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Application of Simple Multispectral Image Sensor and Artificial Intelligence for Predicting of Drought Tolerant Variety of Soybean

Marcelinus Alfasisurya Setya Adhiwibawa[a], Yonathan Eric Setiawan[b], Yusuf Setiawan[b], Kestrilia Rega Prilianti[b], Tatas Hardo Panintingjati Brotosudarmo[a]*

[a]Ma Chung Research Center for Photosynthetic Pigments, [b] Department of Informatics Technology
Universitas Ma Chung, Jalan Villa Puncak Tidar N-01, Malang, Jawa Timur,65151 Indonesia.

Abstract

Environmental stress such as drought is a limiting factor of the soybean production in Indonesia. The varieties of drought-tolerant soybean become necessary to be cultivated especially in a marginal farmland. The characteristics of these varieties can be identified from the morphology of plants and the content of chlorophylls. Conventional techniques for predicting the variety of drought tolerant are usually labor extensive, time consuming and costly. A simple and rapid method that based on an automatic system to provide predictions on the variety of drought tolerant soybean is proposed in this paper. The method uses a simple multispectral sensor from a web camera that captures physical and physiological characteristics such as leaf areas, plant heights and is also able to calculate the content of chlorophylls. This research also compared fuzzy logic and artificial neural network as artificial intelligence methods to process raw data in order to predict the variety of the drought resistance soybean. The drought tolerant variety can be best predicted by artificial neural network method with an accuracy of about 80 %.

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Keywords: Artificial intelligence; chlorophylls; drought tolerant; multispectral sensor; simple and rapid method.

Nomenclature

NDVI	normalized difference vegetation index
NIR	near infrared channel of image
RED	red channel of image
SPAD	soil plant analysis development
DAP	days after planting

* Corresponding author. Tel.: +62 821 4149 0052
E-mail address: tatas.brotosudarmo@machung.ac.id

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