTHORITIES

FUTURE PROJECTIONS AND REFORESTATION PLANNING

Solution Prototype



Solution Prototype



References

[1]K. KARAMAN, V. SAINTE FARE GARNOTAND J. D. WEGNER, “BRADD-S1TS”. ZENODO, JUN. 20, 2023. DOI: 10.5281/ZENODO.8060250.

[2]XAVIER, A. C., SCANLON, B. R., KING, C. W., & ALVES, A. I. (2022). NEW IMPROVED BRAZILIAN DAILY WEATHER GRIDDED DATA (1961–2020). INTERNATIONAL JOURNAL OF CLIMATOLOGY, 42(16), 8390– 8404. HTTPS://DOI.ORG/10.1002/JOC.7731