Introducing White paper for AI/ML outline.

October 6, 2022
WGISS/Technology Exploration I.G.
• This white paper shows a use case about Deep Learning (DL), Machine Learning (ML) and Artificial Intelligence (AI), which uses EO data.

• Some CEOS agencies provide DL/ML/AI data and platforms and introduce them at WGISS meetings.

• But there aren't any summarized documents.

• This document can lead data users to data and platforms.

• Additionally, data providers can know where to upload or what cloud is proven for DL/ML/AI dataset.
Who and Why

• Who will benefit from a White paper
  – Data User
    • Student majoring in remote sensing
    • Data Scientist who isn’t majoring in remote sensing
  – Data Provider
    • Agency who plans to provide dataset for AI/ML newly.
Contents

1. Introduction
2. Basis of AI/ML for earth observation domain.
3. Introduce AI/ML use case in CEOS.
4. Share platforms and data
5. Notice the difference between common AI/ML and EO’s one.
1. Introduction

- To explain purpose of white paper.
• Before AI/ML era.
  – Model based analysis.
  – Only focused/processed a part of data.
    • Event analysis
    • area/time of interest
  – huge resources are needed for processing so most data are frozen.

• Towards AI/ML
  – Learning based analysis.
    • Expand to untouched observed data by using analyzed one.
    • Simplify data analysis like image processing.
• Categorize AI/ML application.
  – Image processing
    • Image detection
    • Segmentation
    • Recognition
    • Classification
  – Estimation
    • Upscale

• Those techniques can Rediscover EO data value.
  – User can access data much easier.
    • After image processing, we can add “label” to metadata.
    • User can understand intuitively.
    • Bridge the gap remote sensing to other study (including data science).
Use case in CEOS/WGISS

• Show experimental use case.
  – UK/PML
  – ESIP
  – NASA ESDSWG Task 4
    • ML training data and NASA Earthdata Cloud
  – NOAA

Refers from past WGISS.
Adds by volunteers including Tech. EXPO.
**Platforms and data**

- Show/List platforms and data for AI.
  - This table summarize experimental use case by platform, data and policy.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Data</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>PML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NASA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOAA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Example)JAXA</td>
<td>AIST</td>
<td>ALOS-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Closed access</td>
</tr>
</tbody>
</table>
Perceived problems

• difference between “standard ML” and “ML for EO”.
• difficulty in ground truth data, training data, models.
• Efficient access to agency data - NASA
**Time line**

- **WGISS-54**
  - Share/Check Outline
- **WGISS-56**
  - Share draft
- **WGISS-57**
  - Publish

**In-house work**
- Allocate author to excels part.
- Report in monthly meeting

**Review**
- Pass round in WGISS