CLEMSON UNIVERSITY RESEARCH FOUNDATION
curf.clemson.edu

Nix-Pro: A Commericial Sensor for Soil Color Determination (2018-050)

A commercial color sensor with smart phone applications for more accurate and precise soil color determination

Market Overview

An inexpensive, precise, and more readily available alternative to qualitative methods, the Nix Pro color sensor is the only accurate and proven soil color determination sensor presently on the market. BCC Research estimates that the global environmental sensor and monitoring business has grown approximately $4.4 billion dollars from 2014 to 2019, a CAGR of 5.9%. The conventional Munsell Color Chart method for color analysis is subject to multiple limitations including human error, variable environmental conditions, and difficult statistical analysis. Clemson researchers have developed a more precise, accurate, and objective tool called the Nix Pro to successfully measure soil color in a variety of color codes, with smartphone applications.

Technical Summary

Munsell Color Charts are often used for a convenient, in-the-field soil color analysis. Soil color can be a robust indicator of organic matter and iron oxide levels and humus content in soil. Further, it can be used to differentiate between soils after treatments like air-drying, moistening, ashing, and more. However, different regions have different soil properties, and other treatments may be needed to objectively and accurately determine color. The Nix Pro Color Sensor provides a superior, convenient alternative for soil color determination, as its color values are more closely related to that of a laboratory standard colorimeter. This low cost sensor is controlled wirelessly by any Android or Apple phone or tablet through Bluetooth and has its own light-emitting diode (LED) light source located within the concave base of the sensor. The sensor is rechargeable, easily accessible because of its small size, easily recalibrated, and can produce scan results in various color system codes Additionally, this technology is able to determine the true color of a soil sample regardless of moisture content or indoor/outdoor lighting conditions.

Application

Geology, Agriculture, Colorimetry, Soil Data Collection, Soil Science Education

Development Stage

Proof of Concept

Advantages

- Color values are closely related to that of a laboratory stardard colorimeter, providing more accurate and precise soil color determinations
- Built in LED light source and Bluetooth controls, allowing for simple, convenient smartphone applications
- Sensor scan produces variety of accurate color codes including CMYK, RGB, HEX, and HTML allowing for objective conversion to Munsell color codes

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
N/A	United States	N/A	N/A	2018-050	Dr. Christopher Post Dr. Mark A. Schlautman Dr. Elena Mikhailova

About the Inventors

Dr. Christopher Post

Professor of Environmental Information Science at Clemson University

Dr. Christopher Post currently serves as the Chair of the Clemson Academic Technology Council. He received his Ph.D. in Environmental Information Science from Cornell University in 2001. Dr. Post is the leader of the Clemson Intelligent River project and has authored/co-authored over 27 publications. His research interests include geographic information systems, remote sensing, and environmental sensor networks.

Dr. Mark A. Schlautman

Professor of Environmental Engineering and Earth Sciences at Clemson University

Dr. Mark Schlautman received his Ph.D. in Environmental Engineering Science at the California Institute of Technology in 1992. Along with being at professor at Clemson, he works with the Clemson Experiment Station, graduate faculty for Environmental Toxicology, and the Clemson Environmental Institute. Dr. Schlautman is also a past recipient of a National Science Foundation CAREER Award. His research interests focus on using environmental geochemistry, hydrochemistry, and/or physicochemical treatment processes.

Dr. Elena Mikhailova

Professor of Soil Science and NSF Advance Fellow at Clemson University

Dr. Elena Mikhailova received her Ph.D. in Soil Science (Pedology) from Cornell University. She is internationally recognized for her highly collaboratice, multidisciplinary research in the areas of soil and water conservation, soil organic and inorganic carbon dynamics, and soil science education. She is the author/co-author of 108 publications and is published in 38 journals. Her research intersts include international agriculture and soil science, such as soil genesis, conservation, and information systems.

For more information on this technology contact:

Andy Bluvas
Technology Commercialization Officer
E: bluvasa@clemson.edu
P: (864) 656-0797