EARTH OBSERVATION SYMPOSIUM (B1)
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AUTONOMOUS TIME SERIES GENERATION OF HIGH SPATIAL RESOLUTION IMAGES

Abstract

Development of optical sensor system and the addition of new remote sensing satellites in a well-planned constellation ensures the availability of daily high spatial resolution remote sensing data soon a reality. Even with the fully developed functional remote sensing constellation, the remote sensing satellite architecture has some major limitations in providing the required daily high spatial resolution images over a particular area. After such a remote sensing satellite constellation is established, limitations such as cloud cover over a particular area may block the remote sensing satellites from observing the ground surface. Also the forecasted remote sensing satellite constellation will only provide daily high spatial resolution images over the north and south hemispheres. Daily observation over the equatorial zones are still far from achieving. These major factors results in temporal gaps in high spatial resolution data and these gaps needs to be filled by other means. Because the performance of remote sensing applications such as crop monitoring and rapid changes in the ecosystem greatly depends on the daily availability of high spatial resolution data. The lack of availability of data affects the effectiveness of the mentioned applications. Time series generation of high spatial resolution data seems to be the better alternative for this issue. Using data fusion algorithms, time series generation produces synthetic high spatial resolutions images to fill the temporal gaps by fusing the high temporal moderate spatial resolution images with the low temporal high spatial resolution images. Time series generation is a tiresome process which requires lot of human interventions. This is because, time series generation as a whole involves multiple sub processes. The main sub processes are downloading of satellite data, pre-processing of data, removal of cloud pixels and filling the gaps caused during this process, time series generation by data fusion and finally assessing the quality of generated data. Having a single tool which can perform the time series generation autonomously will be a great benefit for the remote sensing community. So far there is no such tool available as it is quite complicated to perform all the sub-processes autonomously on the images from different sources used for the time series generation. This paper provides detailed description about the above mentioned sub processes, investigates the challenges of automating the sub processes and finally provides a possible solution to develop a tool which can perform the time series generation autonomously with less to no human interaction.