

# Japan-Taiwan Data and AI Module Platform for Analyzing Remote Sensing data, Part 2

Hidemoto Nakada, Ryosuke Nakamura, Kyoung-Sook Kim, Jason Haga, Yusuke Tanimura, Ryousei Takano, Yoshio Tanaka (**AIST**)  
Hsiu-Mei Chou, Hsi-En Yu, Chun Hung Huang, Weicheng Huang  
(**NCHC**)

Bo Chen, Scarlet Peng (**NSPO**)

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# The Goal

- We want to share our
  - Programs
  - Computational resources
  - Data resources

# Background

- Program
  - AIST - Machine Learning module that detect objects in the satellite images
- Computers
  - AIST- ABCI – a cluster for AI
  - NCHC – Clusters
- Data
  - AIST – Landsat 8 satellite images
  - NCHC/NSPO – Formosat satellite images

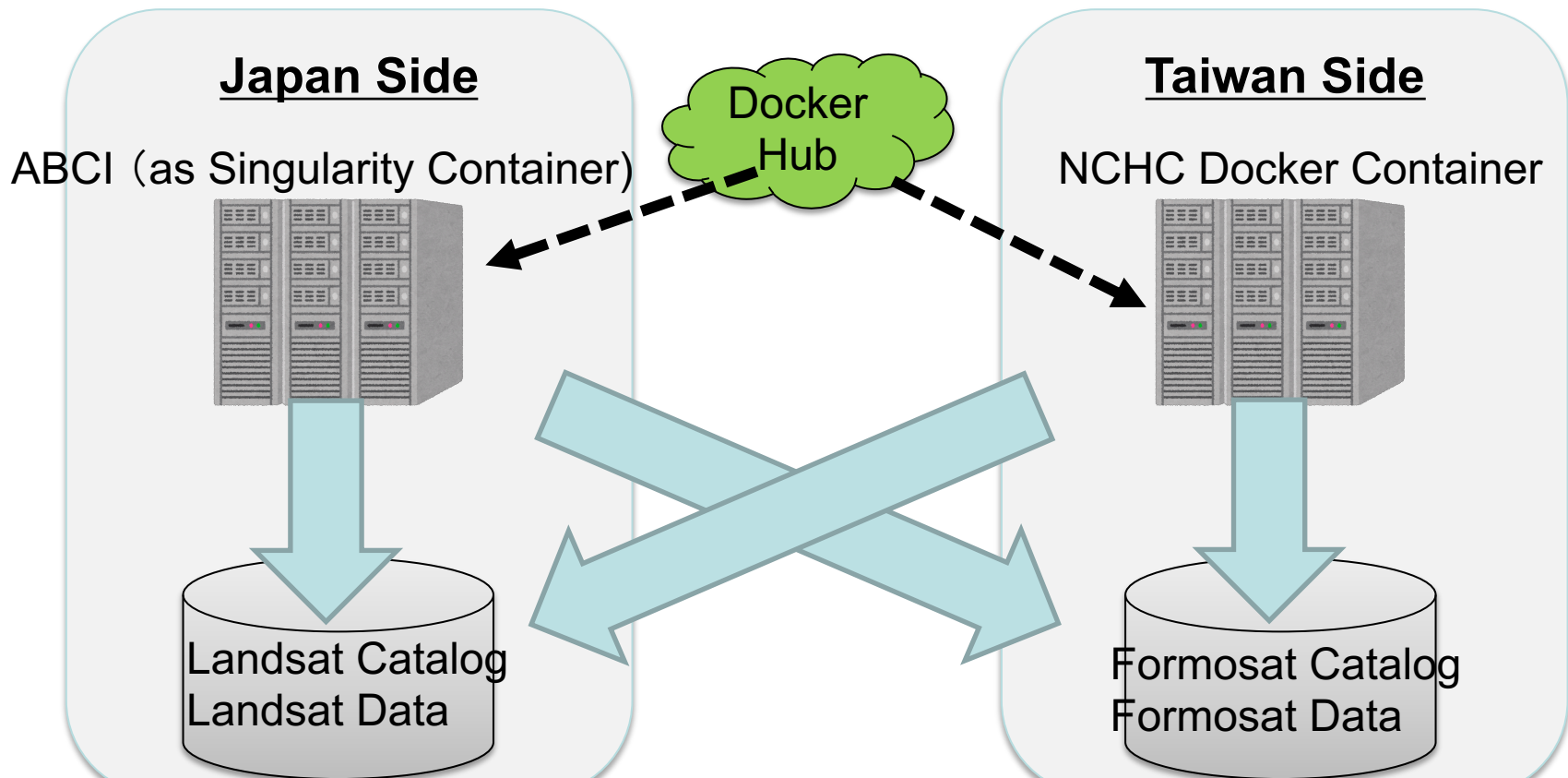
**→ How can we share them?**

# Issues and solution

- Program Sharing
  - ➔ **Dockerhub**
- Computational resource interoperability
  - Linux version, software stack ..
  - ➔ **Docker Image**
- Data interoperability
  - Satellite data format / protocol
    - Data format and protocol are different
    - ➔ **Dedicated data retrieval layer for each site**
  - Satellite image difference #channels, resolution
    - ➔ **Developed a network that can handle both**

# Overview of the Demo at PRAGMA 36

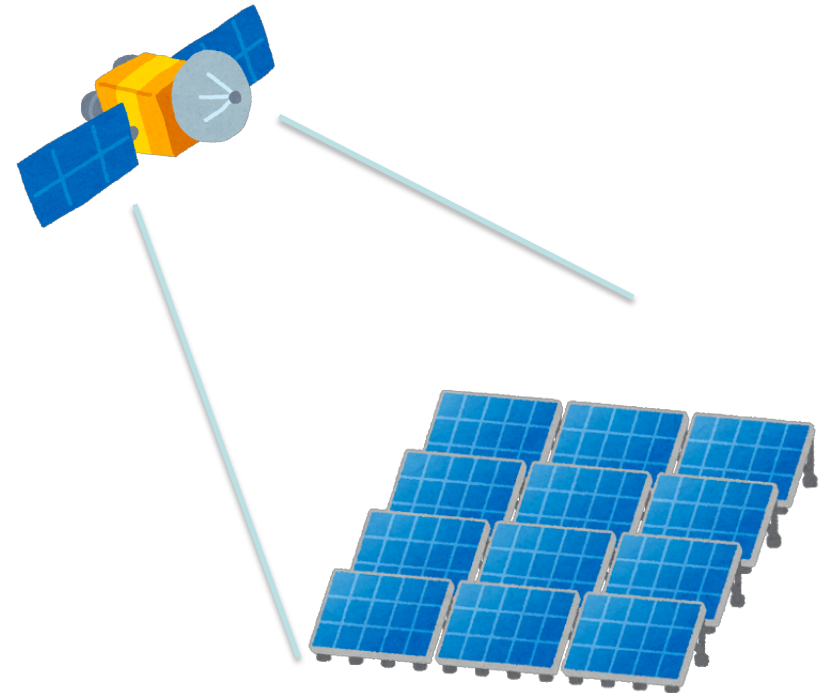
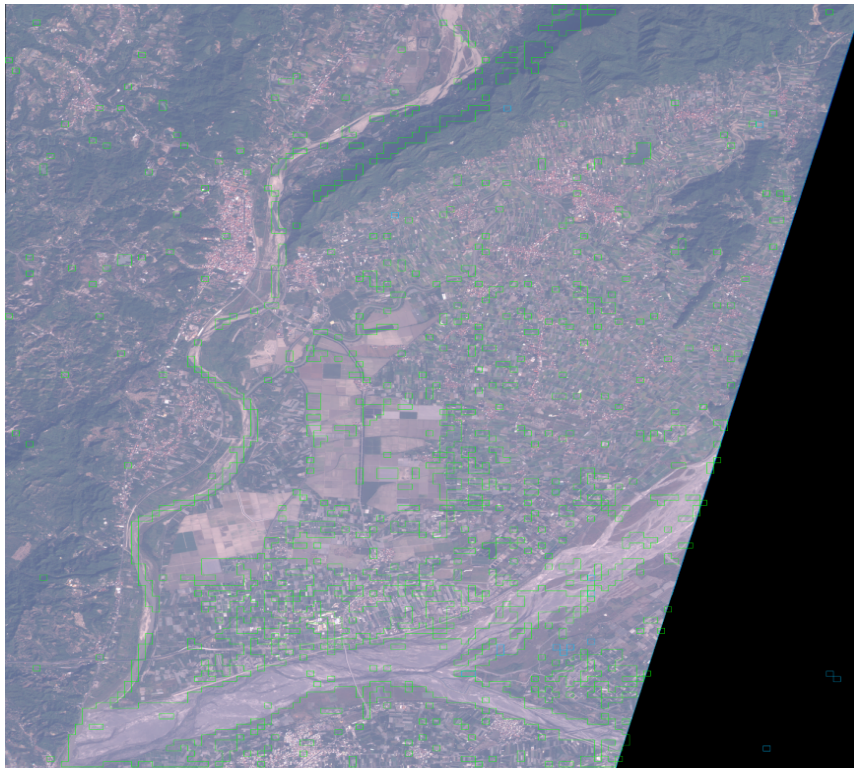
- Sharing computing resources and data resources
- Interoperable ML module on Docker hub
- Deploy and run the module for any combination of the resources.



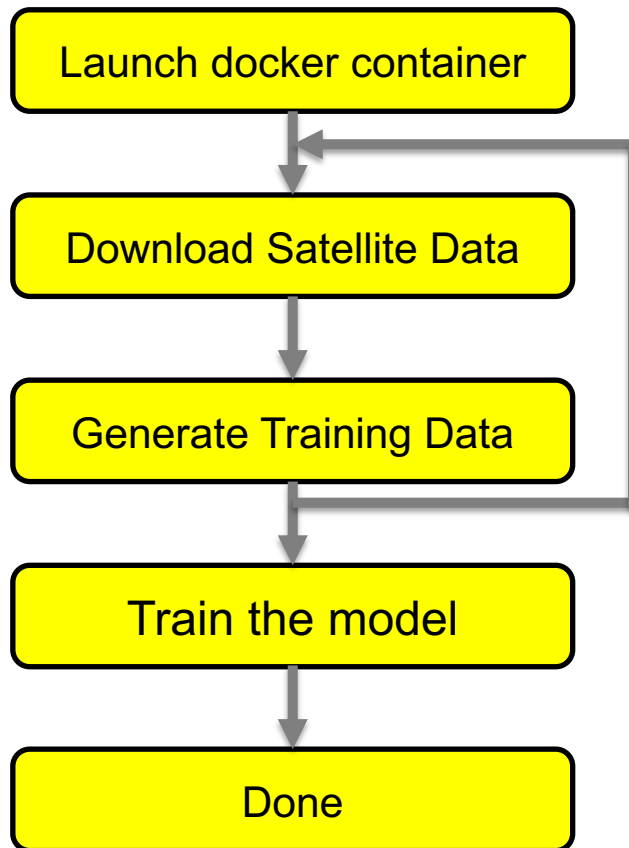
# DEMO

# The application

- Detect the solar panel in the satellite image
  - Just an example of object detection
  - The system could be easily reused for other purpose, with appropriate training data



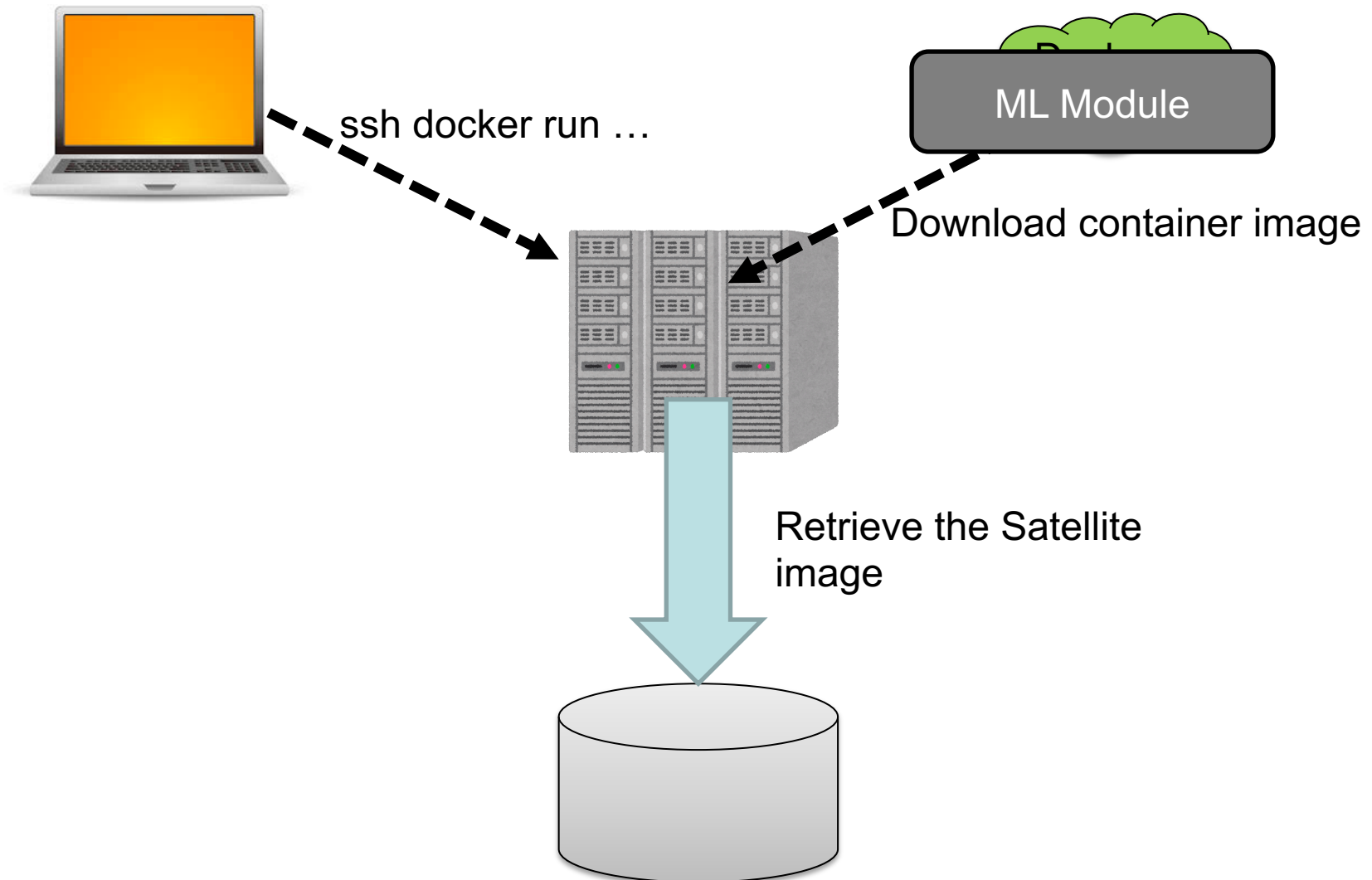
# Workflow



- Download container image from dockerhub
- Launch it in the container
- Download satellite image from storage
- Split the satellite image into small patches with labels
- Train the model with the training data
- Shutdown the container



# Behind the scene

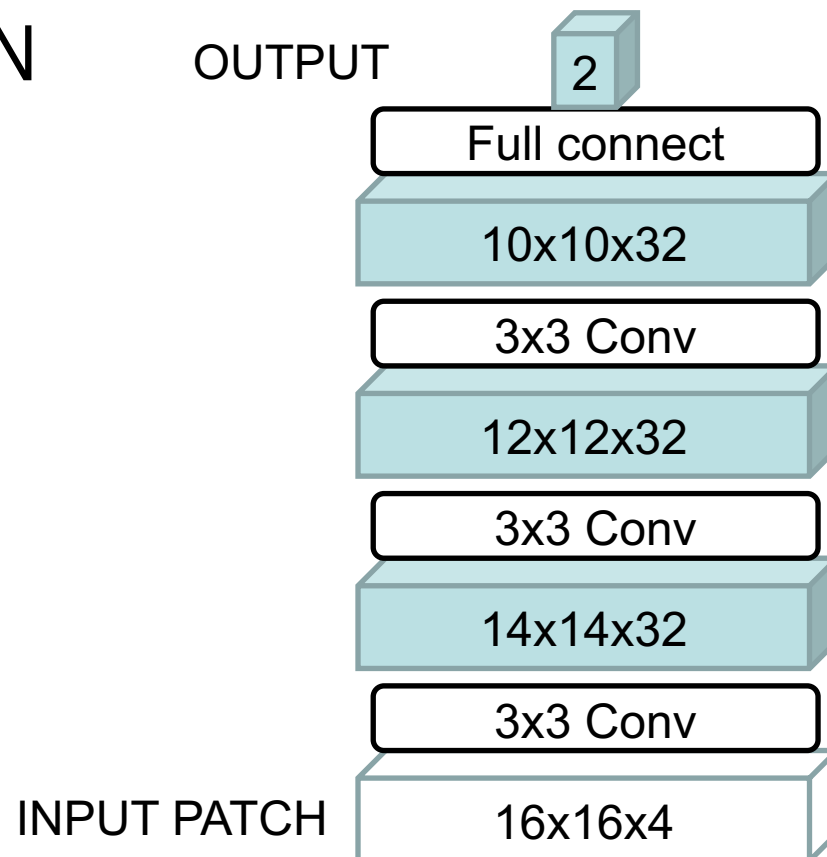


# Singularity

- Container for HPC environment
  - Docker is not appropriate NFS environment
  - NFS depends on the unix accounting and Docker ruins it – anybody can access anyfile
  - Singularity is NFS compliant
- Docker compatible
  - Docker Image could be automatically converted and deployed

# Neural Network Architecture

- MUSIC4P3
  - Conventional CNN
  - Implemented in Chainer



# Conclusion

- Computational resource interoperability problem is nearly solved thanks to Docker images
  - Easy to build and easy to use
  - We can safely ignore the software dependencies
- Data interoperability is still the problem
  - Protocol
  - Data format
  - We have to keep the effort on standardization

# Demo at PRAGMA 35

- Deploy the preconfigured 'Module' docker container on NCHC node
- Only use NCHC computing resources
- Data is embedded in the docker image

