

# **AUTOMATION OF DISAGGREGATION OF LAND SURFACE TEMPERATURE BY DEVELOPMENT OF AN IDL WIDGET APPLICATION**

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# Introduction

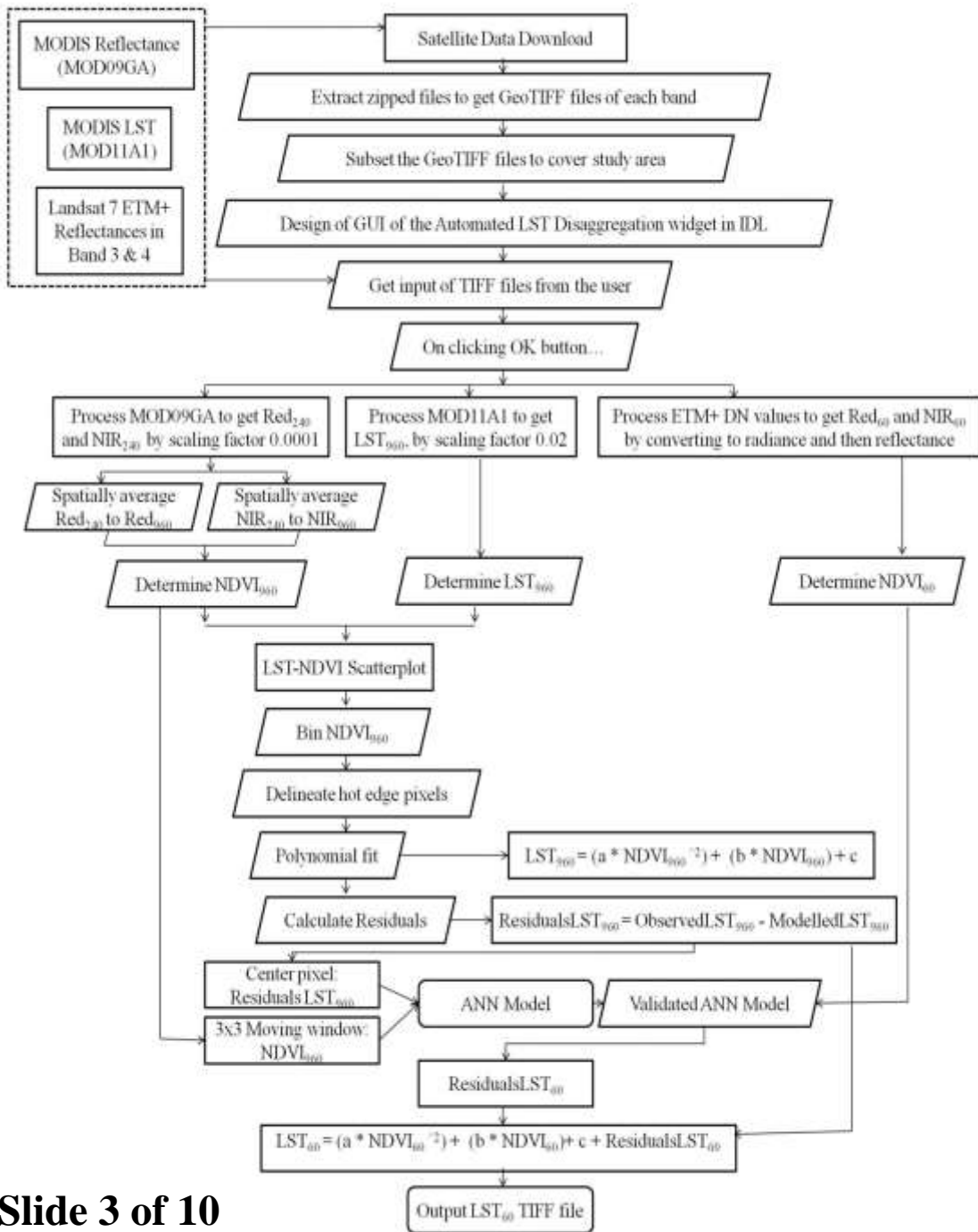
- **Satellite-derived fine resolution Land Surface Temperature (LST) is an important input variable for many hydrological applications**
- **Non-linear Radiant Temperature Disaggregation (NL-DisTrad) algorithm is used to disaggregate coarse resolution LST to finer resolution**
- **It is automated by developing an IDL widget**
- **It allows an end-user to input the mandatory GeoTIFF bands, processes them automatically, and downscales MODIS LST (spatial resolution 960m) to that of Landsat ETM+ at 60m**

# Objective

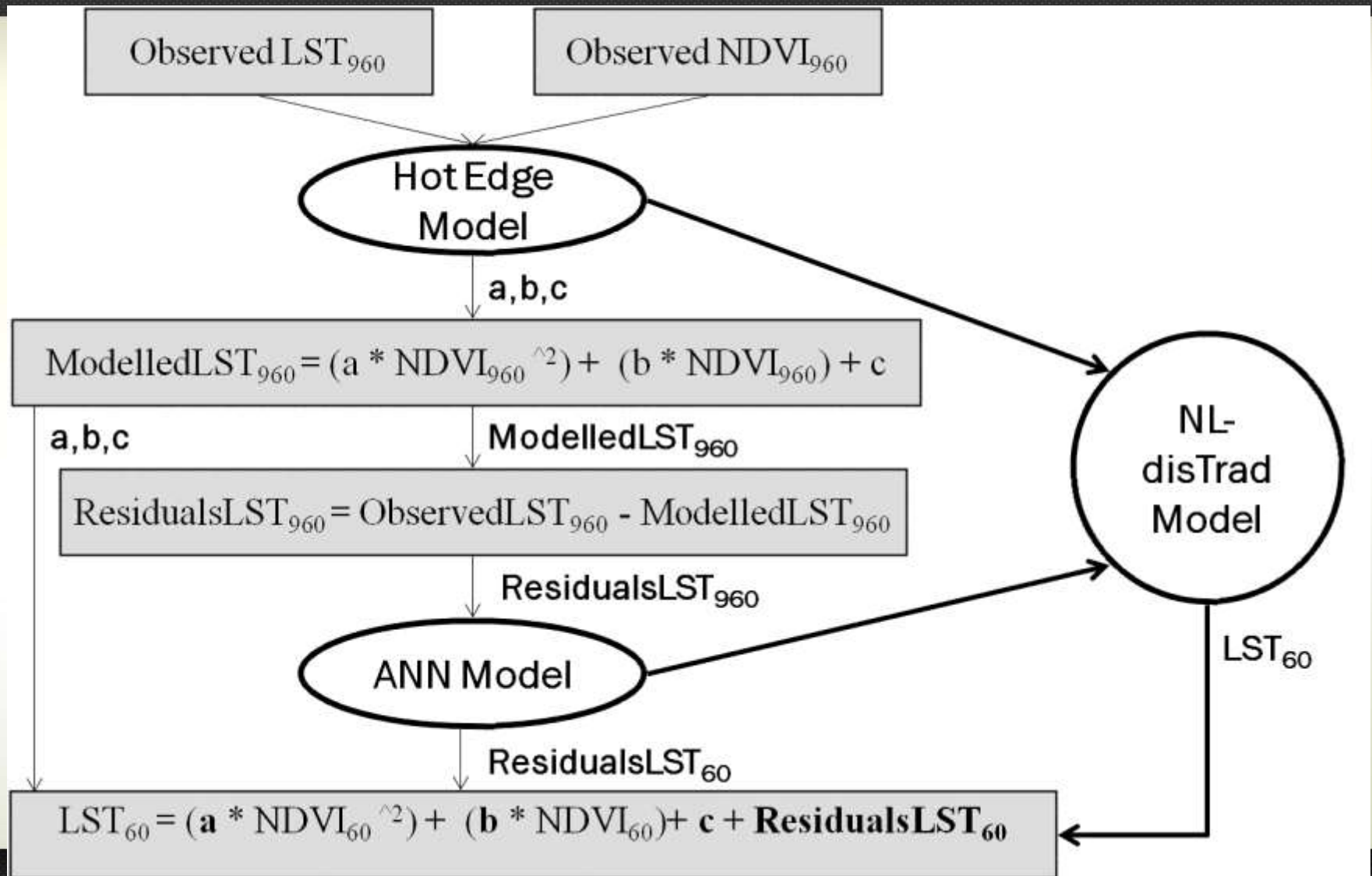
- **To automate the disaggregation of LST using NL-DisTrad algorithm, in IDL programming language by synergistic use of Landsat-7 and MODIS thermal data products**

presentation file

# Methodology

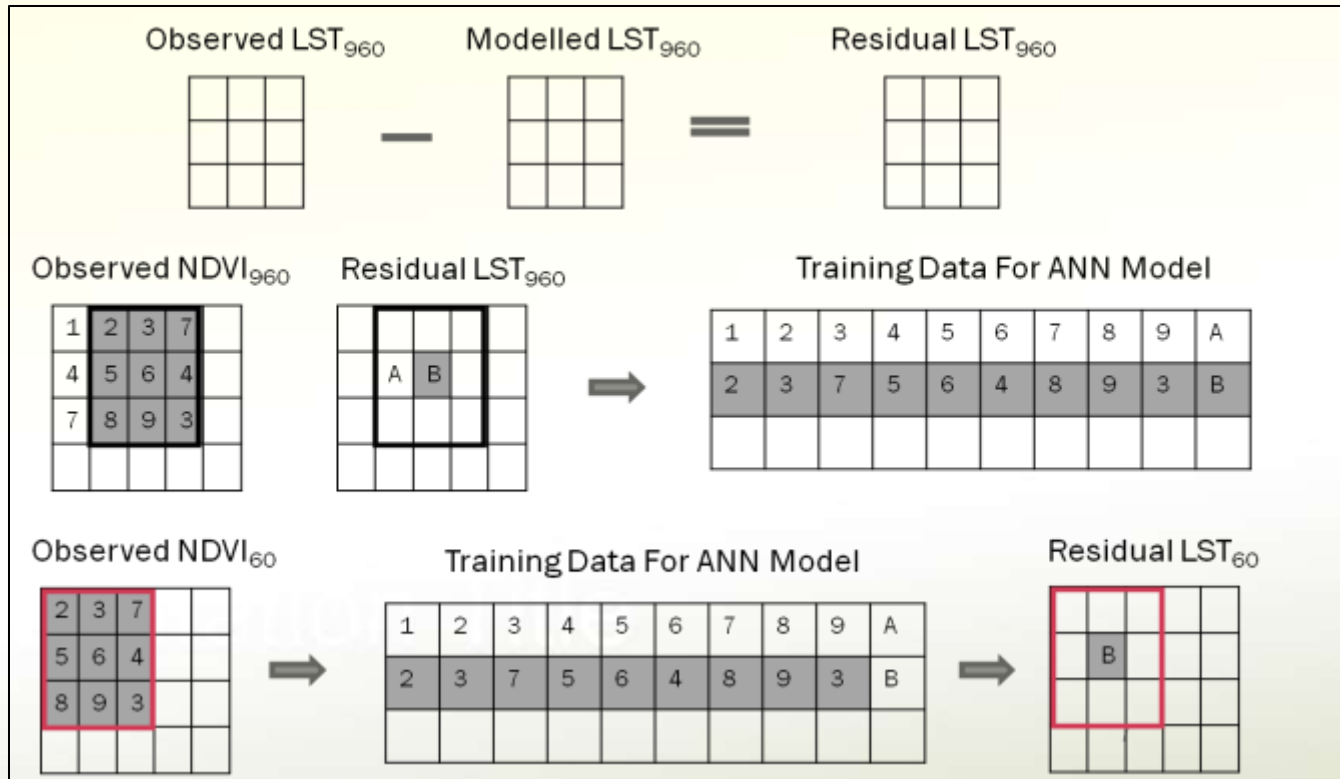


# NL-disTrad Model





# Training the ANN





# Results & Discussion


## Developed IDL Widget

Automated LST Disaggregation


MODIS Data Input:


Thermal Band (960m):  


Red Band (240m):  

NIR Band (240m):  

Landsat-7 Data Input:

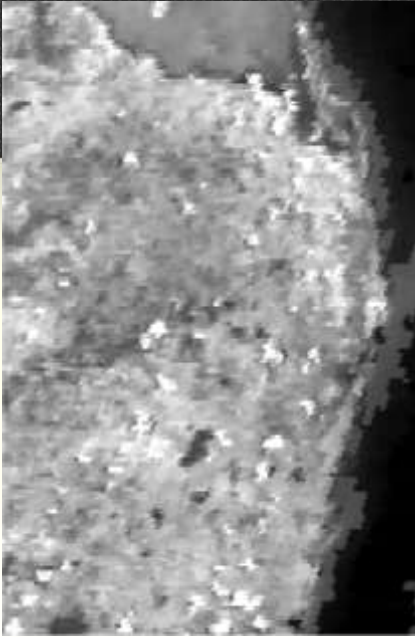
Red Band (60m):  

NIR Band (60m):  

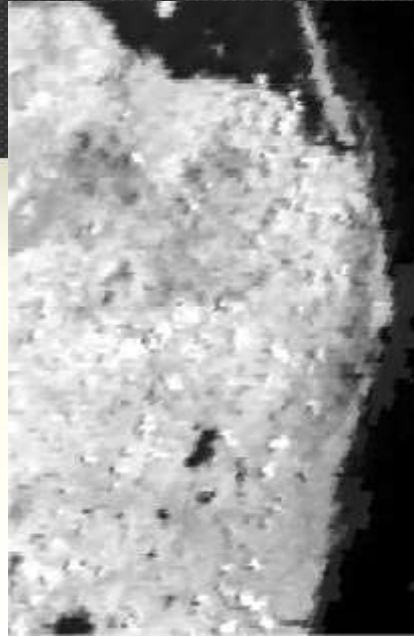
Output Location:  

OK

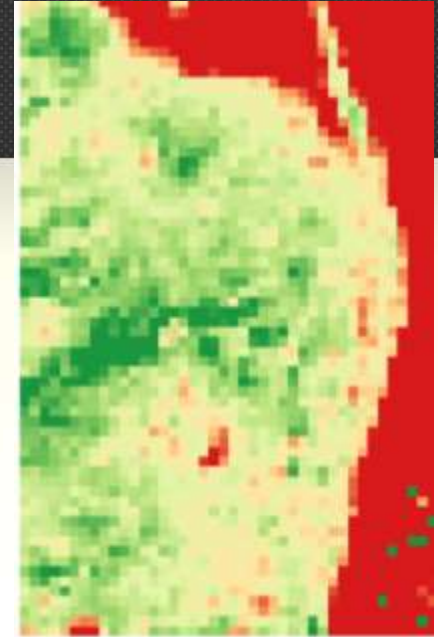
**MODIS**  
**Red**



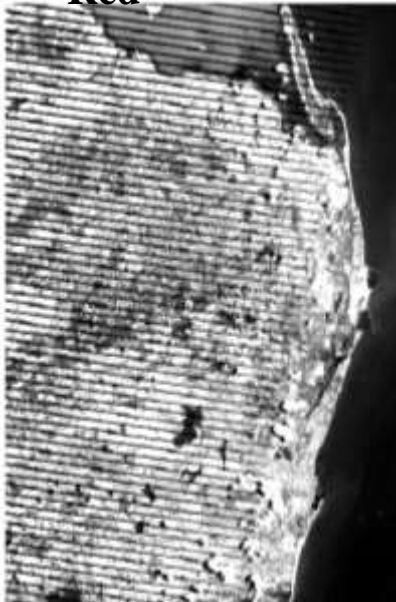
**NIR**



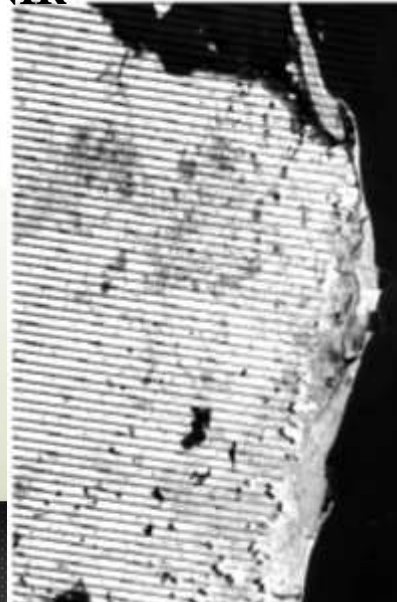
**NDVI**



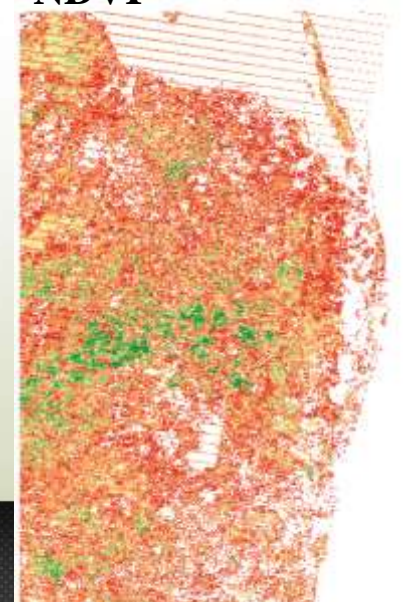
**Landsat - 7**  
**Red**



**NIR**



**NDVI**

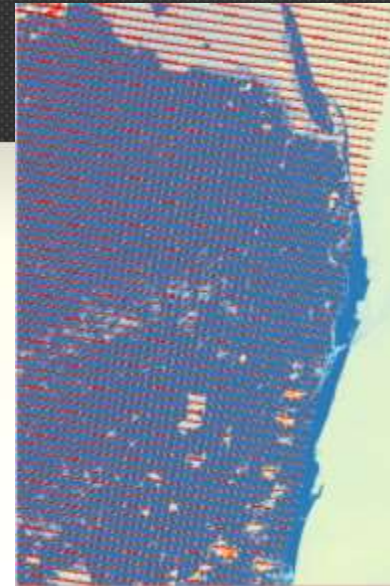




**MODIS  
LST 960m**



**Landsat - 7  
LST 60m**



**Modelled MODIS  
LST 60m**



# Results & Discussion

- **The NL-DisTrad algorithm uses the relationship between NDVI and LST at a coarse resolution, for hot edge pixels**
- **Using an ANN model, the residuals obtained at the coarse resolution are modelled and the resulting residuals are added to the disaggregated LST at a fine resolution**
- **The ANN model uses NDVI of neighbourhood pixels, as it is assumed that the LST of a pixel will be influenced by the vegetation in surrounding pixels**
- **This hybrid model (Hot edge model + ANN model) is validated by comparing the automatically disaggregated LST to the observed ETM+ LST**

# Conclusion

- **Some satellites do not carry thermal sensors, but can provide fine resolution NDVI**
- **As this widget requires only LST and NDVI datasets at coarse resolution, it may be used to disaggregate the MODIS temperature data to a resolution comparable to that of other bands' reflectance datasets**