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Estimating coffee pest and disease attacks embedded application

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RATIONALE

Producers confronted with attacks by coffee pests and diseases tend to overestimate the level of attack on their plots and therefore over-treat their coffee trees (Rémond, 1996). In order to reduce chemical treatments on plants, we are developing an embedded decision-support tool to help estimate the health status of their plots, for use in South America and Africa. Embedded application are promising tools in view of the importance of mobile phones in people's daily lives (Berrou and Mellet, 2020). One disease and two pests are specifically targeted: leaf rust, Black twig borer and coffee berry borer.

METHODS

The condition of the plot is evaluated using a sequential statistical procedure. The embedded application determines the number of plants to be sampled and guides the grower in entering the plant information. The various sensors in the phone are used for this guidance by mobilizing the GPS chip and the accelerometer to help determine distance travelled and direction. The architecture of the application follows a classical scheme with an initialization phase (description of the plot, targeted pests and diseases, etc.), a data entry phase using intuitive picture based selections, and a restitution phase, synthetizing the statistical analyses and proposing treatments from predefined tables.

EXPECTED RESULTS

We expect an Android application that is easy to use, tested and approved by growers. As a first outcome, the application will provide information on the general health status of the plot and an index of heterogeneity. As a second output, the tool will propose an advice for a recommended action (treatment ...).

CONCLUSIONS & PERSPECTIVES

The modularity of the application allows numerous upgrades. At a later stage, the integrated tool could include automatic data acquisition in the field by processing image captures. Statistical procedures may evolve and a production and attack development model could be included to refine recommendations for action. The ability to send analyses to a server could also feed models for the evaluation of attacks on a regional scale.

References:
- Rémond 1996 Mise au point de méthodes d'échantillonnage pour estimer les attaques des fruits du caféier par le scolyte (Hypothenemus hampei Ferr.). Applied mathematics PhD these Univ. Montpellier
- Berrou and Mellet 2020. Réseaux, 219, 11-38. DOI: 10.3917/res.219.0011.
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