East-West Seed

Low-cost instrument for generalized real-time multi-category seed sorting

AGRICULTURE

Background

Seed sorting is the process of identifying and separating seeds based on characteristics such as seed quality, type, size or color. Sorting can be performed manually or by mechanical, optical, or other various techniques.

In plant breeding, observable seed characteristics may be indicative of important underlying genetic traits. For example, haploid seeds of maize exhibit a colorless endosperm that is distinguishable from the darker colored embryo found in diploid or hybrid maize seeds.

Manual inspection of seed is time consuming and laborious. Cost-effective, automated solutions would streamline the seed sorting process and enable broad application across multiple crops. Generalization in automated seed sorting refers to the system's ability to adapt and efficiently process a wide range of seed types and traits without the need for extensive reconfiguration. This flexibility allows for the sorting of seeds based on predefined characteristics across different crops.

The ideal eventual instrument or developed solution would be able to sort seeds into distinct (more than two) categories using on-line image classification, including maize seeds. It would have processing speeds of multiple seeds per second and a design that would allow for continuous operation in both humid and dry tropical conditions. For ease of use, it would have a compact, portable design that could be transported in the back of a pickup truck and operated on a table (e.g. 2 m x 1.5 m).

A potential immediate use case for such a device would be haploid identification in using the R1-nj marker system. Haploid seeds showcase a distinct coloration pattern compared to diploids.

What we're looking for

East West Seed is seeking brief, non-confidential proposals for developing a low-cost, automated instrument for real-time multi-category seed sorting based on images. We are open to partnering on earlier-stage development or identifying partners with existing solutions.

Our must-have requirements are:

- All proposals should include a plan to test the machine in an agricultural research station environment. In this test, the machine will be used for haploid kernel detection of maize.

Our nice-to-have requirements are:

- Proposals with higher technology readiness will be prioritized, but concept-to-prototype solutions will also be considered provided the project duration does not exceed 1 year.
- Able to process various types of seed, including maize, beans, and cucumber.
- Able to process seed batches ranging from 20 grams to 10 kilograms.
- Processing speeds of >1000 seeds/minute.
- Sorting accuracy of at least 90%.

Acceptable technology readiness levels (TRL): Levels 2-9

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you

Eligible partnership models:

- **Sponsored research**

Benefits:

Sponsored Research

Up to $50,000 inclusive of a maximum of 10% indirect costs. Indirect costs available to academic and nonprofit research institutes only.

Expertise

Partners will interact with an East-West project lead in order to mutually develop a project plan and engage in regular meetings to ensure success of the project.

Reviewers

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Pre-Breeder

Please contact the University of South Florida Technology Transfer office representative for submission – Karla Schramm at kschramm@usf.edu