Environmental Impact Assessment using Image Processing and Analysis

Abstract

Water is elixir of life. So rainfall becomes the

“Water is the elixir of life while Soil is the fuel for agriculture”

In this fast moving world, estimation of rainfall and soil content has become a necessity specially when the global heat levels are soaring and soil pH levels are rising. The proposed approach here given in the paper requires the digital images and videos which are captured via high speed cameras along with some complex algorithms to determine the amount of rainfall and the soil type so to maximise the utilisation of the resources and minimize the impact of environment on these resources.

In case of rainfall measurement, we use two methods:

First, in this we see the number of drops and there volume in a frame of an image. Later we are dividing the image into blocks in Grey-Scale so that we can calculate the number of water droplets in an image frame and using certain proven algorithms, the software is then able to determine the rainfall intensity.

Second, in this we use a video footage of a water pour during the rainfall and use video-frame comparison techniques so to determine the rate of change in rainfall and its intensity as well as measure the factors affecting it due to environmental impact.

This system is found to be more accurate and error free as spreading of drops induced errors are neglected as this system uses image processing tool to make analysis of data. It involves many operations, which are performed on raw data collected from high definition camera also the system response time is also less.

In case of soil measurement, we use similar two methods:

First, in this we take some digital images of the soil of a small area and using the technique of RGB image-block comparison to some predefined images in the database we determine the soil type and obtain the different parameters regarding the concerned soil type.

Second, in this we use a video footage of a soil block made over a period of time and using the video-frame comparison technique we determine the change in the different parameters of the soil in question so to obtain results regarding the soil type and the change in soil due to the environmental impact.

For project calculations, colour characteristics are analysed using the RGB and the Grey-Scale model while the texture features are analysed using entropy, energy, contrast and homogeneity. A relationship between extracted features and moisture content is developedso to determine the soil and rainfall characteristics.