

# DEVELOPMENT OF AN AUTOMATIC SATELLITE IMAGE COLLECTION SYSTEM FOR LONG-TERM TIME-SERIES ANALYSIS OF A REGION OF INTEREST

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## ABSTRACT

Satellite image information has the advantage of quickly acquiring data for a wide range of areas or areas that are difficult to access, in contrast to other methods such as IoT sensors and drones. Recently, there has been a growing demand for high-resolution satellite imagery and Analysis-Ready Data due to the increasing need for satellite image utilization. However, users have many difficulties when using satellite images, as it takes a long time to acquire satellite images and data for analysis is insufficient. In this paper, we proposed a system for automatically collecting freely available satellite images accumulated over a long period of time and utilizing them for time-series analysis. The proposed development method has 3 steps: Automatic satellite information collection, relative geometric correction, product generation. Firstly, we have established automatic multi-type satellite image data collection plan by webcrawling. The system automatically searches and collects satellite images that meet the specified criteria when user inputs the region of interest and acquisition date of satellite image. The selected satellites for data collection include CAS500-1, Sentinel-2 and Landsat-8/9, which are optical satellites, and Sentinel-1, which is Synthetic Aperture Radar images, that are currently available for free. Secondly, relative geometric correction is performed to correct the geometric information between the collected satellite images. For relative geometric correction, Sentinel-2 images covering the entire Korean Peninsular during a specific period are collected and used as reference data. Based on this reference data, accurate images are generated by adjusting the relative geometry between images. This process enhances the reliability of analysis by generating high-precision data. Finally, in the product generation it is possible to generate time-series products according to the user's requirements. In this context, the term "time-series product" refers to timeseries images and time-series video. In this study, we established a development method an automatic satellite image collection system so that not only to experts but also to non-experts. The established system has the advantage of reducing the time required for data collection and simplifying the pre-processing performed on the data. The generated time series images are expected to be useful for users in detecting changes in urban, vegetation over time. The timeseries video is created by combining multiple images into a single video file. It is expected that non-experts will be able to access satellite information by visually representing changes over time in urban areas or vegetation. Through, users can immediately utilize images for analysis. The development of an automatic satellite image collection system will be utilized in various industries by local governments, institutions, and other related entities. But the currently proposed automatic satellite image collection system is limited to specific satellite images. Further study is needed to expand the types of satellite images to be collected. Additionally, research should be conducted on methods for collecting drone and aerial images.

**Keywords:** Multi-Satellite Imagery, Time-series analysis, Automatic data collection, Utilizing satellite information

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