SOUTH DAKOTAVIEW 2023 - 2024 ACTIVITIES

The innovative approaches and solutions developed in this project for crop growth monitoring and yield forecasting offer substantial contributions to precision agriculture, sustainability, and the development of scalable, technology-driven strategies for enhancing food security. By integrating satellite and UAS remote sensing with advanced artificial intelligence and machine learning (AI/ML) algorithms, the project has introduced novel methodologies for monitoring crop growth, evaluating crop health, and forecasting yield and quality. These advancements support improved decision-making for farmers, agronomists, and policymakers by facilitating timely interventions, optimizing resource allocation, and mitigating losses attributable to diseases and environmental stressors.

Beyond its scientific impact, the project has provided significant educational and professional development opportunities aligned with NLRSEORA Objective 3. Three students received hands-on training with state-of-the-art technologies, with one achieving certification as an FAA Part 107 UAS pilot. The methodologies developed and the data collected during the project are integrated into the UAS Remote Sensing and Agricultural Remote Sensing courses curricula, fulfilling NLRSEORA Objective 4. The project's broader influence is further evidenced by a peer-reviewed publication and 17 presentations at international, national, regional, and local conferences, underscoring its role in advancing scientific knowledge and fostering cross-disciplinary collaboration.

Ubaid Janjua (Ph.D. student) collects light intensity measurements using a LICOR device.

Drone Day: A student attempts to fly a drone through an obstacle.

Students identify locations from Landsat satellite images.

- **Big Sioux Water Festival**
  - May 7, 2024. Attended by over 1,200 fifth- and sixth-grade students and K-12 educators from east-central South Dakota.
  - Provided educational materials for students and teachers and an interactive StoryMap of before and after Landsat images.
- **Drone Day (Second Annual)**
  - April 25, 2024. Drone displays and flight activities. Attended by >70 students.
- **55ᵗʰ Annual South Dakota State Geography Convention**
  - April 4-5, 2024. Students presented remote sensing research posters.
  - Interactive display: Physiographic identification from Landsat imagery.
  - South Dakota as Art display. Open to the public (>200 visitors).
- **2023 South Dakota Geospatial Conference**
  - October 18-19, 2023. Presented South Dakota as Art display highlighting the state's unique landscapes. 123 attendees.
- **GPRM Annual Meeting 2023**
  - October 6-7, 2023. Students presented remote sensing research posters. 98 attendees.

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BENEFITS TO SOUTH DAKOTA

- The use of satellite and UAS remote sensing combined with AI and ML is crucial for enhancing crop growth monitoring, yield forecasting, and quality assessment in South Dakota. This technology provides real-time, high-resolution data for early crop stress detection, enabling targeted interventions and resource optimization. These advancements help mitigate risks from climate change, improve decision-making, and enhance global food security by increasing crop productivity and reducing environmental impact. Additionally, the cost-effectiveness of these technologies enables efficient monitoring of agricultural systems.

- Hosting and participating in academic and educational conferences in South Dakota to promote knowledge transfer and research development by facilitating collaboration between local institutions and visiting experts, exposing students to cutting-edge research, and fortifying academic networks. They offer a platform for South Dakota universities and technical colleges to showcase their strengths and build partnerships while aligning with the state's economic development, particularly in emerging fields like geospatial technologies and agriculture.

Students perform UAS crop monitoring over a South Dakota study site.

Madison DeJarlais shows changes on Landsat images to 5th and 6th-grade students at the Big Sioux Water Festival.

SOUTH DAKOTAVIEW CONSORTIUM MEMBERSHIP

Federal consortium members identified above do not receive funding from AmericaView.

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