



Visualizing Archaeology with Digital Reconstruction



Northern Periphery and
Arctic Programme
2014-2020



EUROPEAN UNION
Investing in your future
European Regional Development Fund

Overview

- Visualising Archaeology goals and examples
- Issues in digitising archaeology
- Digital modelling and architectural reconstruction
- Artefact digitisation, reconstruction and placement
- Exploration and interaction
- Creating Characters
- Communication and dissemination
- Resources

Archaeology

the study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.

- Remains
- Artefacts
- Buildings



Visualising Archaeology

Examples

- Prisoner of War Camp – Highlanders museum
- St Andrews Cathedral
- Iron Age Roundhouse
- St Madoes Stone
- Perth 1540
- Callanish landscape



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- Visualising Archaeology goals and examples
- **Issues, guidelines and best practice**
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Issues, Guidelines and Best practice

- London Charter
- Seville Principles



London Charter 2006

- Charter for the computer-based visualisation of cultural heritage.
- Focus on being transparent about the evidence behind a reconstruction.
- <http://www.londoncharter.org/>



Seville Principles 2011

- International principles of virtual archaeology.
- Builds on the proposals in the London Charter.
- <http://smarterheritage.com/seville-principles/seville-principles>



Interdisciplinarity

Among the experts ... it is essential to ensure the specific presence of archaeologists and historians, preferably those who are or were responsible for the scientific management of the excavation work or archaeological remains to be reconstructed.

Purpose

Any proposed computer-based visualisation will always aim to improve aspects related to the research, conservation or dissemination of archaeological heritage. The overall aim of the project must be encompassed within one of these categories

- 1) research
- 2) conservation
- 3) dissemination

The category concerning dissemination includes both educational projects, whether formal or informal education, and recreational projects (cultural tourism)

Complementarity

The application of computer-based visualisation for the comprehensive management of archaeological heritage must be treated as a complementary and not alternative tool to other more traditional but equally effective management instruments.

Computer-based visualisation should seek forms of collaboration with other methods and techniques of a different nature to help improve current archaeological heritage research, conservation and dissemination processes. To do so, compliance with “Principle 1: Interdisciplinarity” will be fundamental.

Nevertheless, computer-based visualisations might be an alternative approach when original archaeological remains have been destroyed (e.g. due to the construction of large infrastructures), are placed in areas with difficult accessibility (e.g. without roads) or at risk of deterioration due to the huge influx of tourists (e.g. rock paintings).

Authenticity

Computer-based visualisation normally reconstructs or recreates historical buildings, artifacts and environments as we believe they were in the past. For that reason, it should always be possible to distinguish what is real, genuine or authentic from what is not. In this sense, authenticity must be a permanent operational concept in any virtual archaeology project.

Historical Rigour

To achieve optimum levels of historical rigour and veracity, any form of computer-based visualisation of the past must be supported by solid research, and historical and archaeological documentation.

The historical rigour of any computer-based visualisation of the past will depend on both

- a) the rigour with which prior archaeological research has been performed
- b) the rigour with which that information is used to create the virtual model.

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Architectural Reconstruction

- Gather **all** available evidence
- **Archaeological Evidence**
- Maps
- Scale plans and elevations
- Look at Comparisons sites
- Photos and illustration
- Written evidence



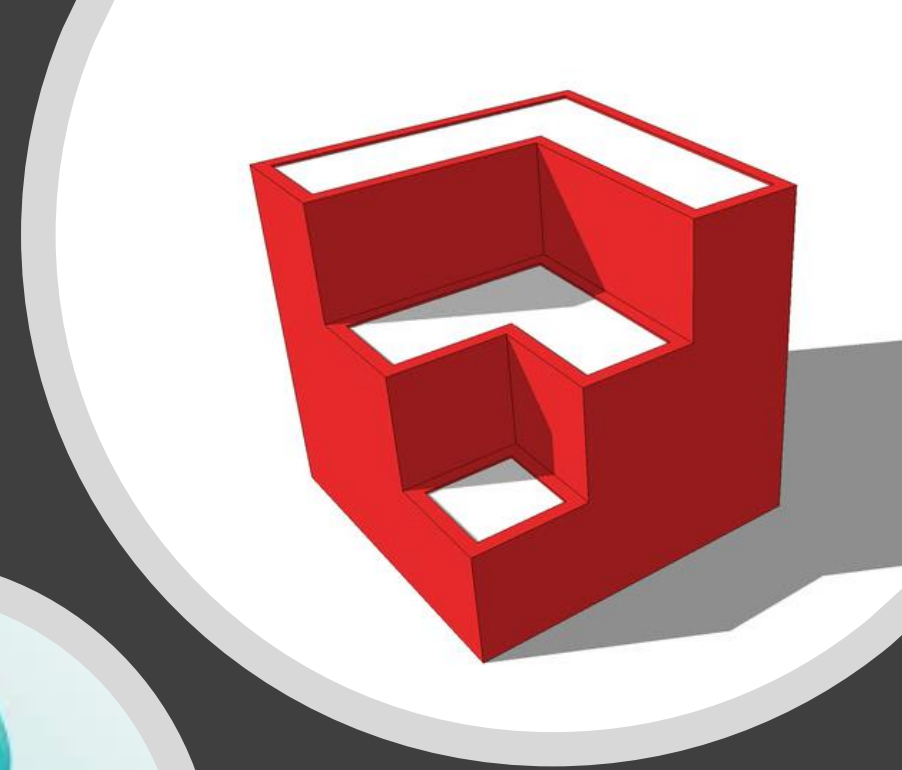
Architectural Reconstruction

- Archaeological evidence can be transformed into virtual landscape and structures and built upon to create a better understanding of the past and better visualise sites for education and further research.



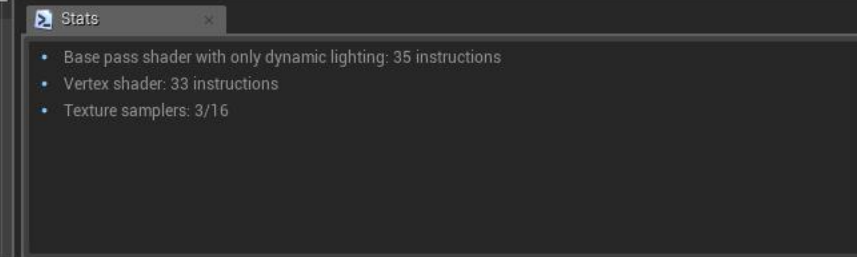
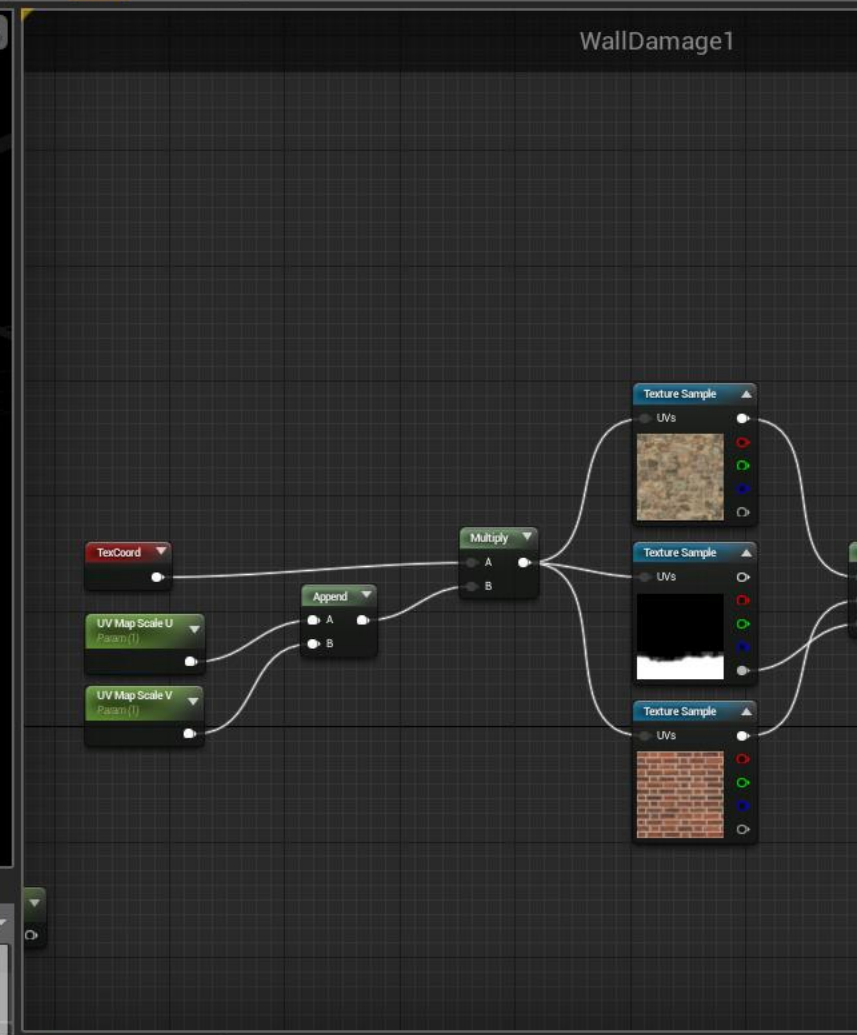
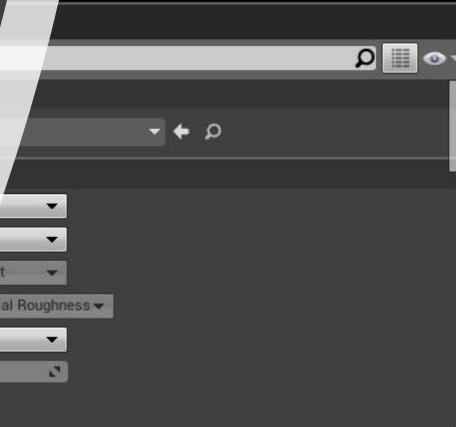
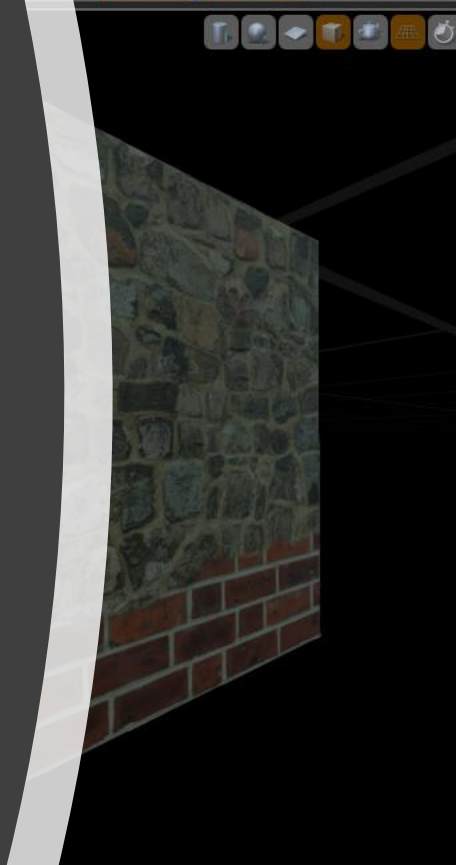
Mesh Creation

- Software Examples
- Blender
- SketchUp
- 3ds MAX



Materials and Textures

- UV Mapping
- A **UV map** is the flat representation of the surface of a 3D model used to easily wrap textures. The process of creating a **UV map** is called **UV unwrapping**. The U and V refer to the horizontal and vertical axes of the 2D space, as X, Y and Z are already being used in the 3D space.
- This can be done in **Blender**, **Unreal Engine 4** or **Autodesk MAYA**, **Substance Paint**





Workflow Example

- **Import .fbx files to Unreal Engine 4**
- FBX is a file format owned and developed by Autodesk. It is used to provide interoperability between digital content creation applications such as MotionBuilder, Maya, 3ds Max, SketchUp and Blender.
- Unreal Engine features an FBX import pipeline which allows simple transfer of content from any number of digital content creation applications that support the format.
- The advantages of the Unreal FBX Importer over other importing methods are:
 - Static Mesh, Skeletal Mesh, animation, and morph targets in a single file format.
 - Multiple assets/content can be contained in a single file.
 - Import of multiple LODs and Morphs/Blendshapes in one import operation.
 - Materials and textures imported with and applied to meshes.



Development phases

1. Create simple accurately scaled models.
2. Add items to interiors, placeholder characters.
- 3 Materials and textures.
4. Develop interaction system, add interactions to objects, information panes, integrate dialogue system.
5. Polish existing assets (recreate/improve).
6. Create multi-camera setup, produce video, produce photospheres.

Asset lifecycle

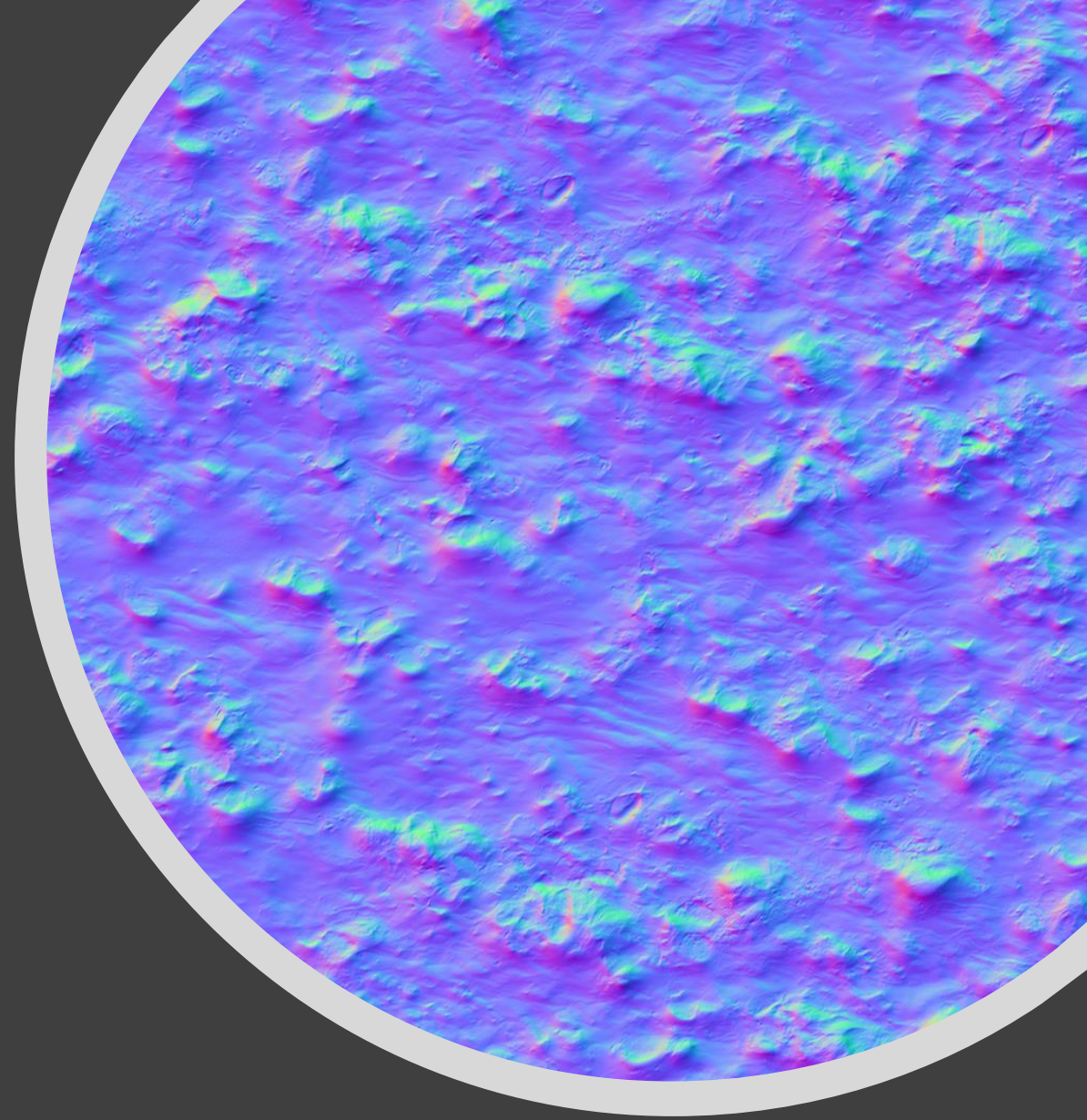
EVIDENCE

CREATION OF ASSETS

MATERIALS & TEXTURE

CHARACTERS & ANIMATION

ASSETS INTO GAME ENGINE

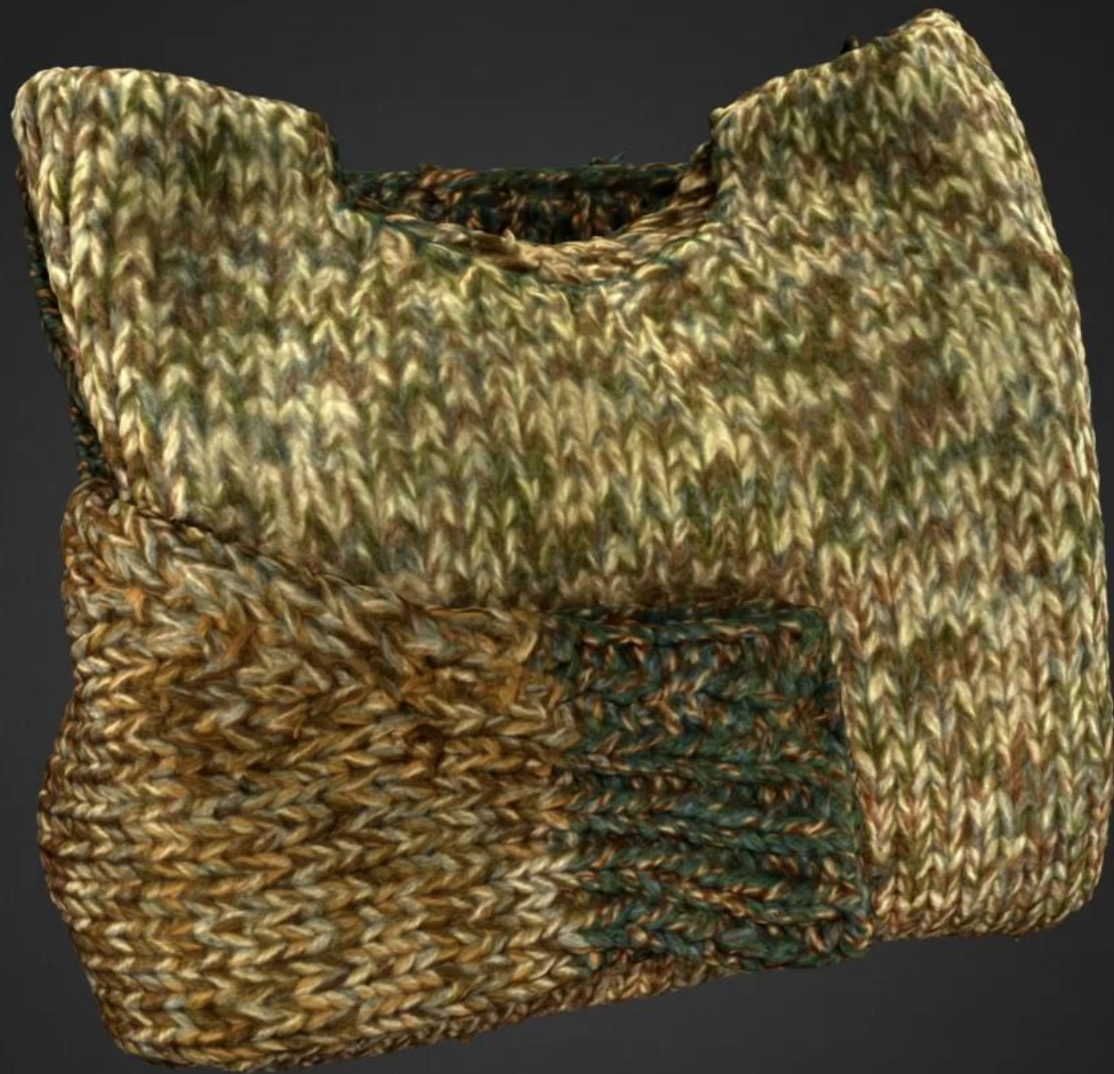


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The Illicit Still *Experience*





MOVE INTO VIRTUAL REALITY...

Virtual Reality (VR) is a technology that allows users to interact with a computer-generated environment. It is used in various fields, including gaming, education, and training. This poster provides a five-step guide to using VR.

| STEP 1 | STEP 2 | STEP 3 | STEP 4 | STEP 5 |
|--|--|---|---|---|
|  Put on your VR headset. |  Hold the VR controller. |  Adjust the VR headset. |  Use the VR controller. |  Look around the virtual environment. |

The Illicit Whisky Story



Tomintoul & Glenlivet Today



The Illicit Whisky Tour



the Highlands often commented on the ready Elizabeth Grant of Rothiemurchus, who grew up in the early nineteenth century, claimed that, 'the whisky was certainly too much of it going. At every house it must be tasted or offence would be taught to believe... The very poorest cottages the men engaged in the wood manufacture drank goblets three times a day'.

Whisky

Highland whisky (both in great demand in Lowland distilleries rapidly than the Highland taste of the final product became more valuable place of origin



Next

Walk Around

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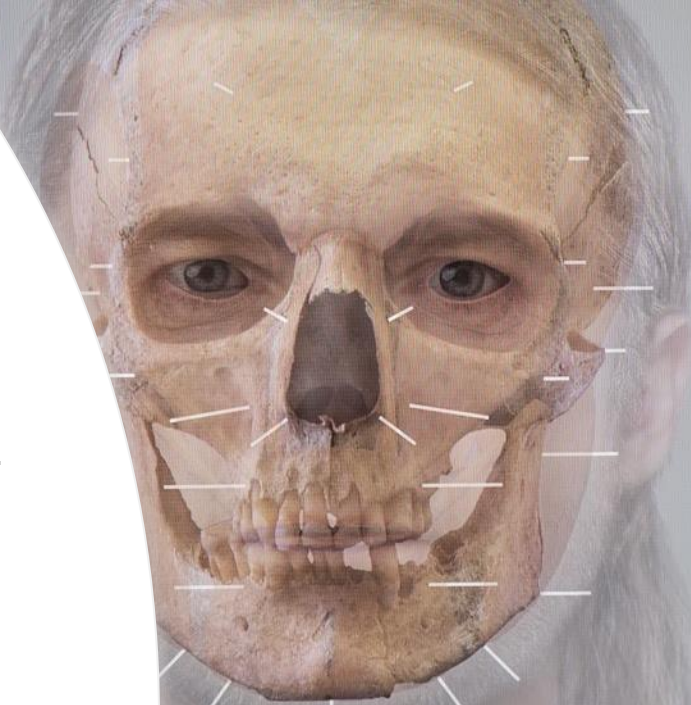
Creating Characters

- Characters add life to a virtual scene
- Animation can help tell a story

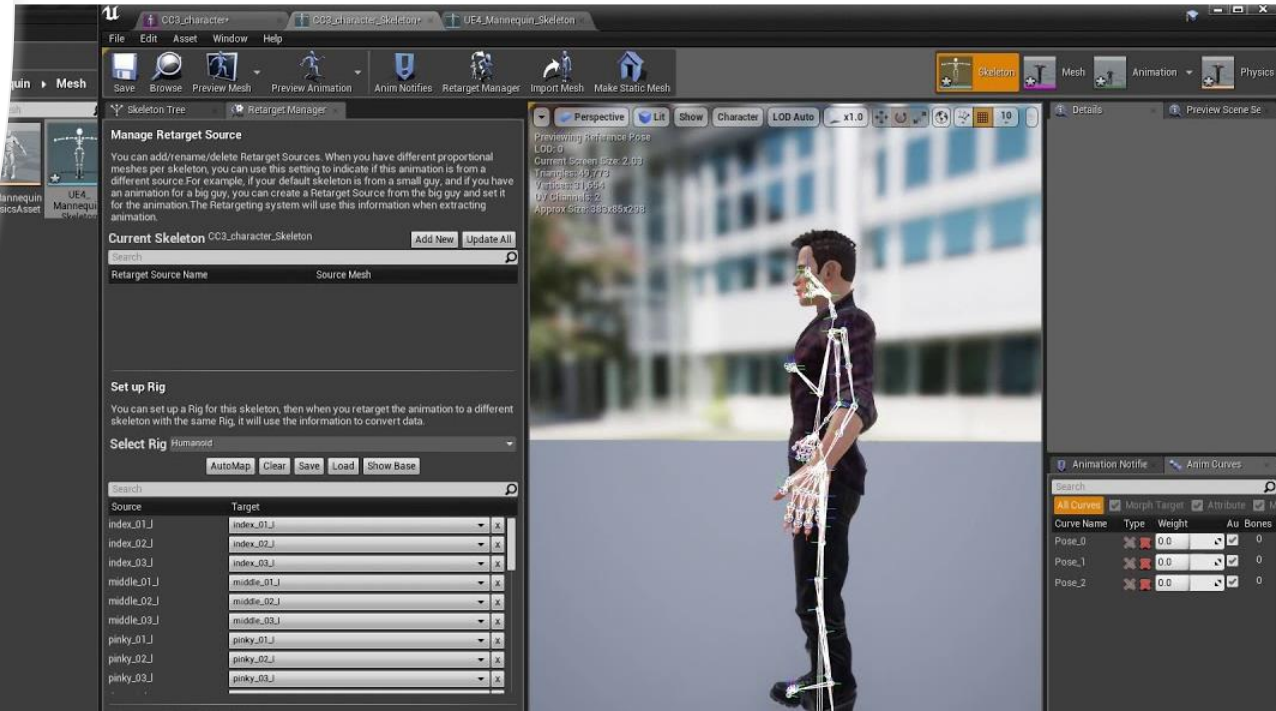


Creating Unique Characters

- Archaeological evidence can also provide us with an insight into lifestyle of people living on a site.
- Textiles
- Human remains
- Pottery
- Trade



Forensic artist Hayley Fisher

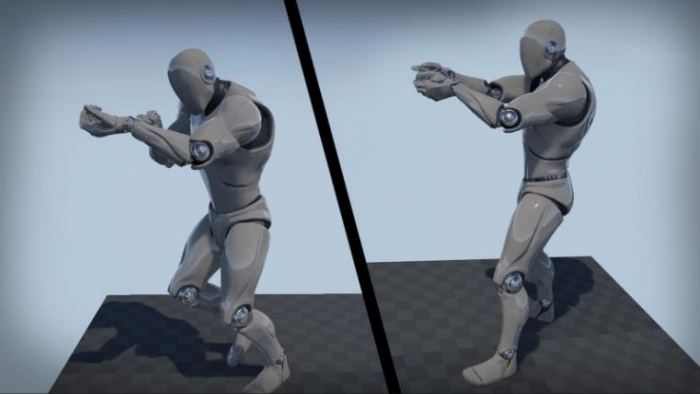


Animation starter Packs

MARKETPLACE

CONTENT DETAIL

Home Browse Industries



Animation Starter Pack

Epic Games - Aug 20, 2014

★★★★★ 1005 81 reviews

a Fantastic resource for prototyping your next project or getting your next mod up and running.

Download

OR

Write a Review

< >

Description Reviews Questions

Epic's Animation Starter Pack contains 62 animations that can be used with the classic Mannequin as well as upcoming Marketplace releases. This animation pack is a fantastic resource for prototyping your next project or getting your next mod up and running.

Licensed for use with the Unreal Engine Only.


Technical Details
Designed for Desktop and Mobile

Please visit https://wiki.unrealengine.com/Marketplace_Instructions for instructions on how to use this asset pack.

Tags

ANIMATIONS

Related Content



Modular Packs



Chests



Legs


MODUL

Character Kits

COMMUNITY MARKETPLACE

DETAIL

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Modular slot system
Texture variations
Facial expressions
Accessories

Stylized Character Kit: Casual 01

ROCKETARTS - Jun 9, 2020

★★★★★ 44 reviews written | 17 of 18 questions answered

Modular stylized male character. Contains hairstyles, accessories, and several body parts options.

Free

OR

Add to Cart

Supported Platforms
Supported Engine Versions
4.25
Download Type
Asset Pack

STYLIZED CHARACTER KIT

Casual Male 01

Description Reviews Questions

*ROCK: Stylized character kits. Characters modular parts are interchangeable and compatible among different assets.

Video demonstration

UPDATE 1.01 (June 16 2020): Changed File naming conventions, now they match with Casual 02 file names. Scene documentation updated correspondingly.
UPDATE 1.02 (June 24 2020): Added ID and D_0 (diffuse 0 = base grayscale texture) textures to the head mesh.

Modular character kit, containing several options for the torso, legs, and head accessories. Contains the naked body. Head includes morph targets for several facial expressions: Joy, Anger, Fear, Disgust, Sadness, Eyeblink, Surprise.

This pack is designed to be compatible with my other packs yet to be released, so basic structure elements could be mixed up with other characters. The model divided into the following slots: Head, Head Accessory, Torso, Arms, Legs.

Technical Details

Rigged: Yes
Rigged to Epic skeleton: Yes
If rigged to the Epic skeleton, IK bones are included: No
Animated: No
Number of characters: Characters are split in parts, 11 meshes in total (Head, Head Accessory, Torso, Legs, Arms). Contains 3 pre-constructed characters.
Vertex counts of characters: 23000 - 31000
Number of Materials and Material Instances: 45
Number of Textures: 95
Texture Resolutions: 2048x2048, 1024x1024
Supported Development Platforms:
Windows: Yes
Mac: Yes
Documentation: Migrate the assets to your current project and assign Epic Mannequin skeleton to them.

Tags

Communication and dissemination

- Museum Exhibit
- Image gallery
- Spherical images
- Virtual Tour
- Video
- Web exploration
- Steam exploration
- Twitch streaming
- Exhibitions
- Conferences
- Press
- Radio
- TV
- Social Media

Create
interest in
your project



Virtual Time Binoculars - Edinburgh 1544
Smart History 67.2K views



Edinburgh 1544 Townscape
Smart History 42.2K views



Edinburgh 1544 - Location Compilation
Smart History 3,555 views



Grassmarket - Edinburgh 1544
Smart History 1,774 views

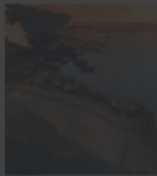
Heritage Trust.

The project has been credited with piecing together the everyday life of the Picts with its findings used to inform the digital reconstruction.



The lost Pictish settlement at Lair, Glen Shee, has been reconstructed in virtual reality to extraordinary effect. Reconstruction by Jack Horsburgh, still image courtesy of Perth and Kinross Heritage Trust. Copyright: Other 3rd Party

Publicity



[Read More](#)

[The Picts: How their mysterious world is being illuminated like never before](#)

David Strachan, director of Perth and Kinross Heritage Trust, said that people all over the world could now get an insight of this remarkable site.

He added: "The digital reconstruction in Virtual Reality of the sites excavated in Glen Shee really brings to life what otherwise are fairly technical plans and maps of the findings.



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30 funny Scottish jokes: the most hilarious one-liners, puns...

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Museum
Perth & Kinross

5
CARVED
ULDER

ROMAN AL
SLAB

CT AN OBJECT TO INTERACT

Picts & PIXELS

The ancient Picts were a mysterious
civilisation who inhabited the
north of Scotland from the 5th to the 9th
century AD. They were a
people of warriors and warriors
through their history.

Pictish art is a unique and
important part of Scotland's
cultural heritage. It is a
mixture of Celtic and Roman
art, and is a testament to the
Picts' artistic and technical
skills.

Exhibits

Demos

- Video showcase: <https://youtu.be/wRgbxX1lwsM>
- Interactivity Demo Video: <https://youtu.be/3pt5BGYwCvc>
- Roundme tour:
<https://roundme.com/tour/399204/view/1392126>
- Screenshots:
<https://photos.app.goo.gl/KpuvSFTThMp3bXDdw7>
- Cineg listings:
 - <https://cineg.org/galleries/layergallery.php?title=Layer&id=18>
 - Cineg map: <https://cineg.org/map/?mapid=5>

Communicating Archaeology

- Demonstrate the use of images to effectively communicate archaeological concepts
- Use social media to disseminate archaeological concepts
- Create basic maps
- Assess various audiences for archaeological communication
- Use digital media to communicate archaeology



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Resources - Research

- Canmore - canmore.org.uk
- National Library of Scotland - nls.uk/digital-resources
- Your friendly Archaeologists and Historians



Digital gallery

View digitised items from our collections



eResources

Access thousands of books, journals and databases



Map images

View thousands of maps online

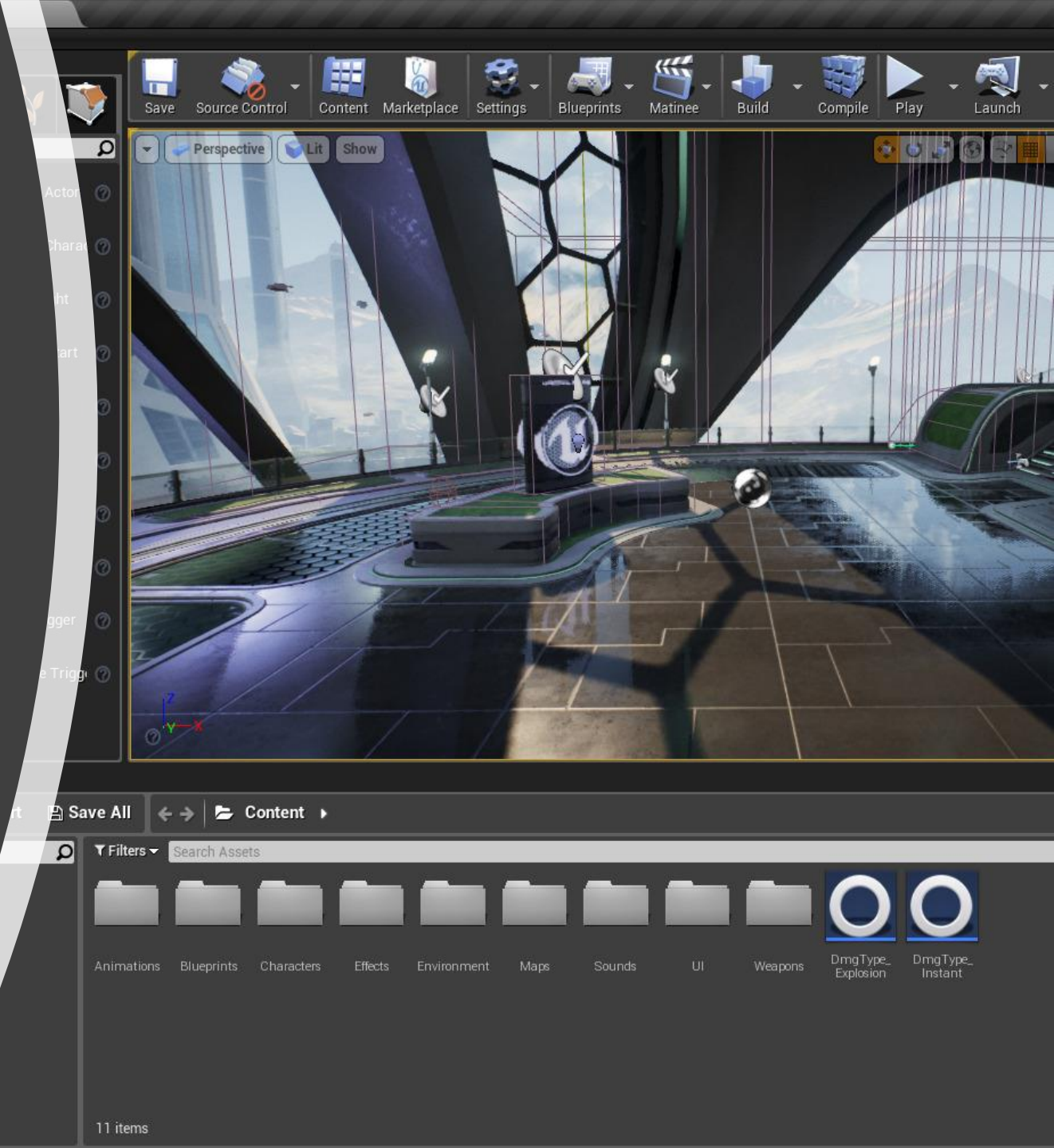


Moving images

Watch films in the Moving image

Resources - Software

- Blender
- SketchUp
- 3ds Max
- Fusion 360
- Mudbox
- Substance by Adobe
- Unreal Engine 4



MONTHLY HIGHLIGHTS #17

EXPLORE

FEDERAL MATERIALS + HDRI SPHERES + RUSSIAN ORNAMENTS

Resources - Assets

- Textures.com
- Sketchfab
- Unreal Engine 4 Marketplace
- CGtrader
- Free3D
- Turbosquid



Flowers Sheets



Bread Objects



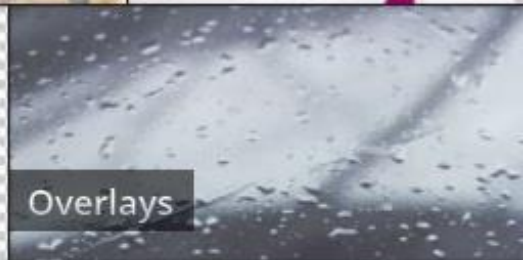
3D Ornaments



Graphic Designs



Decals



Overlays