

# A Big Data Approach for Situation-Aware correction and estimation of NDVI, based on Landsat8 OLI/TIRS (Surface Reflectance) time series data

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The Landsat8 Surface Reflectance Higher-Level Data provided by USGS corrected from medium resolution MODIS Terra /Aqua Satellites data, contain Cloud QA, CFmask, CFmask Cloud Confidence and Interpolation Flag bands corresponding to prior single Quality Assessment(QA) Band of OLI/TIRS data. These corrected band data, when used for deriving vegetation indices such as Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI), Soil Adjusted Vegetation Index (SAVI) still exposes limitations in presence of atmospheric artifacts such as aerosol, cloud, cirrus cloud etc. The effect of occlusion by these artifacts imposes an important challenge for estimation of accurate vegetation indices, adequately affecting application areas such as digital precision agriculture: Where recommendation applications developed for farmers largely depend on these indices(e.g. Spatio-temporal irrigation recommendations to farmers based on NDVI based estimation of crop evapotranspiration - Etc). Our approach corrects the surface reflectance band values in the case of occlusion by cloud and other artifacts, defusing Spatio-temporal correlations and regressions. The Big Data process pipeline consisting correlation and regression techniques developed on Apache Spark can easily scale for large data sets including many tiles(scenes) and over widened time-scale.

Keywords: Normalized Difference Vegetation Index (NDVI), Situation-Aware, Big Data, Apache Spark, Landsat8