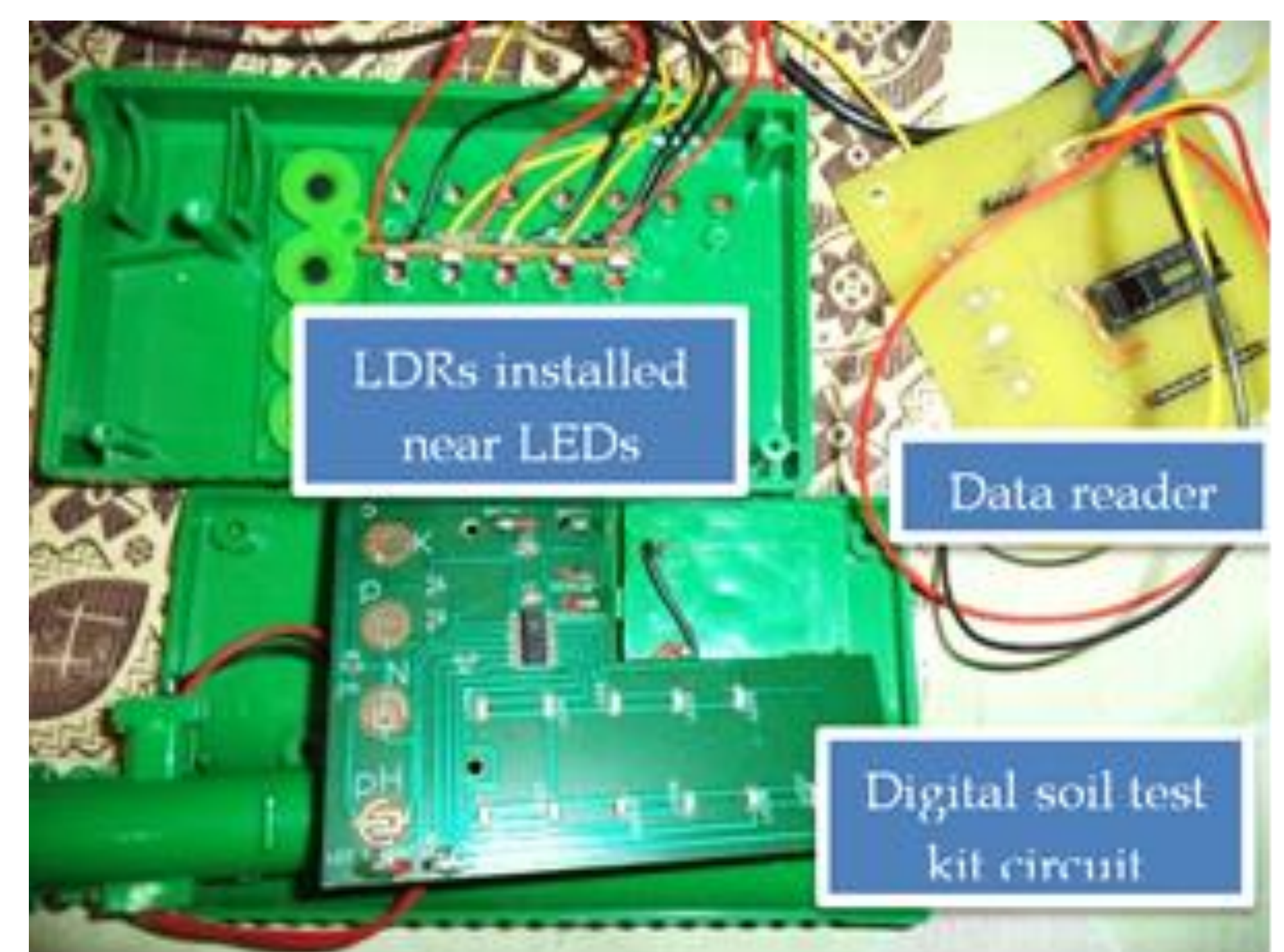




NPK Data Recording System for Digital Soil Test Kit & Method Thereof

PI2018002896



BRIEF TECHNOLOGY

A digital NPK data recording system based on photocell was developed to record and transmit the results of NPK to controller of smart variable rate liquid fertilizer applicator. For the measurement of NPK in the soil of oil palm plantation, its measurement procedure was modified with consideration of environmental light factor to improve the accuracy.

PROBLEM STATEMENT /CURRENT ISSUES

Variable Rate Technology (VRT) Sprayer requires an instant value of NPK of the soil using Digital Soil Test Kit (DSTK) before it can replenish the required amount of N, P and K for the soil as fertilizer for Oil Palm.

- ❑ Currently, DSTK cannot communicate with the VRT Sprayer. No data recording system can be integrated with this kit without redesigning its electronics.
- ❑ In many situations, this equipment can give wrong results of NPK because NPK measuring technique of this equipment is environmental light dependent.
- ❑ NPK determination procedure was defined for many plants but NOT for oil palm.

INVENTIVENESS & NOVELTY

- ❑ Digital NPK data recording system offers remote monitoring approach for recording NPK results from existing DSTK without altering its original circuit or program algorithm.
- ❑ The optimum environmental light conditions (18-21 W/m²) were determined for accurate measurement of NPK using DSTK.
- ❑ For oil palm plantations, a new NPK measurement method was defined to enhance the accuracy of digital NPK data recording system.

USEFULNESS & APPLICATION

- ❑ In oil palm plantations this system can play a role as a component of Precision Agriculture (PA) to measure NPK quickly at inexpensive rates relieving the farmers from high cost and longer time.
- ❑ With new data recording capability and modified NPK measurement method, this system can be linked and used with the smart variable rate liquid fertilizer applicator at improved accuracy.

ADVANTAGES OF THE INVENTION

- ❑ Digital soil test kit is a cheaper (3.6 USD/sample/nutrient), easier and faster way to determine the NPK of soil in oil palm plantation.
- ❑ It can determine the NPK in soil sample in 10-20 minutes with reliable results while laboratory methods take days or weeks for analysis depending upon number of soil samples.
- ❑ Results showed that N, P and K results of this system matched with the laboratory method at 91.7 %, 89.6 % and 93.8 % respectively using new NPK measurement method in the oil palm plantation.
- ❑ This equipment can be used effectively for enhanced fertilizer management in oil palm plantation because of quick and low cost soil analysis.

MARKET POTENTIAL

- ❑ Global Precision Agricultural market size is ~3.54 billion USD.
- ❑ As a component of Precision Agriculture, this system has a good market potential in many countries like Malaysia, Indonesia, Thailand, Colombia, Nigeria, Ecuador, Guatemala, Honduras, Papua New Guinea.

TRL : 5 - Validation in real environment



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