Cross training future workforce on data handling and interpretation for precision agriculture systems.

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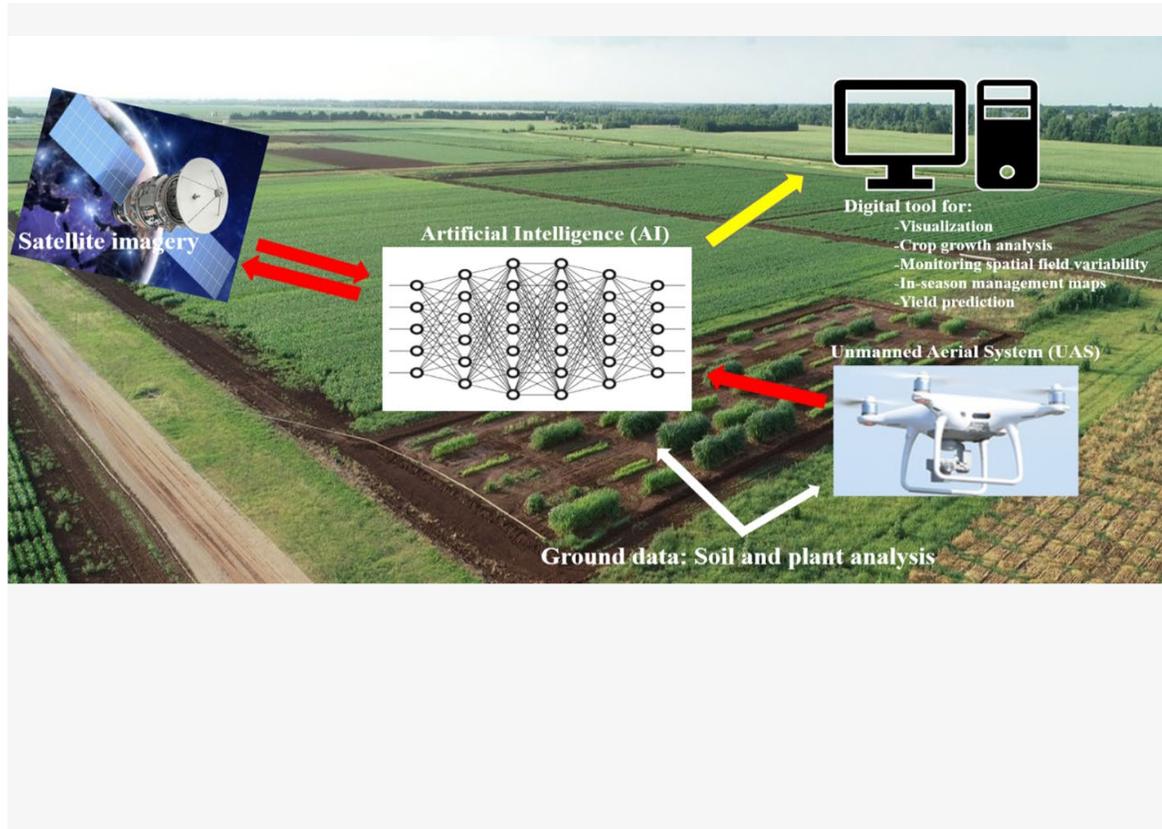College of Agriculture
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Objective

The objective of this presentation is to report observations from a 10-week summer training program on Data Management for Animal Science, Computer Science, and Plant Science students.

Background

The project

Public domain
Training guide
Standardized database
Training videos
Codes used for data analysis

www.ag2pi.org

Objective 1: **Organize a summer training internship program for undergraduate students with background in animal science, crop science, and computer science**

The goal is to develop student competency in understanding data-generating systems, and the database, and utilize it to develop data-driven tools for precision phenotyping.

Provide opportunities for cross-training and cross-discipline collaboration

Objective 2: **To develop a training manual on big data management in agriculture**

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The course

- 10 weeks online summer program

- Students attended weekly training sessions on data collection, management, processing, and visualization software including ArcGIS, MySQL and power BI.

- Students also worked as a team and developed a database project, and prepared an oral presentation on their team project.

- UAV data in plants, Accelerometer data in animals

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Demographics

Animal science TAMU

2 Students

Computer science TAMU-CC

2 students

Plant science TAMU Kingsville

2 students

- 2 Undergraduate students with a background in animal science, 2 plant science, 1 with computer science, and 1 with spatial data experience
- 3 female and 3 male students
- Learned handling and interpretation of sensor-based data derived from both animal sensors and UAV images of plant fields.

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Pre course survey

- One-third of the students indicated that they never had an experience in data **handling**, and half of the students had some data **analysis** experience

- Half of the students had previously taken a course in data analysis whereas the rest were unaware of the methods and tools applied in the analysis of sensor data

- Students indicated that they learn more **through hands-on exercises, one on one interactions, seeing and watching someone do analysis, and understanding the practical application** of what is being discussed.

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Pretraining survey

- To begin with, the students had a mean score of 4.3 (range 0–8; on a scale of 0-10) for **knowledge of data management in agriculture** .

- A half of the students had **not seen a large data set** whereas one student indicated partial experience of working with sensors.

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Post training survey

- In general, students indicated that they were very satisfied with the internship experience.
- On a scale of 0-10, the mean satisfaction score was 8.75 (range 7.5-10).
- Students indicated that they were more **confident** working with and talking about data from systems **other than their own**; animal systems (mean 8.5; range 7-10) and plant systems (mean = 8.4; range = 7-10).

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Post training survey

- All students indicated that they learned **at least one new concept** related to animal and plant data ecosystems.

- Students indicated that the program was a **good start for understanding the overall data architecture, indicated progress on data handling, and found it helpful to understand opportunities** in agriculture.

- All students agreed that their understanding of **data management in agriculture changed significantly** because of the course.

- Consequently, four students indicated that they **were interested in career opportunities related to data in agriculture** whereas two students indicated their interest in the application of the developed tools for on-farm use.

Post course overall

- When evaluating the effect of the cross-disciplinary training, students agreed that the training was helpful in learning **concepts outside of their own discipline** with a mean score 9.4(range 8-10) on a scale of 0-10.

- All students indicated that they learned **team management skills** and skills working with people with experiences that are **different from their own**.

- Students suggested **improvement on the communications, prerecorded videos, in-person meetings, and weekly reporting reviews in future iterations** for students to benefit more from the program.

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Future Directions

- In-person, intensive approach

- Potential for Integrated courses and multidisciplinary activities involving multiple universities and disciplines

- Developing marketable skills for future agriculturists

Thank you!

Do you have any questions?

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