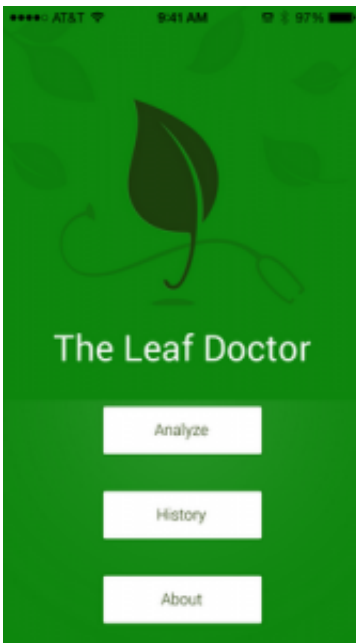


Plant pathologist creates new plant disease assessment app

May 14 2014, by Frederika Bain



Fresh from his success with two widely utilized smartphone apps, CTAHR (College of Tropical Agriculture and Human Resources) plant pathologist Scot Nelson has created a new and more technical app, the Leaf Doctor, for a more specialized audience. He doesn't anticipate that the Leaf Doctor will have the same broad, popular appeal as his Plant Doctor app, which helps to identify disease on plants and has been used all over the globe, from Iceland to Indonesia. Likewise, his recently released but already widespread Pic-a-Papaya app, which tracks papaya

ringspot virus in Hawai'i, was originally intended only for use in the Honolulu area but has been getting submissions from throughout the Hawaiian Islands. For many of those who will use the Leaf Doctor, though, it is likely to be a professional game-changer.

Disease tends to increase over time and space, whether in an individual plant or in a plant population, and researchers need to know how fast and how far it's increasing. Plant epidemiology includes the assessment of disease in order to make a mathematical model of its progress in time and space. Being able to accurately quantify disease is necessary for growers looking at different plant varieties for [disease resistance](#), or breeders attempting to introduce increased resistance into a new hybrid. It's also useful for those advising farmers about when to time certain pest-management strategies, since some forms of management are more effective at certain points in the development of an epidemic.

Currently those who assess plant disease severity use a quite low-tech method that hasn't changed much in decades. They obtain rough estimates by comparing what they see with printed or online "standard area diagrams." These standardized drawings—usually not even photographs—depict what different percentages of host coverage of a given disease look like on a particular type of plant.

There is one computer-based plant disease assessment system available, Dr. Nelson explains; only available for PC users, it costs \$795 and is difficult to use, not interactive, and not particularly accurate. By contrast, the easy-to-use, interactive app that he has created may be downloaded for free to iPhones and other iOS devices at [itunes.apple.com/us/app/leaf-d ... d874509900?ls=1&mt=8](https://itunes.apple.com/us/app/leaf-d...d874509900?ls=1&mt=8) and is accurate to within a percentage point.

Dr. Nelson notes that, while the app was not simple to develop, it is simple to use: The user takes a picture with the iPhone or calls one up

from the phone's gallery, then identifies the coloration of healthy tissue in the photo by touching the screen to identify up to seven healthy areas on the plant to account for natural color variations, light changes, and veins. A slide bar is used to mask out everything that is not healthy, which the app identifies as diseased tissue and calculates as a percentage of total leaf area displayed.

Users are then able to email the image and the generated assessment data to themselves or others; they are also able to build specialized and far more accurate standard area diagrams by creating a gallery of images showing a range of percentages of disease. If Dr. Nelson is able to secure more funding next year, he hopes to add further analytical functions to the app. More information may be found about the app at Dr. Nelson's website at sites.google.com/a/hawaii.edu/leafdoctor/.

He anticipates that the main users of the [app](#) will be plant epidemiologists and breeders, and plant pathology professors and students, not necessarily home gardeners. However, it may have more users than originally assumed, because it is free and fun to use, and its far-ranging applications could be used for quantifying the area in any photograph for skin [disease](#) or invasive species.

Provided by University of Hawaii at Manoa

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