CREATING 3D MODELS OF EXHIBITS IN THE PALEONTOLOGICAL MUSEUM OF IVAN FRANKO NATIONAL UNIVERSITY OF LVIV USING A PHONE CAMERA AND THE FREE REALITYSCAN APP

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INFORMATION ABOUT THE MUSEUM

The Paleontological Museum of Ivan Franko National University of Lviv is one of the prominent scientific and educational institutions in Ukraine, possessing a significant collection of fossils that spans various periods of Earth's geological history. Established in the 19th century, the museum holds unique specimens of fossils that assist scientists and students in researching ancient biodiversity and evolutionary processes.

The museum's collection includes fossilized remains of plants, invertebrates, and vertebrates, among which are rare and well-preserved specimens of great scientific significance. The museum's exhibitions demonstrate to visitors the complexity and diversity of ancient life on our planet, as well as the changes that have occurred in ecosystems over millions of years.

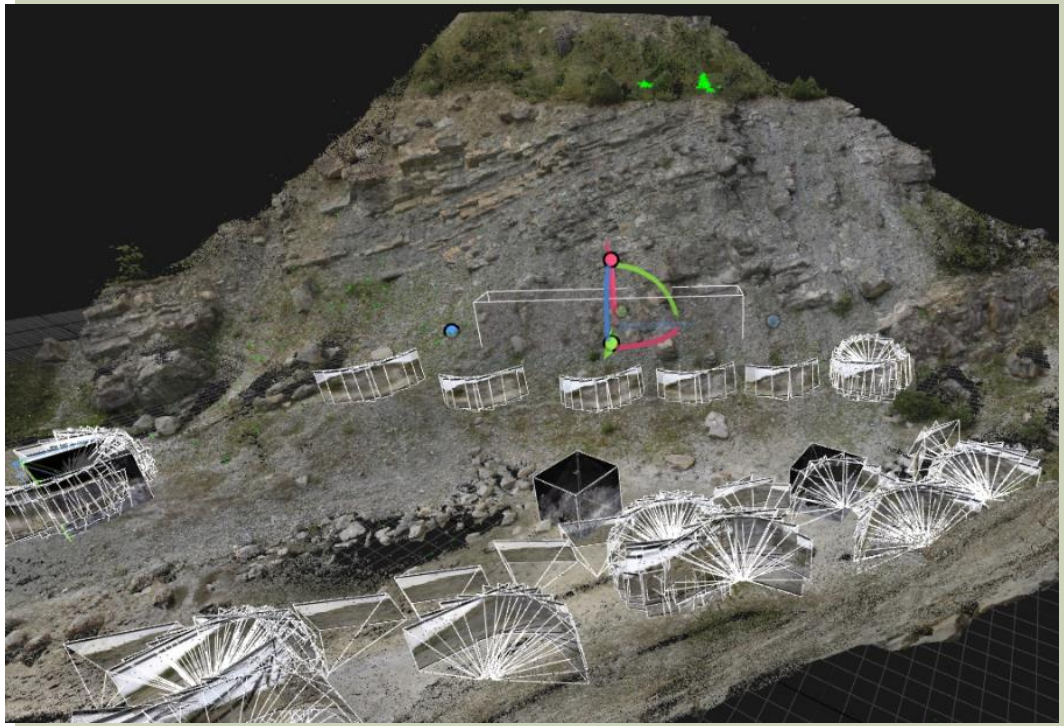
PHOTO OF THE PALEONTOLOGICAL MUSEUM

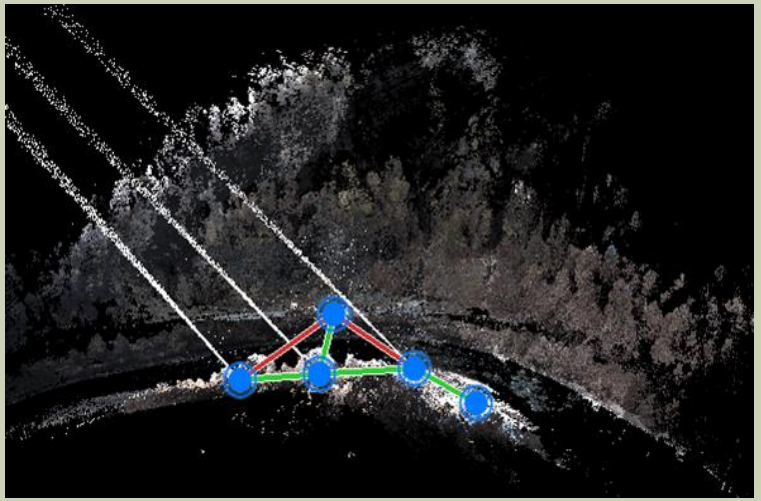
The museum actively collaborates with scientific institutes and universities, conducting research projects and scientific conferences. In addition, the museum serves as an important educational center, offering lectures, tours, and educational programs for schoolchildren, students, and all those interested in paleontology.

OVERVIEW OF AVAILABLE 3D SCANNING TECHNOLOGIES

- Laser scanning (LiDAR)
- Photogrammetry
- Use of mobile applications such as RealityScan
- 3D scanning with the help of UAVs (drones)

EXAMPLE OF CREATING A 3D MODEL USING THE TRIMBLE TX6 LASER SCANNER





THE WORKFLOW PROCESS OF DATA COLLECTION USING A UAV (QUADCOPTER DJI PHANTOM 4) FOR CREATING A 3D MODEL

WHY REALITYSCAN?

- Accessibility
- Ease of use
- Quality of 3D modeling
- Mobility
- Wide possibilities for further processing
- Promotion of digital conservation

ADAPTATION OF THE SCANNING PROCESS TO THE PALEONTOLOGICAL MUSEUM

- **Detailed planning of scanning**
- **Careful handling of exhibits**
- **Use of auxiliary materials**
- **Taking pictures from different angles**
- **Lighting adjustment**
- **Further processing to correct specific features**
- **Consultation with experts**

THE PROCESS OF CREATING 3D MODELS

1) Preparatory work

- Selection of exhibits for scanning

2) Description of the scanning process using a phone camera and the RealityScan app-

Scanning stages

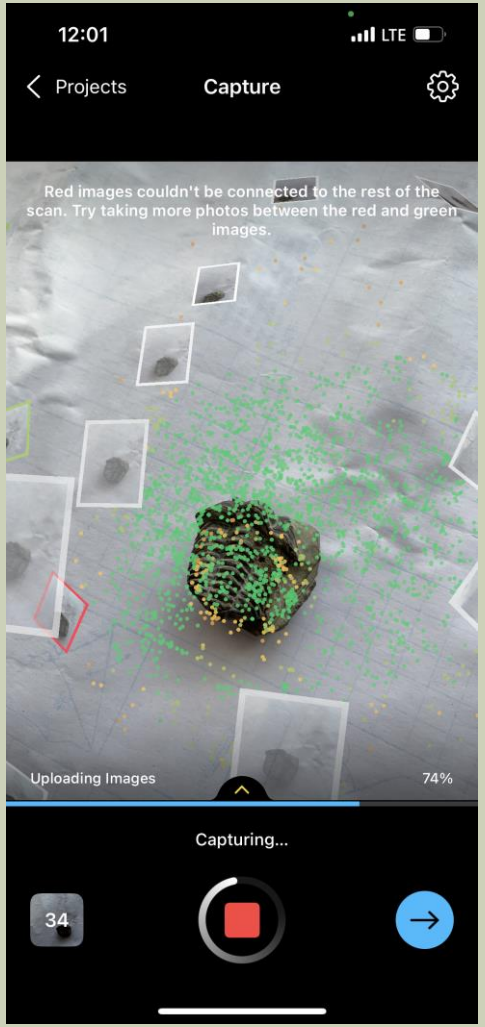
- Optimization of lighting conditions and placement of exhibits.

3) Processing of collected data and creation of 3D models

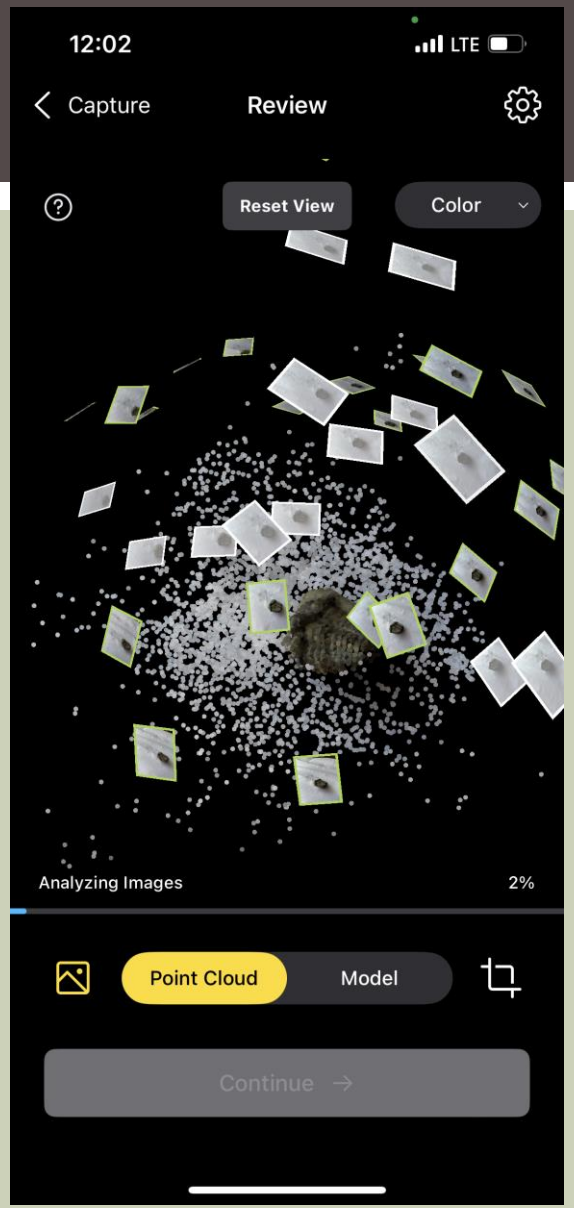
- Software for processing

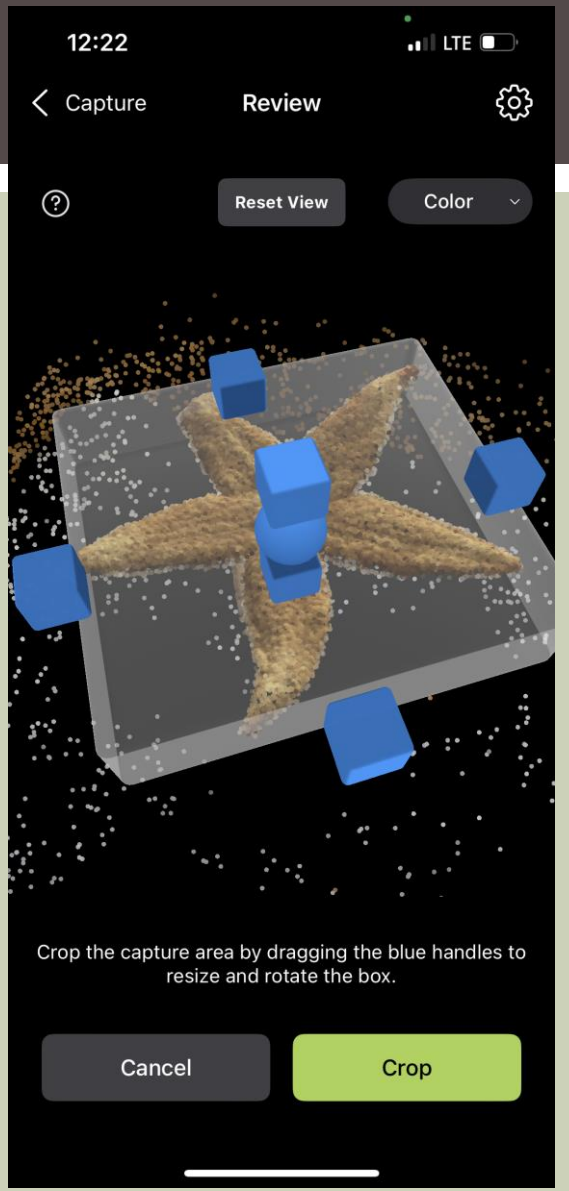
Technical aspects of model optimization

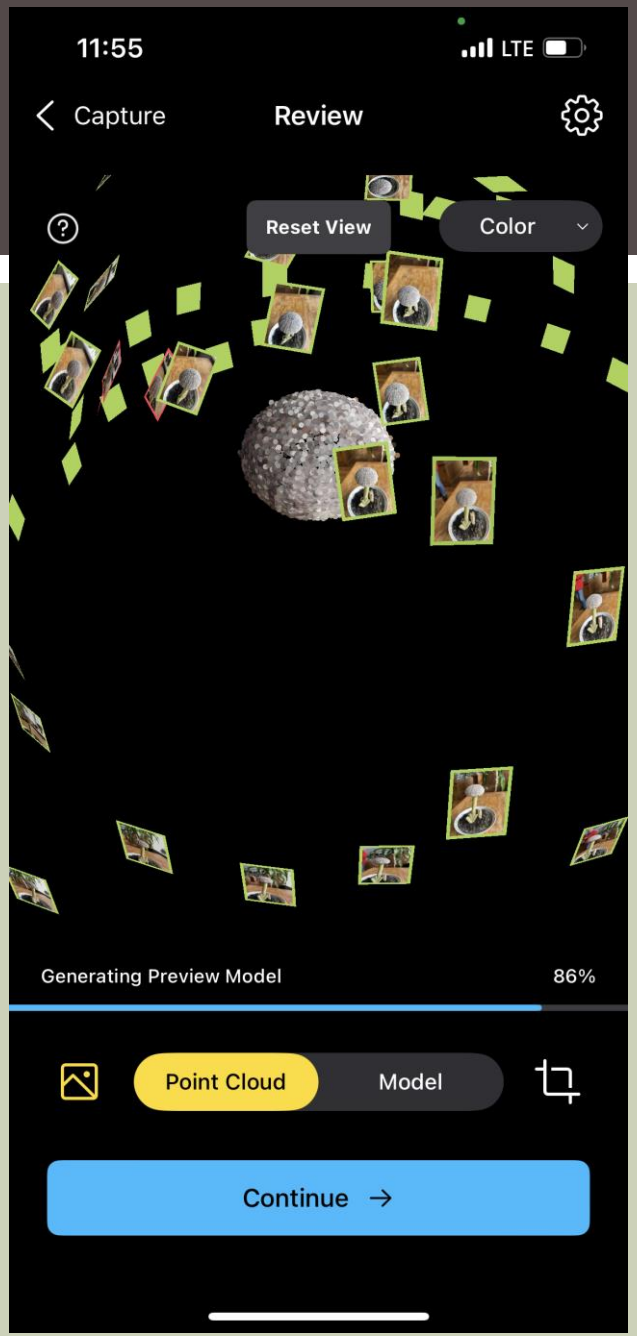
SCANNING WORKFLOW PROCESS



12:11
LTE
Capture
Review
Reset View
Color
Waiting for server...
Point Cloud
Model
Continue →


12:02
LTE
Capture
Review
Reset View
Color
Analyzing Images
2%
Point Cloud
Model
Continue →


12:22
LTE
Capture
Review
Reset View
Color
Crop the capture area by dragging the blue handles to resize and rotate the box.
Cancel
Crop


11:55
LTE
Capture
Review
Reset View
Color
Generating Preview Model
86%
Point Cloud
Model
Continue

17:02
LTE
Projects
Igac

EXAMPLES OF CREATED 3D MODELS

CHALLENGES FACED BY REALITYSCAN AND PROPOSED SOLUTIONS

- **Insufficient lighting** → **Improvement of lighting**
- **Difficulties with textures** → **Use of markers**
- **Moving objects** → **Stabilization of the object and camera**
- **Large or complex objects** → **Dividing into parts**
- **Technical settings** → **Calibration of the camera**

IMPORTANT FACTORS THAT AFFECT THE OUTCOME

- **Selection of optimal software settings:**
- Experiment with the scanning software settings, such as scanning resolution, to find the perfect balance between model quality and processing time.

- **Use of professional software for editing 3D models:** For complex projects or high-quality requirements, consider the possibility of further processing models in professional programs such as Blender, Meshmixer, or ZBrush.

THE IMPACT OF THE PROJECT ON THE ACCESSIBILITY OF MUSEUM COLLECTIONS

- *Expanding the museum's audience through digital technologies*
- *Global access*
- *Interactivity and engagement*
- *Contribution to the conservation of paleontological heritage*
- *Digital conservation*
- *Documentation and archiving*
- *Prospects for the use of 3D models for remote learning and research*
- *Educational programs*
- *Research*

CONCLUSIONS

The implementation of the project for creating 3D models of exhibits at the paleontological museum opens new possibilities for accessibility, education, and the preservation of unique scientific heritage.

The digitization of museum collections becomes an important step in the development of modern technologies and research methods, providing an impulse for the further development of science and education.

THANK YOU FOR YOUR ATTENTION