The California State Polytechnic University, Humboldt Library groundbreaking project 3DHerbarium.org version one was released open source on January 25, 2024. This immersive 3D web-based interface with augmented and virtual reality views enhances botanical education for all ages, connecting botany students, faculty, citizen scientists, and the community to learn and share knowledge. The goal of version two is to extend the platform for any discipline, from archeology to zoology, and to further advance the research in creating layered animated models that enable learners to explore specimens from the whole body to internal microscopic structures.

The 3D Digital Herbarium advanced the team’s understanding of 3D photogrammetry methods for modeling thin complex shapes, such as leaves and plants. Additionally, the team discovered the need for a similar tool in a variety of disciplines and is evaluating various research interests to develop the roadmap for version two, called 3D Exhibits4Learning, an open-source software platform and documentation for other institutions to develop 3D models and to create their own environments.

Cyril Oberlander, Dean, Cal Poly Humboldt Library
AJ Bealum, Programmer & Project Manager, Cal Poly Humboldt Library
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5 minute - Introduction
10 minute - Demo & Features
5 minute - Future of project
5-10 minutes Q & A

3DHerbarium.org

Traditional Herbarium digitized in 2D
Images from the Cal Poly Humboldt Vascular Plant Herbarium

Dana York; Annie Allen
http://creativecommons.org/licenses/by-nc/4.0/legalcode

M. R. Mesler
http://creativecommons.org/licenses/by-nc/4.0/legalcode

Cara Witte
http://creativecommons.org/licenses/by-nc/4.0/legalcode
Solution Engineering
Curating Classroom + Co-Curricular Experiences as Innovative Project-based Learning Infrastructure

Ideation
Dr. Bogle asks library for challenges to present to Fall Software Engineering Course

Summer
Interactive Digital Herbarium - Flora Touch Screen Kiosk Project
Make botany fun and interactive by developing an interactive digital herbarium database that is optimized for touchscreen and mobile phones, more about virtual herbaria. https://3dherbarium.org/

Examples:
- California Herbarium
- iFlora Herbarium and Science in Place learning
- MetaFlora Botanical Gardens
- Herbarium Projects (Brown University)
- Australian Human Herbaria
- Mesoamerica Digital Herbarium
- Charles Sturt University - Virtual Herbarium (Bioimages Online)
- Cape Town Herbarium (Reactive and Cinnamon)
- Appalachian State University (Herbarium Showcase)
- Woodward University Library Herbarium
- UC Berkeley Herbarium

Back to class?
Adapt Version 1: 3D Exhibits4Learning
New Features or New Challenges?

How to make a 3D immersive Botany experience?
iNaturalist: 175M observations by over 7.3M members: community scientists, biologists, naturalists… & used by Cal Poly Humboldt Botany Students for Plant Identification

Demo

- See user uploads from the social network for naturalists and biologists, iNaturalist.
- Content can be filtered through options on the map, these include:
  - Filter by location (including options for radius size)
  - Filter by observation grade (verifiable, research or any)
  - Filter by observation date
- Being a social media site, iNaturalist also provides data about the most active users regarding a given specimen.
- These results are also filtered through the map options allowing the user to find local, active users interested in the same biodiversity as themselves.
- Students in Botany taking Plant Taxonomy/Identification classes use iNaturalist for assignments
Plant.id

- Exactly as it sounds, Identify a plant from a photo.
- Results appear in the order of what the image of your plant is most likely to be (with likelihood percentage).
- Clicking on a given result will reroute you to collections page for that particular specimen.

Identify a plant through just an image. JPEGs and PNGs only!

Choose Files  No file chosen
Future

- 3DHerbarium.org an experimental feature to view inside the specimen using opacity slider... a potential feature of the herbarium
- The 3D Herbarium is just the beginning of a general 3D learning tool, the 3DExhibits4Learning
- Mushroom 3D model
- Vertebrate articulated skeleton 3D model
We welcome feedback & suggestions.

IMLS Planning grant submitted, awaiting to hear if granted.

14 month planning process to build:
Flexible open-source immersive prototype platform for galleries, libraries, archives, and museums to showcase their collections:
3D Exhibits for learning any discipline!

- Customizable configuration and APIs
- Editorial submission workflows for teams, courses, and shared projects.
- Explore Omeka integration.
- Interactivity features for learner engagement; flashcards, games, quiz...
- Partner feedback and evaluation of mockups and prototypes
- Photogrammetry and workflow training documentation.
- Preservation options
Thank you, questions?

What is your vision for the future of learning in digital environments?

What are the learners’ behaviors and expectations for learning?

What research activities align how we approach these questions?

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