By - Padhiar Karansinh Atulsinh
18DCS055

Detection of Day Time Fog over India using INSAT-3DR Satellite Data

Domain:

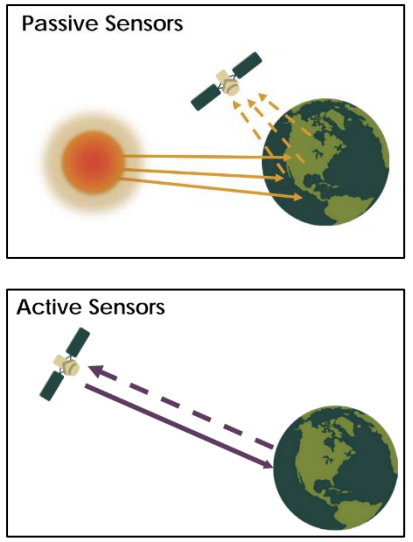
Remote Sensing, Satellite Data Processing, Computer Vision, Machine Learning

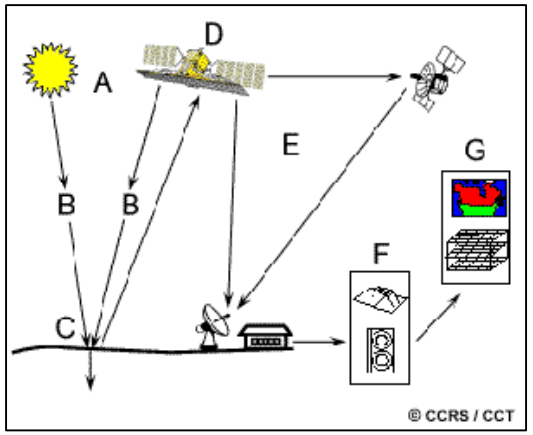
Abstract:

- Fog is a hazardous weather phenomenon that appears when water vapour near the surface is condensed to form suspended water droplets.
- The north-Indian region experiences dense fog during winter from November to February every year, reducing the horizontal visibility below 1 km range.
- Fog can impose serious danger to navigation for aviation and transportation sectors, which in turn can affect the economy and endanger lives.
- Therefore, it is crucial to monitor the spatial extend of fog in order to take important decision which, in turn, can prevent occurrence of accidents.
- In this project, **we propose an algorithm for automatic detection of day-time fog** over the Indian region using INSAT-3DR IMAGER data**.**
- Later on, using satellite data, we plan to predict the time when the fog patch would disappear completely.

What is Remote Sensing?

- "Remote sensing is the science (and to some extent, art) of acquiring information about the Earth's surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and processing, analyzing, and applying that information." [1]





Types and Components of Remotes Sensing

[1] Fundamentals of Remote Sensing [https://www.nrcan.gc.ca]

* I agree to the Terms and Conditions of the MOSDAC for use and sharing of INSAT-3DR data.

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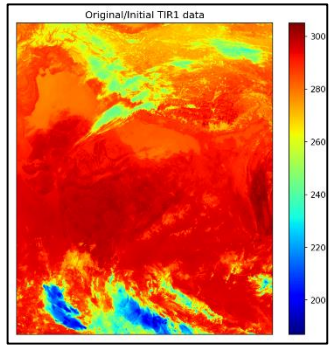
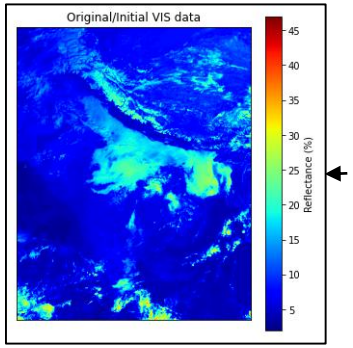
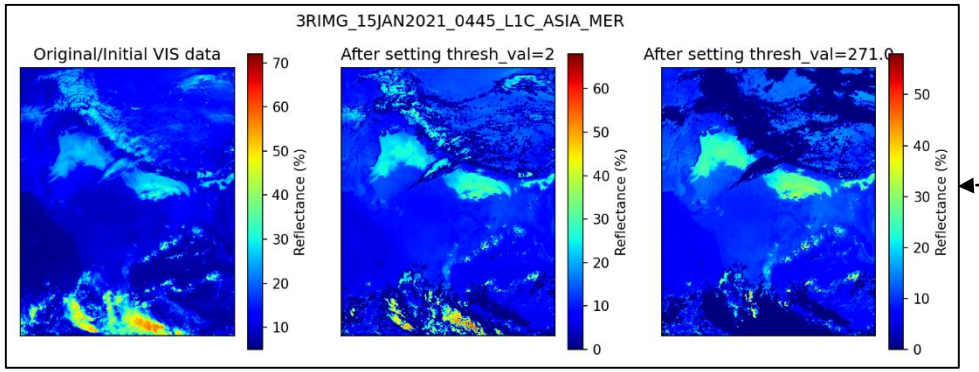
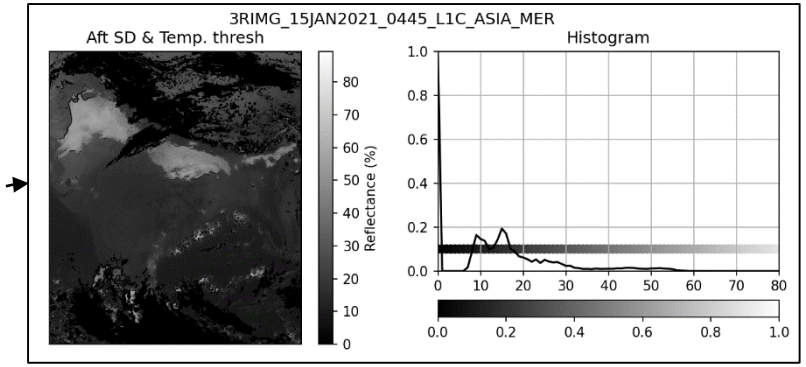
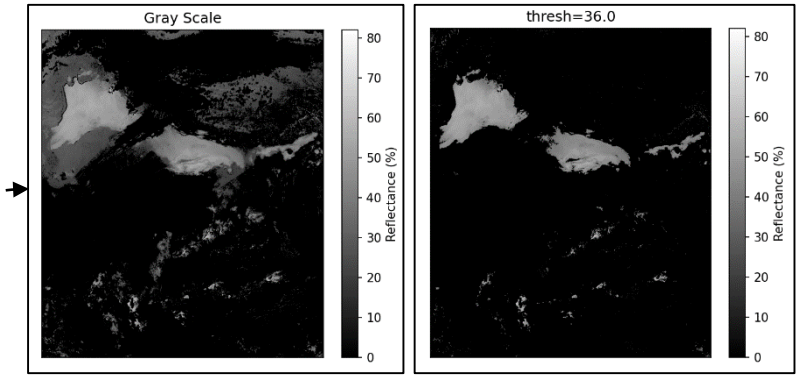






- INSAT-3DR VIS and TIR1 band preprocessing (conversion of DN value to reflectance and brightness temperature)
- Reflectance Normalization on VIS image w.r.t Solar Zenith Angle
- Calculate a dynamic temperature threshold value from TIR1 histogram
- High- and mid-level water cloud removal using TIR1 data
- Calculate a dynamic reflectance threshold value from the resultant VIS histogram
- Apply image thresholding to keep only the fog region (Removal of Snow/Land)
- Image containing the detected fog





[2] “Detection of Day Time Fog Over India Using INSAT-3D Data” - Chaurasia, S., & Gohil, B. S. (2015).
[3] “Detection of Fog Using Temporally Consistent Algorithm With INSAT-3D Imager Data Over India” - Chaurasia, S., & Jenamani, R. K. (2017).