

Image Generation for Microwave Remote Sensing Using Java Language

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ABSTRACT

The Microwave Remote Sensing is the emerging field for study of natural resources such as dry and wet soil as well as vegetation etc. Microwave Remote Sensing sensors are divided into active and passive sensors which give the scattering and emission behavior of the terrain respectively. The dry and wet soil behaves differently and gives emission as well as scatters the energy at Microwave frequencies. Both emissivity and scattering coefficients are the function of soil moisture. The radar scattering coefficient (σ^0) of a soil surface depends primarily on the surface roughness and the dielectric constant of the soil. It also represents the scattering behavior of an object at a given frequency, incident angle and polarization and defined directly in terms of the incident and scattered fields. The emissivity (ϵ) of a body is the ratio of the emission from the body as to a black body emission at same physical temperature. It depends on the surface roughness and the dielectric constant of the body. To study large areas, the images are generated using the emissivity or brightness temperature and scattering coefficient along with moisture content data and the suitable computer language. For the present paper, the Java language has been used for generation of images. Java is an Object Oriented Language through which images can be created efficiently for Microwave Remote Sensing applications. The data in the form of emissivity, brightness temperature, scattering coefficient and moisture content of soil of Rajasthan has been used and which has been obtained using Microwave Remote Sensing techniques. The data is initially stored in a file in the form of 'Strings'. This is then converted into 'Float' value that can be directly accessed in the main program to create image of the data. For this the main program consists of applet codes, the Java graphics, exception handling etc. Finally, the image obtained indicates the percentage of moisture content present in the soil and different colors are used to indicate the different ranges of brightness temperature and scattering coefficient and moisture content.