

FACT SHEET AVATAR BUILDER

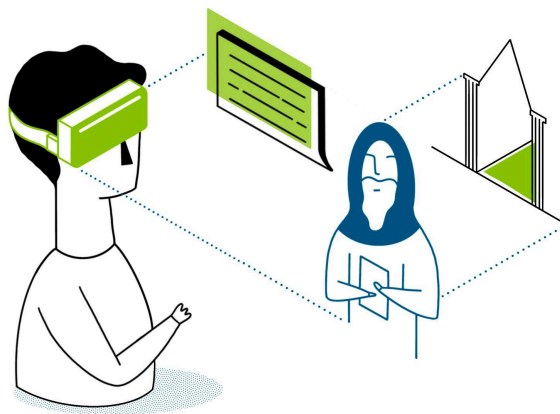
The use of virtual humans in cultural heritage offers significant advantages for interpretation, education, and audience engagement. By embodying historical or fictional personas, virtual humans can serve as interactive mediators bridging the gap between visitors and cultural content.

To effectively support the creation and deployment of virtual humans in cultural heritage contexts, a structured and accessible production process is essential. Developing expressive and platform-compatible avatars typically requires technical expertise in 3D modelling, animation, and software integration, skills that are often beyond the reach of curators or heritage professionals.

The Avatar Builder addresses this challenge by providing a process framework that guides users in creating, animating, and preparing avatars for multiple visualisation platforms. By leveraging open-source, accessible software, the tool makes avatar production possible for non-experts while ensuring compatibility with immersive VR/MR environments and web-based 3D viewers.

WHAT IS THE AVATAR BUILDER?

Avatar Builder is a workflow and pipeline for creating animatable virtual characters that can be embedded in XR experiences.



WHO IS THE AVATAR BUILDER FOR?

- Cultural Heritage Professionals
- Creative and XR professionals

KEY FEATURES

- Create or adapt humanoid avatars
- Animate gestures and narration
- Combine avatars with 3D environments
- Deploy to web-based viewers
- Support for VR and MR pipelines

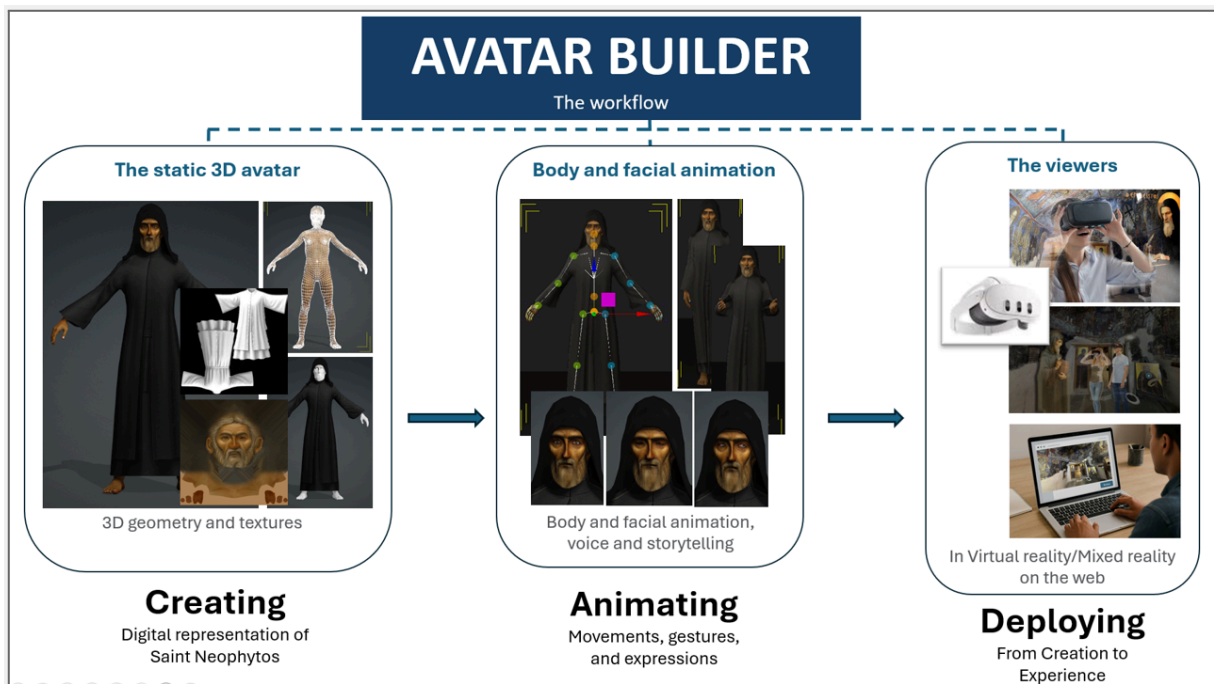
EXAMPLE USER STORY

A cultural heritage institution wishes to communicate the story of a historical site through one of its key historical figures, making the narrative more engaging and accessible to visitors.

1. The narrative (story, context, main events) is defined from a curatorial perspective.
2. A 3D avatar representing the historical character is created using accessible tools.
3. The narration is produced:
 - a. either recorded by a human voice, or
 - b. generated automatically using text-to-speech (TTS).
4. The audio is used to automatically generate synchronized facial animation (lip-sync) for the avatar.
5. The animated character is integrated into a 3D environment representing the heritage site.
6. The experience is prepared for interactive exploration.

The final application is published for different setup (visualisation mode)

- via a web-based viewer for remote access, and/or
 - as an immersive VR/MR experience. MR is mainly used for on-site visitors.
7. Visitors can explore the environment and engage with the virtual character to learn about the site's history.



Avatar Builder Workflow: from creation to deployment of an animated Virtual Character

OUTPUT

Digital avatar that can be used in multiple platforms, such as XR experiences and web-based platforms

WHAT DO YOU NEED?

- No advanced programming skills are required, although some steps may involve a more technical setup depending on the chosen output.
- A computer
- Internet access
- Free software tools: MakeHuman, Mixamo, Blender
- Game engine (for immersive experiences): Unity
- Optional: reference images or sketches of your character
- Optional: headphones or speakers
- For immersive experiences (VR/MR): a Meta Quest 3 headset

LEVEL OF COMPLEXITY

- The **web-based workflow (GLB)** is straightforward and accessible to non-technical users.
- The **immersive workflow (VR/MR – FBX + Unity)** requires some basic familiarity with the Unity engine to build and run the application.

However, with clear documentation and step-by-step guidance, both workflows can be successfully used by cultural heritage professionals.

SUPPORTED FORMATS

The proposed Avatar Builder pipeline supports two main output formats, depending on the target platform:

GLB (.glb):

Used for web-based visualisation. This format is optimised for real-time rendering in browsers (e.g. WebGL / Three.js) and enables easy online deployment and sharing.

FBX (.fbx):

Used for immersive applications (VR/MR). This format is well-suited for integration into game engines such as Unity, supporting animation, rigging, and interactive experiences on devices like Meta Quest.

These two formats ensure compatibility with both lightweight web experiences and more advanced immersive environments.

ADDITIONAL RESOURCES

- Step-by-step guidelines detailing the full workflow (character creation, animation, and export)
- Files available on EUreka3D Data Hub/MIRALab - Tutorials:
 - Creating and Animation a Virtual Character.mp4: [Link](#)
 - VR visualisation of an animated Virtual Character (First prototype of Saint Neophitos scenario): [Link](#)
 - Web-based visualisation of an animated Virtual Character (First prototype of Saint Neophitos scenario for Web): [Link](#)
- [Video tutorials](#) demonstrating each stage of the process

ESTIMATED TIME

- Basic avatar creation and animation: 2-3 hours
- Full pipeline (including export and integration): 3-4 hours
- Additional time may be required depending on the level of customization and the target platform (web or immersive)

SKILL LEVEL

- Beginner (Web-based workflow – GLB):
Suitable for users with little to no experience in 3D tools
- Intermediate (Immersive workflow – FBX + Unity):
Requires basic familiarity with Unity for building and running the application

EFFORT REQUIRED

- Low to moderate effort for basic use (following the guide step-by-step)
- Moderate effort for immersive applications, due to additional setup and integration steps

ADVICE FOR NON-TECHNICAL USERS

- **Start with the web-based workflow (GLB):**
This is the simplest way to get familiar with the pipeline and quickly produce a first result without dealing with complex setups.
- **Follow the guide step by step:**
The provided PDF and video tutorials are designed to be followed sequentially. Avoid skipping steps, especially during your first attempt.
- **Begin with a simple project:**
Use a basic character and a short narration to understand the process before attempting more complex scenarios.
- **Reuse existing assets when possible:**
Predefined characters, animations (e.g. from Mixamo), and simple environments can significantly reduce effort.
- **Do not aim for perfection at first:**
The goal is to understand the workflow. You can refine the character, animation, and storytelling in later iterations.
- **Allow time for exploration:**
Even with guidance, some trial and error is normal—especially when working with 3D tools for the first time.
- **Facial animation** can seem complex at first, but in this workflow it is intentionally simplified to remain accessible and easy to use. The objective is to enhance storytelling and user engagement, not to create highly complex animation systems.
- **For immersive experiences (VR/MR):**
If you are unfamiliar with Unity, consider collaborating with someone with basic experience or focus first on the web version.