Colour spaces for paddy soil moisture content determination.

ABSTRACT

A study using RGB, HSV and CIELUV colour spaces was conducted to determine the paddy soil moisture content at two different soil depths. Results from the experiment showed that each layer of soil gave a different soil colour as the soil moisture content varies with the depth of the soil layer. By comparing the result of laboratory work with the result of image processing technique, it was shown that 15 cm depth soil which had higher moisture content gave a lower value of mean pixel intensity compared to the surface soil. When the digital images of soil were transformed to HSV (USGS Munsell), a colour space commonly used to represent soil colour, the result showed that the mean pixel intensity was not consistent for each soil layer. To overcome this problem, the RGB and CIELUV colour spaces were used. The CIELUV colour space gave more consistent mean pixel intensity for each soil layer. It successfully indicated that lower moisture content will give higher value of mean pixel intensity. Results from statistical analysis also showed that RGB and CIELUV colour spaces were significantly related to the soil moisture content. CIELUV gave the highest value of correlation at –0.548 and a smaller value of RMSE in linear regression analysis.

Keyword: Soil moisture content; Colour; Image processing; RGB; HSV; CIELUV.