GISTC 空间智能 因融至慧 | 2023地理信息软件技术大会
2023 Geospatial Information Software Technology Conference

Remote Sensing/SAR Satellite Imagery Analysis and Utilization System using Deep Learning Model

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SPH,Inc. / General Sales manager

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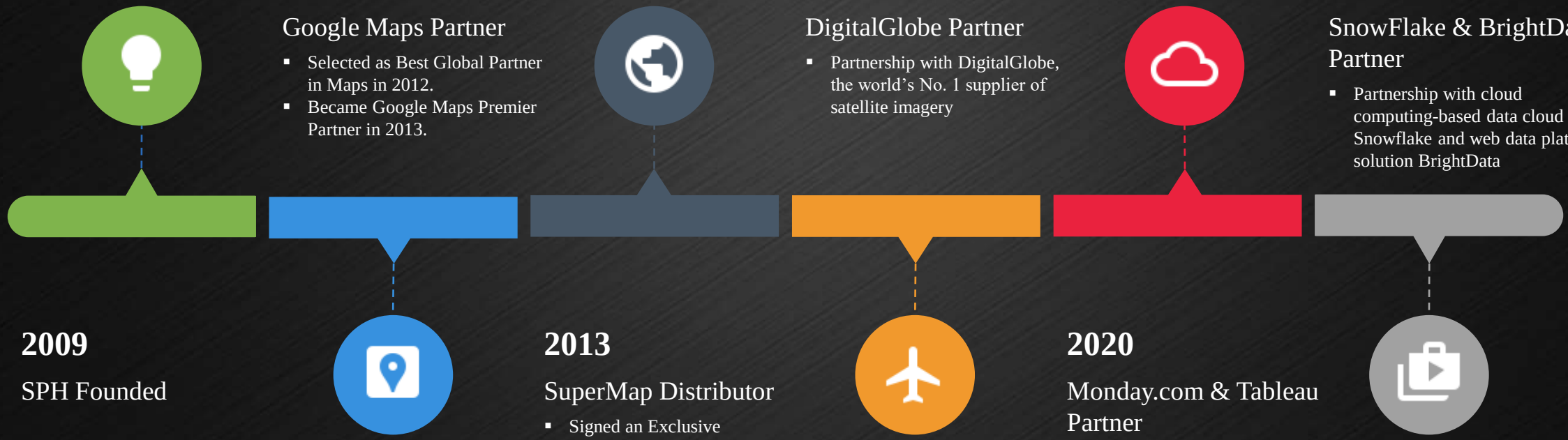
SPH Overview

SPH History

"Making a Story of Human and Place with Technology."



2009

SPH Founded

2011

Google Maps Partner

- Selected as Best Global Partner in Maps in 2012.
- Became Google Maps Premier Partner in 2013.

2013

SuperMap Distributor

- Signed an Exclusive Distributorship with SuperMap, the No.1 in the Chinese GIS S/W market

2018

DigitalGlobe Partner

- Partnership with DigitalGlobe, the world's No. 1 supplier of satellite imagery

2020

Monday.com & Tableau Partner

- Partnership with Monday.com, an Israeli project management software, and Tableau, a data visualization platform.

2023

SnowFlake & BrightData Partner

- Partnership with cloud computing-based data cloud Snowflake and web data platform solution BrightData

SPH History

Provided various Business Systems using SuperMap to Government, Business, R&D industry

Forest Fire Control System

Fight Monitoring System

3D Gas Pipeline Management

Vehicle Control System

Water Management System

Criminal Analysis System

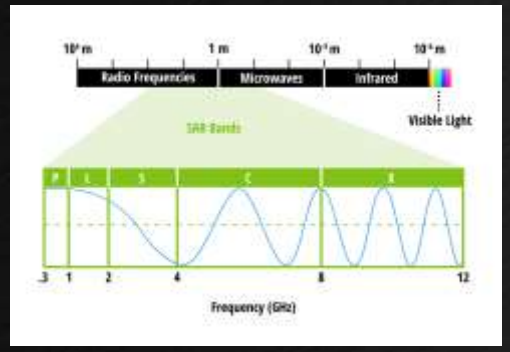
2

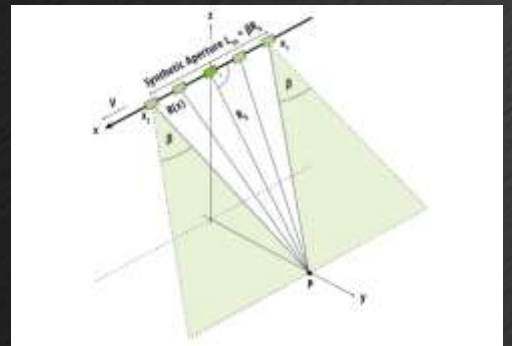
Remote Sensing/SAR Satellite Imagery Analysis

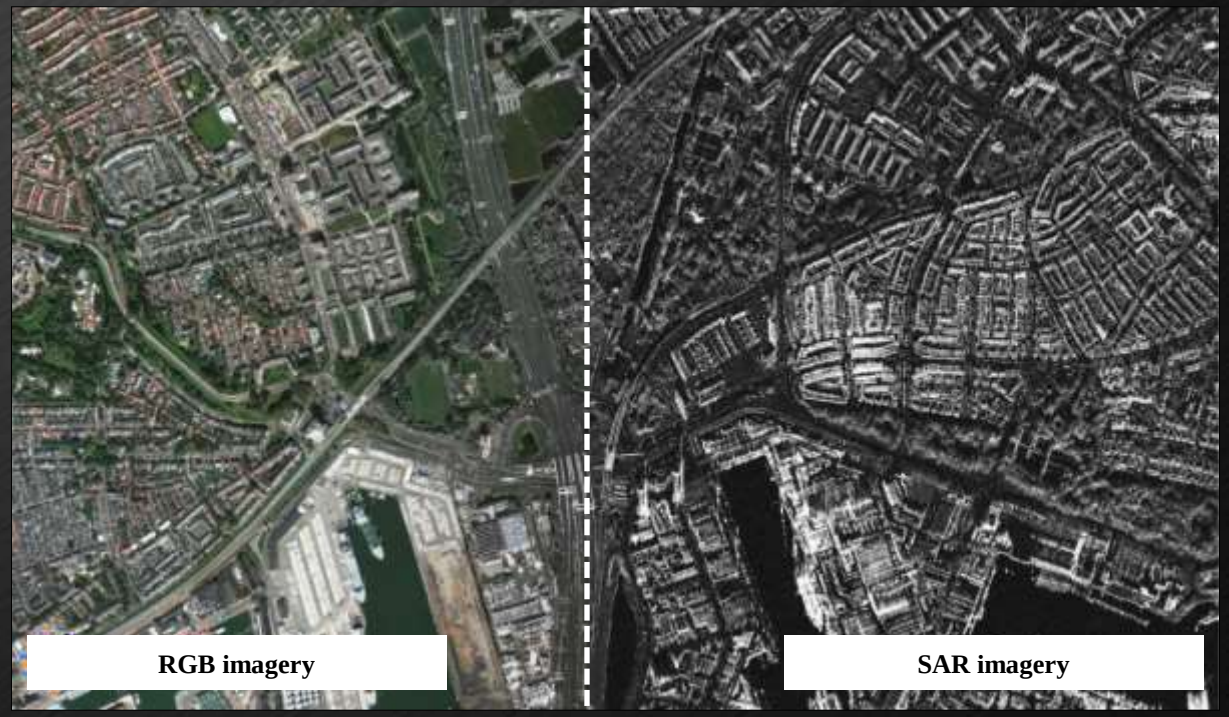
SAR Imagery

SAR (Synthetic Aperture Radar)

An active electromagnetic wave radar sensor that obtains imagery information using microwaves





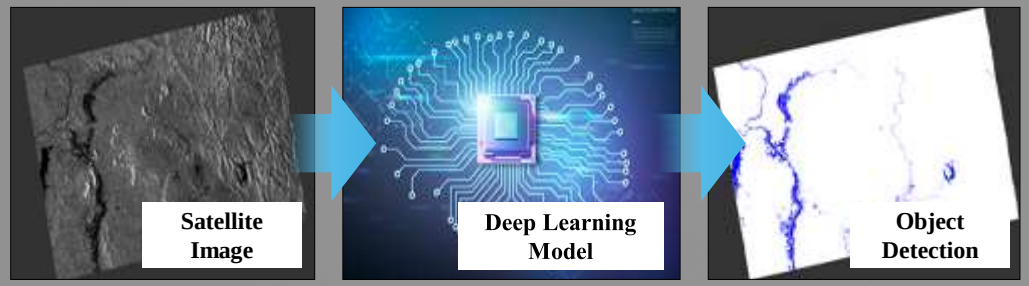


Satellite Imagery Analysis & Utilization System

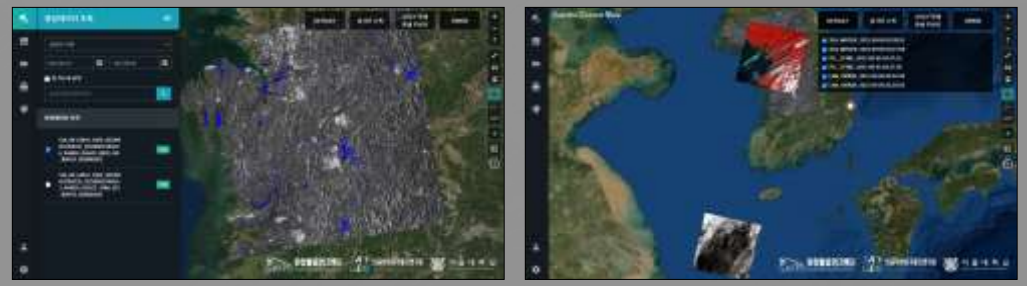
- Remote Sensing/SAR Satellite Imagery Analysis using Deep Learning
- Remote Sensing Imagery Display system for visualization of massive data

Remote sensing/SAR satellite Imagery Analysis and Utilization System

Remote Sensing/SAR Satellite AI Web Service

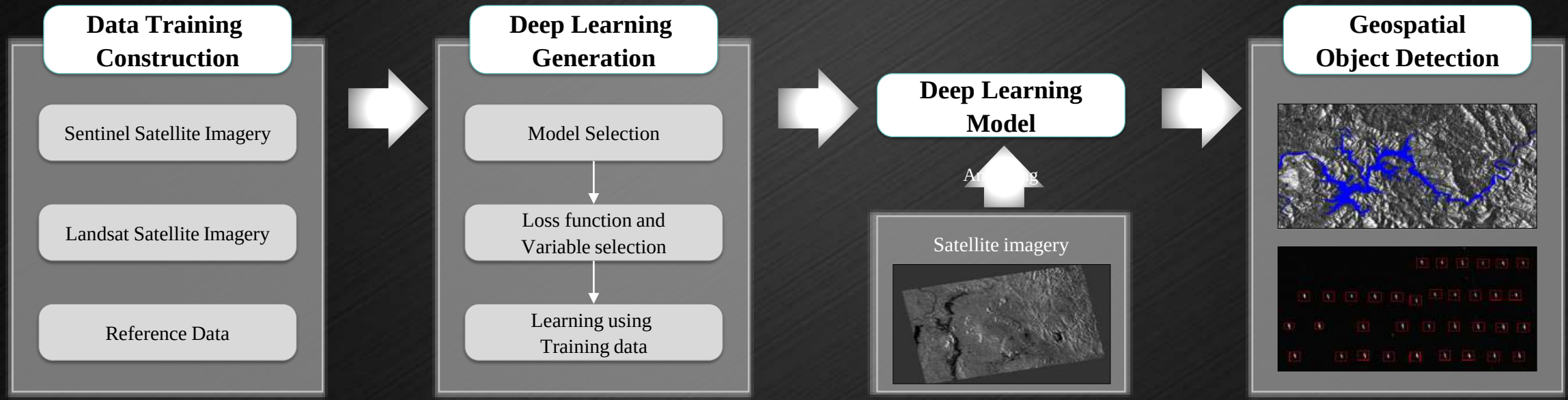


Analyzed Satellite Imagery Utilization Service



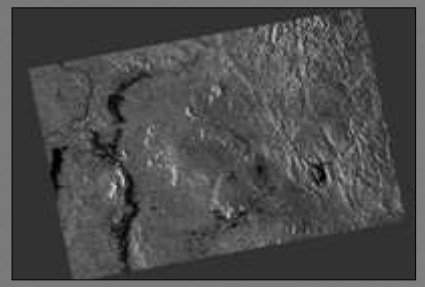
Satellite Imagery Analysis & Utilization System

Example of a general process for Deep Learning model generation for Remote sensing/SAR imagery analysis

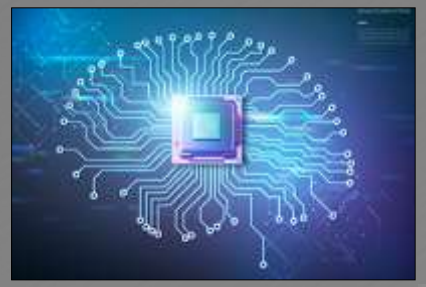


Satellite Imagery Analysis & Utilization System

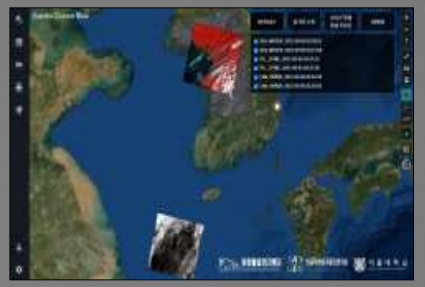
Satellite Imagery

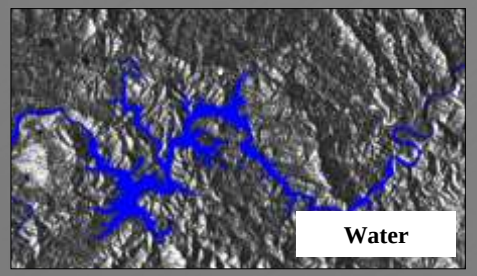


Deep Learning



Utilization Service





Geospatial Object Detection (10types) + Analytical Model (3types)

Satellite Imagery Analysis & Utilization System

Examples of Geospatial Object Detection, Analyzed Model Utilization

Ship Detection

- Control of illegal fishing
- Monitoring marine pollution, such as oil spills.

Vehicle Detection

- Used for marketing and research materials.

Building Detection

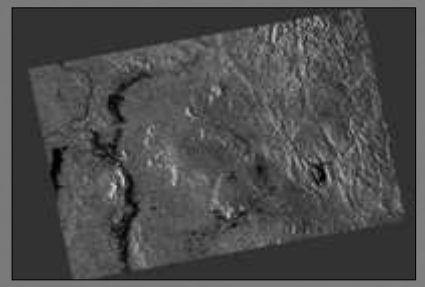
- Monitoring the progress of large-scale construction works.
- Prevention of illegal land or construction use.

Natural Disaster Analysis

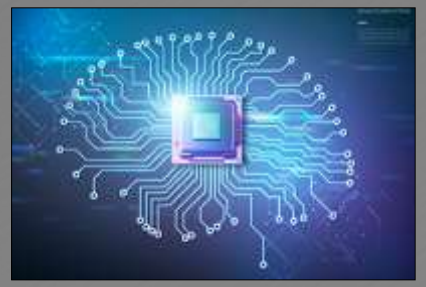
- Analysis of the size of the damaged area due to natural disasters.

Satellite Imagery Analysis & Utilization System

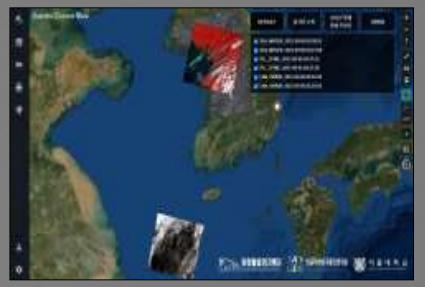
Satellite Imagery



Deep Learning



Utilization Service



Technologies used

SuperMap iServer

PostGIS

React

SuperMap iClient for MapboxGL

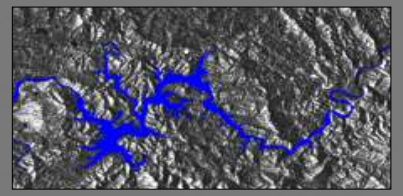
Key Function

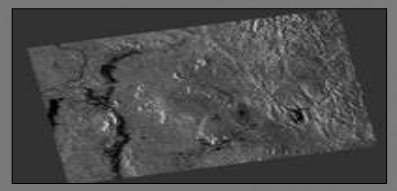
- Satellite Imagery Data Visualization
- Weather Data Visualization
- Imagery Data Analysis Visualization
- AIS Data Visualization
- GIS Data Visualization
- User Management

Satellite Imagery Analysis & Utilization System

Example of a general process for Visualization of Satellite Imagery Analysis Data using SuperMap

Remote Sensing/SAR AI Analysis Service





Imagery Transmission

Utilization Services

1. Data Collection API

- Satellite Imagery(tif)
- Image Analysis Result(tif)
- Image Data(gif)
- Vector Data(shp,kml)

2. Data Pre-processing Module

- Coordinate Transformations
- Data Conversion
- UDBX Generation
- Data Import

3. SuperMap iServer Service

- Create Workspace file
- iServer REST Map Service
- iServer REST Data Service

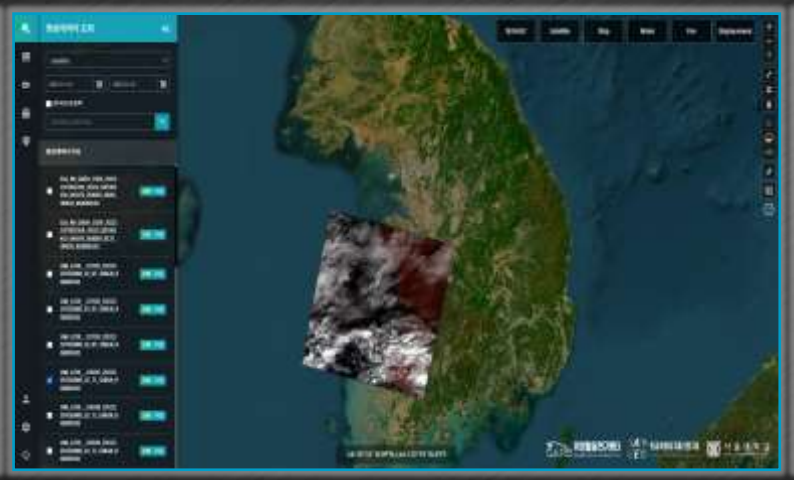
Visualization

Satellite Imagery Analysis & Utilization System

Visualization of Remote Sensing/SAR Imagery with location information and distortion correction

Satellite Imagery Data Visualization

Sentinel S1A Satellite



Landsat 8 Satellite

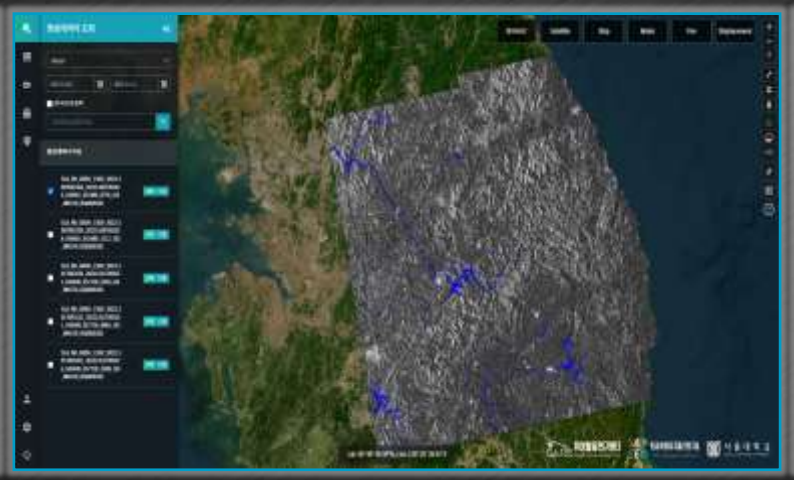
Himawari 8 Satellite

Satellite Imagery Analysis & Utilization System

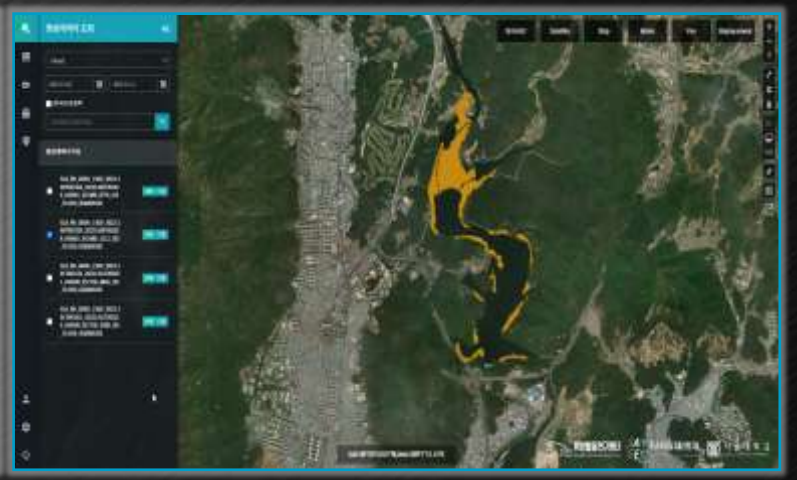
Visualization of the Spatial Object Detection of Remote Sensing/SAR Imagery analyzed

Imagery Data Analysis Visualization

Ship



Water

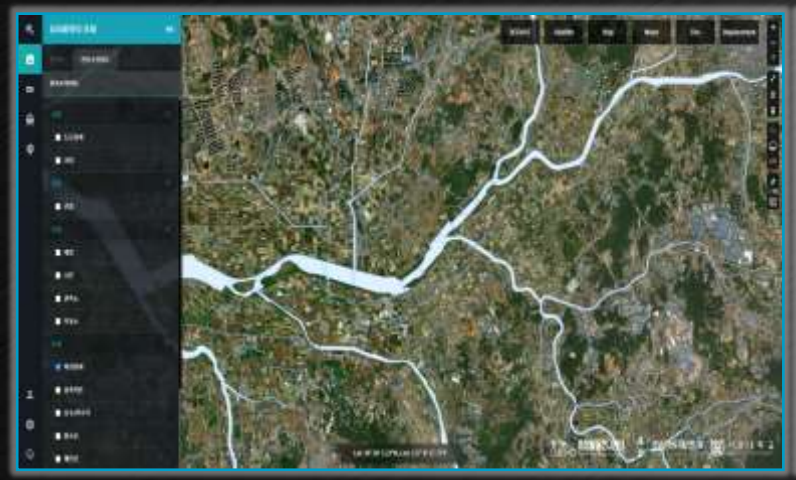


Flood

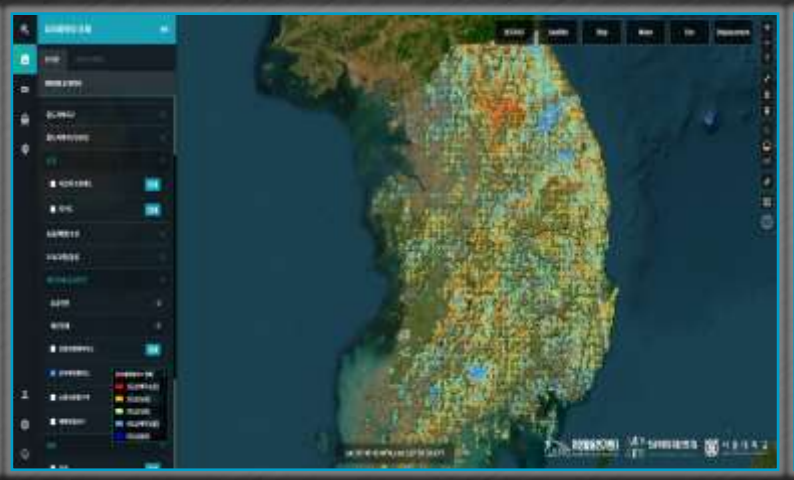
Satellite Imagery Analysis & Utilization System

Visualization of GIS data using Public Open Data and SuperMap iServer REST API

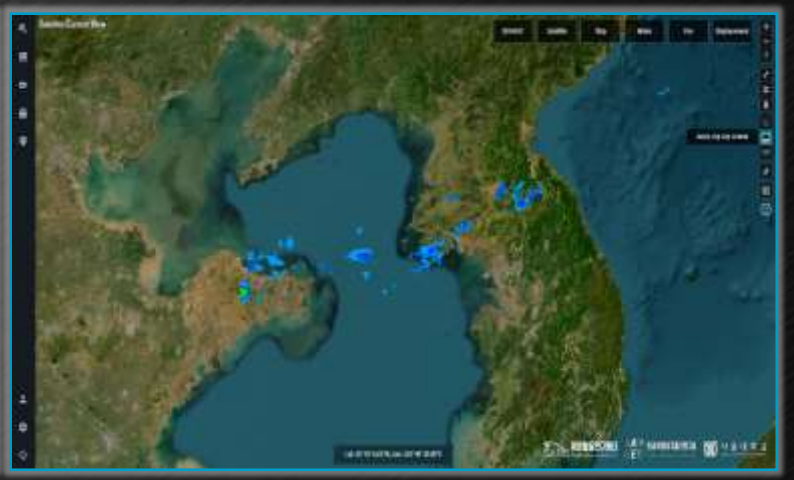
GIS Data Visualization



Open API - River



Open API - Landslide



Open API - Weather

Satellite Imagery Analysis & Utilization System

Visualization of Automatic Identification System (AIS) updated every 5 minutes

AIS Data Visualization

Real-time ship location

Ship Information

Ship Search

Satellite Imagery Analysis & Utilization System

Provided various Background Maps

Various Map Background

V-World(KOR)

Open Street Map

Global Satellite Imagery

Satellite Imagery Analysis & Utilization System

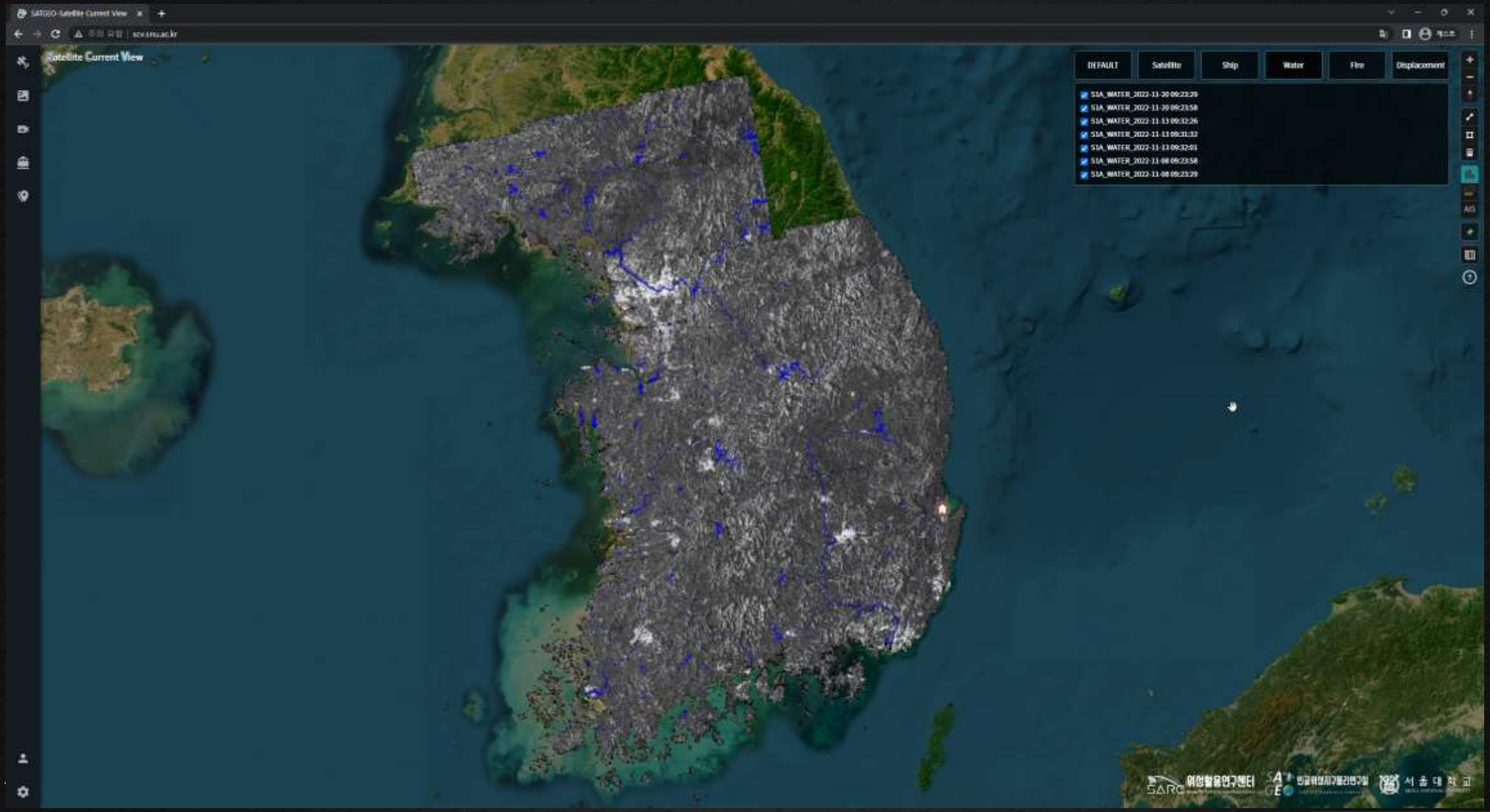
Provided functions that only administrators can use

Administrator Section

User Management

Data Deletion

Spatial Object Detection


Satellite Current View
DEFAULT
Satellite
Ship
Water
Fire
Displacement
SIA_WATER_2022-11-20 09:23:29
SIA_WATER_2022-11-20 09:23:58
SIA_WATER_2022-11-13 09:32:26
SIA_WATER_2022-11-13 09:31:33
SIA_WATER_2022-11-13 09:32:01
SIA_WATER_2022-11-08 09:23:58
SIA_WATER_2022-11-08 09:23:29
AIS

Thank You All!

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