**Title:**  Estimation of high spatial resolution soil moisture using LDCM data.

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**Introduction**

The issue of spatial resolution of thermal imaging of spatial sensors in urban areas is one of the challenges of the recent decade. The temporal and spatial changes of urban phenomena and the lack of fit between spatiotemporal resolution of thermal images and these changes, on the other hand, led to research on improving the spatiotemporal resolution of thermal images. The simultaneous presence of thermal and spectral data on existing sensors and the correlation of these data has led to the idea of improving the spatiotemporal resolution of thermal data using reflexive data using statistical and mathematical relationships , Considered. The aim of this study was to improve the spatial resolution of thermal images using vegetation indices and inert penetration levels and a combination of both indicators in urban areas. MODIS sensor data is used to evaluate the accuracy and reliability of the proposed method in this study. In this way, using the data from the thermal band of this sensor and the proposed method, the heat dissipation level of the surface is improved and its accuracy is investigated.

**Methods**

In this research, after the initial pre-processing, images obtained using the mean filter was simulated at spatial resolutions 120, 240, 480, 720 and 960 m. The relationships between these simulated imaged with the image simulated at the resolution of 960 m were calculated by the use of regression models. These derived models, containing vegetation and impervious surface indices, were then used to simulation of surface temperatures in different pixel sizes. The accuracy of each output, has been evaluated using the thermal images of ETM + and MODIS sensors.

**Results**

The results showed that by increasing the spatial resolution, the errors increases while the gradient of error is not fixed. So that in all indices, there are more increasing in gradient of error when the pixel size goes to smaller than 240 meters. Moreover, the best performance was obtained by combination of impervious surfaces indices and vegetation indices due to the enhancement of spatial resolution of thermal images in Tehran city. Using the combination of these indices, the spatial resolution of the MODIS sensor can be reached to about 240 meters, while the absolute error value is less than 1 K Kelvin.