Newsletter

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Sensilize™
sense.analyze.realize

ROBIN SYSTEM IS HERE!

Sensilize's new solution, the Robin System, has combined the Robin Eye sensor and Robin Mind software.

SOME **HIGHLIGHTS** OF THE ROBIN EYE SENSOR

- 7 narrow multi-spectral bands (incl. 2 in the red-edge)
- RGB camera
- A photo diode sensor for measuring irradiance for the calculation of real reflectance

More details can be found on the Sensilize website.

ROBIN MIND SOFTWARE

- Automated processing flow (Coming soon).
- Fully integrated with the Robin Eye sensor
- Allows for:
  - mission planning
  - data processing
  - data distribution
- Web based interface - the user can access this software from any web browser.

SENSILIZE'S ROBIN SYSTEM IS **USED NOT ONLY** FOR AGRICULTURE

Sensilize's Robin Eye sensor will be flown over railway tracks in France as part of a collaboration with SNCF - French National Rail Company for mapping vegetation along the railroads as part of SNCF vegetation maintenance activities. Other European utilities have approached Sensilize regarding the use of its solution for vegetation inspection along their corridors.

HIGHLIGHTS OF FIRST SIX MONTHS, 2015

- The first Robin Eye sensors were delivered in February 2015.
- The Robin Eye was successfully integrated into various UAV platforms, and has already performed flights in 4 continents -South America (Chile), Africa (South Africa), Europe (UK, Nederland, France) Asia (India) and of course Israel.
- For the first time, information derived from the Robin System has enabled action to be taken for field operational decisions in respect of wheat fields in Israel.
- Sensilize's senior executive team attended and presented at the World Agri-Tech Investment summit in San Francisco, CA in March 2015.

RECENT PUBLICATIONS

- Israel21c- Drones - the future of precision.
- Green prophet -Sensilize delivers chemistry lab by drone to the farmer's field.
- An article about Sensilize ('n Oog in die lug vir boere) in Landbouweekblad, South Africa's biggest and most influential magazine for the agricultural sector.
- GRAPEVINE Magazine -Can this drone swoop in and save the planet?

COMING SOON...

- Sensilize will sponsor the European Conference on Precision Agriculture in Tel Aviv, Israel in July2015.
- Sensilize will take part in the Satellite Workshop on Site Specific Weed Management in Practice acquiring data together with other sensors from a specially designed field
- Pilots with leading "players" within the Ag and utilities markets.
- Not only airborne....

THE USE OF CANOPY REFLECTANCE MODELS FOR THE RETRIEVAL OF QUANTITATIVE BIOPHYSICAL PARAMETERS FROM ROBIN EYE IMAGES | Written by: Dr Agustin Pimstein (Chief Agronomist)

Gazing on your almost fully grown, ready to bloom field, you may often wonder what hides beneath all that green. Is it all so healthy and uniform? Will the yield of every part of my field be about the same? Can I make any adjustments to improve the final results? You know what your abilities to make these adjustments are; adding nitrogen to weak areas, for example, or maybe trying to reduce vegetation growth to improve flowering. But how can you tell? We at Sensilize believe we have moved up one step towards retrieving practical information from the plants. So far, the most common approach to calibrate one or more vegetation indices (VIs) to a certain Biophysical Crop parameter (BPC) is through empirical relationships. The problem with this approach is that these models can be later applied only to crops that were grown under similar conditions and need calibration over time. Alternatively, Canopy Reflectance Models (CRM) can be used for simulating reflectance at different vegetation conditions, and later building more robust models between VIs and BPCs from these simulations. This combined approach has been tested in several field crops and open tree crops and show high accuracy on the retrieval of Leaf Area Index (LAI) and chlorophyll content from hyperspectral images, By using models such as the PROSPECT+SAILH canopy reflectance models, crop parameters such as LAI, chlorophyll content or other pigment concentration, as well as different soil parameters, the crop's spectral signature can be simulated.

The Robin Eye Sensor measures the spectral range between 450-800 nm with 7 multi-spectral bands, two of which are red-edge bands, enabling the computation of a wide variety of VIs. These narrow bands together with Robin Eye's radiometric calibration and the sun sensor for incoming irradiance, assures very accurate and sensitive reflectance data, enabling development of highly variable BPC/VI relationships. After running a broad sensitivity analysis of the different parameters and VIs, the most robust equation (Sensilize Model) is defined for the retrieval of each of the crop parameters that can be retrieved from the CRM from the Robin Eye images. This quantitative approach was tested in an experimental corn field where different nitrogen and sludge amendment treatments were compared. After pre-processing and computing reflectance through Robin Mind software, the Sensilize Model for LAI and Chlorophyll content was applied. Results for chlorophyll estimation using the Sensilize model shows high levels of accuracy (Figure 1a). This approach generates a very sensitive Chlorophyll map (Figure 1b), which clearly responds to the different nitrogen treatments that were applied to that field.

The quantitative retrieval of Chlorophyll content on field crops at critical times during the season enables the field managers to adjust the crop's nutritional status by adding Nitrogen to those weaker areas, helping to increase the homogeneity and quality of the whole field.

[1] Haboudane, D., Miller, J. R., Pattey, E., Zarco-Tejada, P. J. and Strachan, I. B. 2004. Hyperspectral vegetation indices and novel algorithms for predicting green LAI of crop canopies: Modeling and validation in the context of precision agriculture. Remote Sensing of Environment 90 337-352

[2] Zarco-Tejada, P. J., Miller, J. R., Morales, A., Berjon, A. and Aguera, J. 2004. Hyperspectral indices and model simulation for chlorophyll estimation in open-canopy tree crops. Remote Sensing of Environment 90 463-476

[3] Jacquemoud, S. and Baret, F. 1990. PROSPECT: A model of leaf optical properties spectra. Remote Sensing of Environment 34 75-91.

[4] Verhoef, W. and Bach, H. 2003. Remote sensing data assimilation using coupled radiative transfer models. Physics and Chemistry of the Earth 28 3-13.

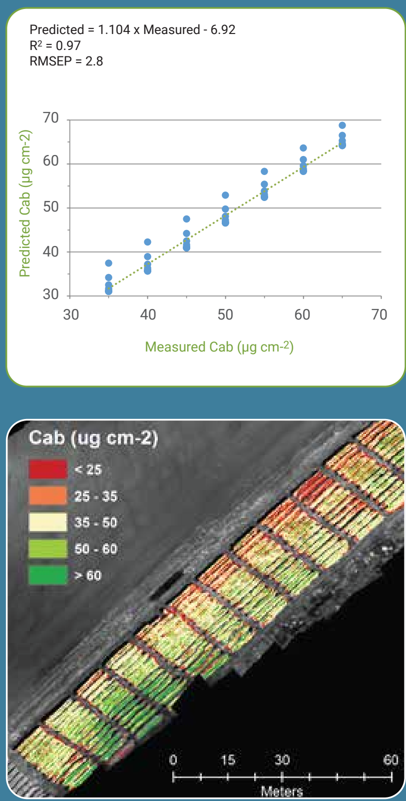

Figure 1. (a) Sensilize Chlorophyll Model accuracy (b) Chlorophyll a+b content for a corn field acquired with Robin Eye multispectral sensor.

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