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EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD

Intellectual Output_O2:
EMERALD e-toolkit manual for digital learning in producing biomimetic mechatronic systems

Toolkit 5
Virtual Reality/ Augmented Reality (VR/AR)

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EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS

E-toolkit – Virtual Reality/ Augmented Reality

Project Title	**European network for 3D printing of biomimetic mechatronic systems 21-COP-0019**
Output	**IO2 - EMERALD e-toolkit manual for digital learning in producing biomimetic mechatronic systems**
Module	**Virtual Reality /Augmented Reality (VR/AR)**
Date of Delivery	**January 2023**
Authors	**Martin ZELENAY, Branislav RABARA**
Version	**Final Variant**

CONTENT

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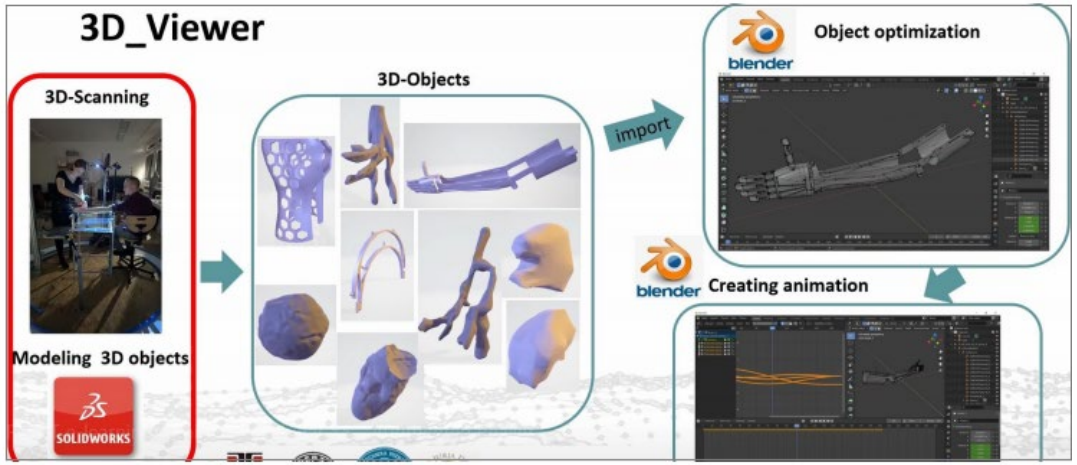
1. Overview of whole process

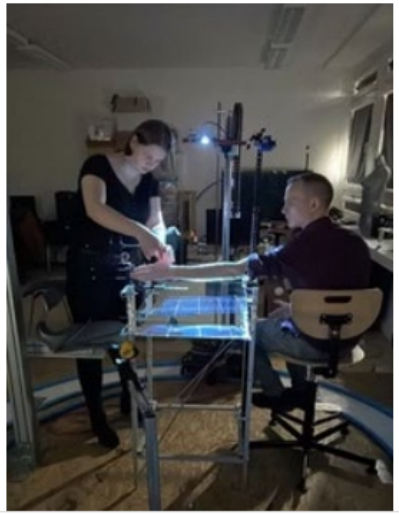


To create the 3D preview in Augmented reality we need 3D objects, we can get this through following steps:

- 3D scanning
- Or modeling of the 3D objects

Then there is a process which involves object optimization and creating animation.

Here we can see the scanning scanning of a hand in detail:



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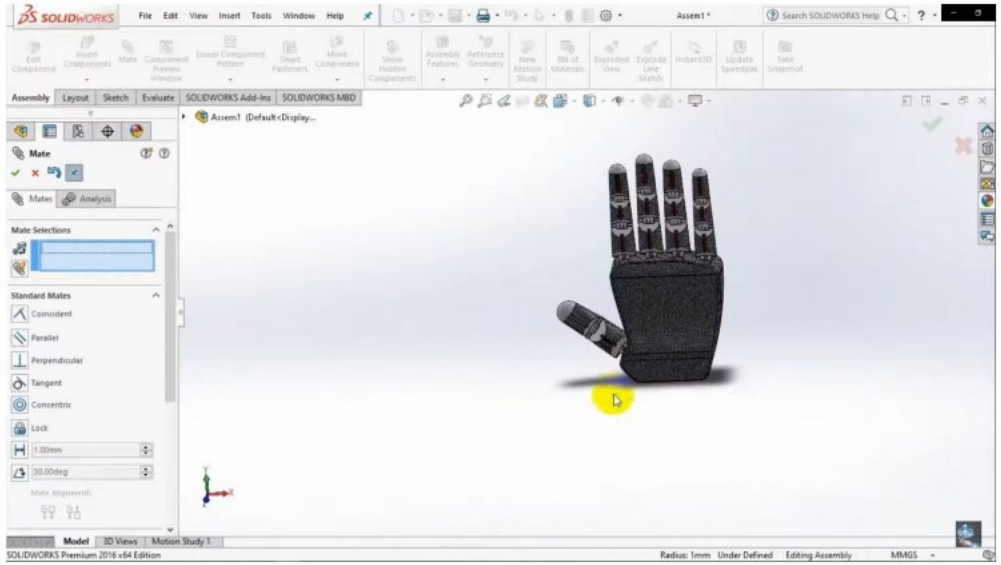
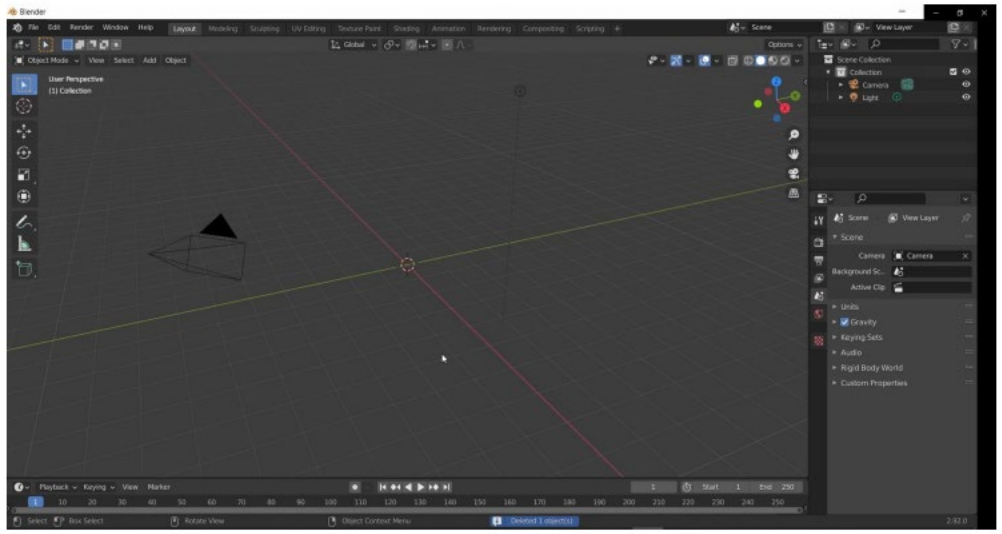
2. Building Augmented Reality animations

2.1 Introduction to Blender software





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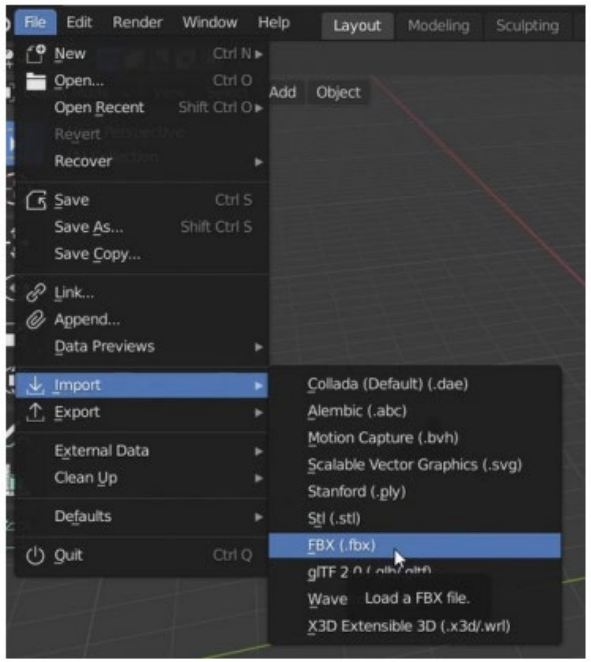
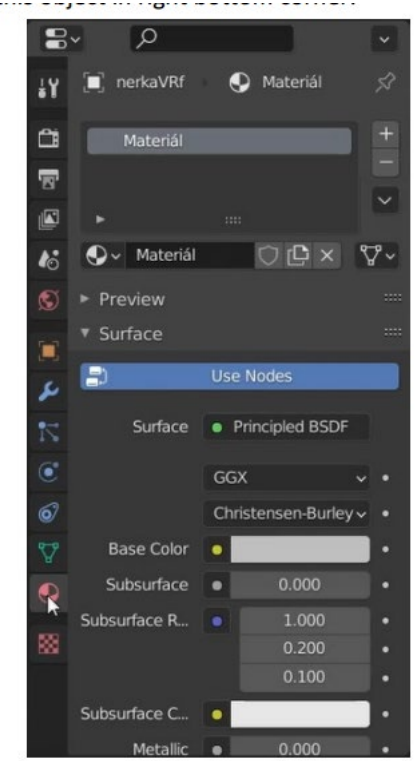
That means if we have a vertex files, we can create animation in Blender software. This is a simple process where we import the model first:



We can change the materials or specifications of the object we will switch to view specifically color palette of this object in right bottom corner:



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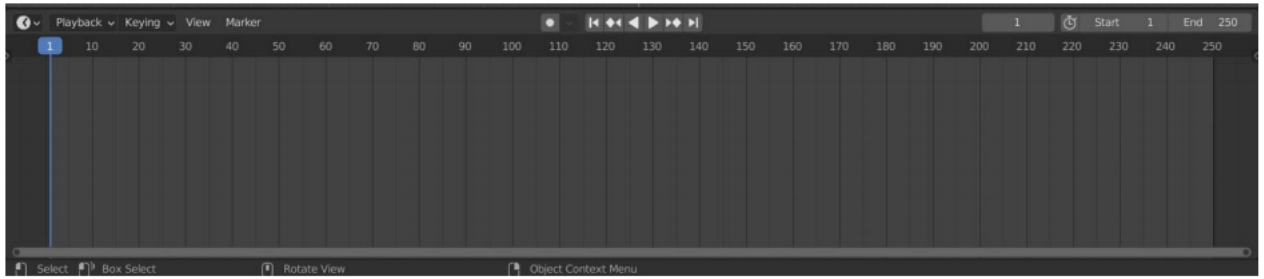
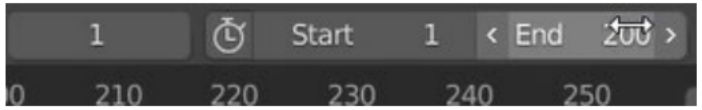
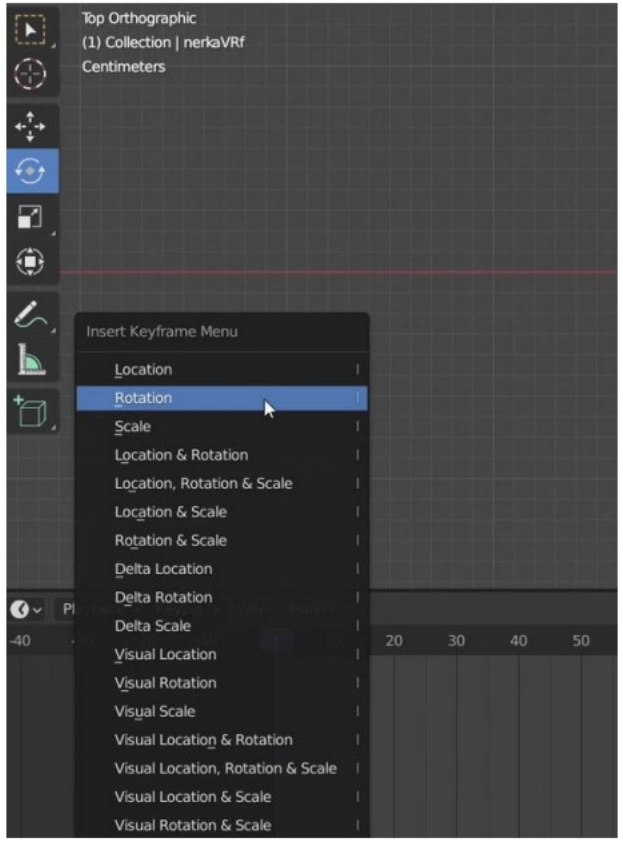


We will set the starting and ending of the timeline



On the first second of timeline, we will create a first frame of the rotation through axis y – by pressing the KEY button "I". Then selecting Rotation from the Edit Mode, or by pressing "R" we rotate the object through axis y.



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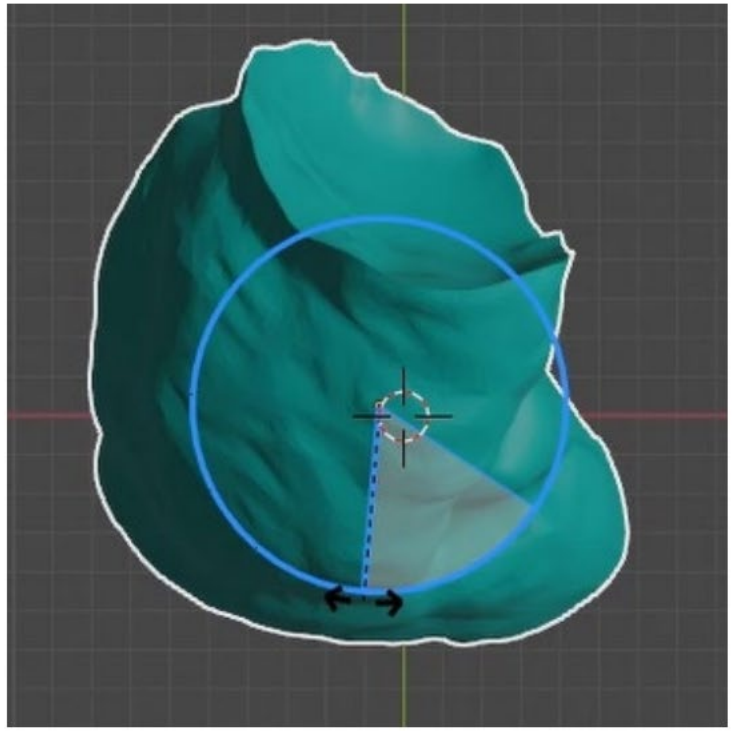

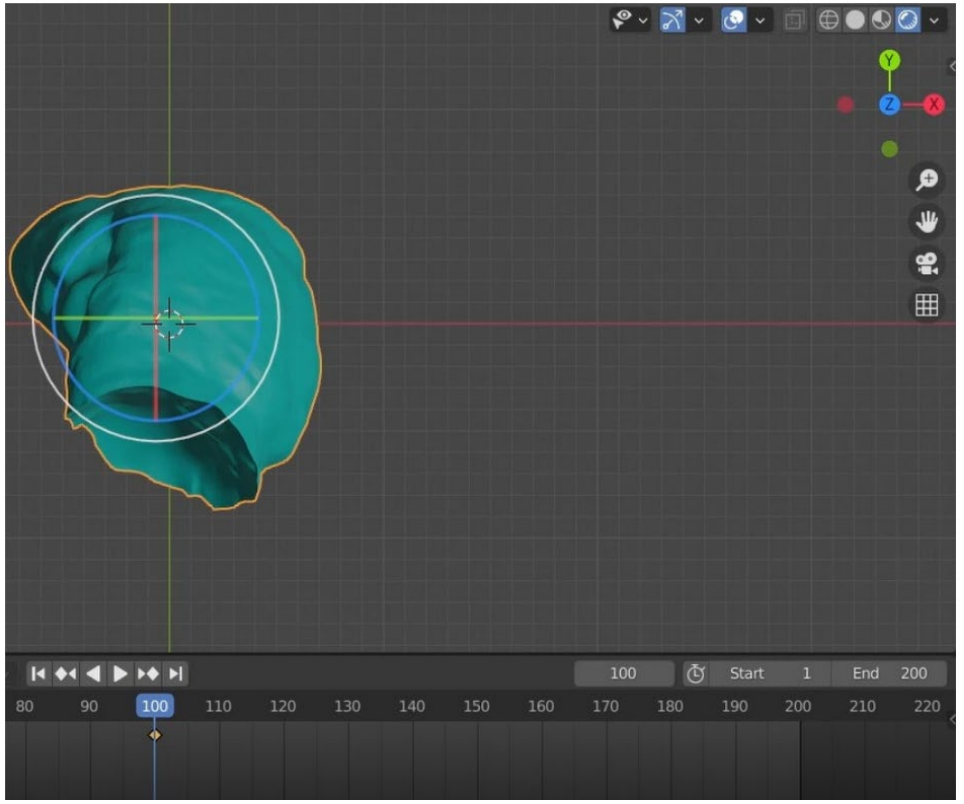

We will fix this position at 100. This means we will move to frame 100 with mouse and then rotate the object by pressing “R” and then pressing the KEY button “I” to fix it.

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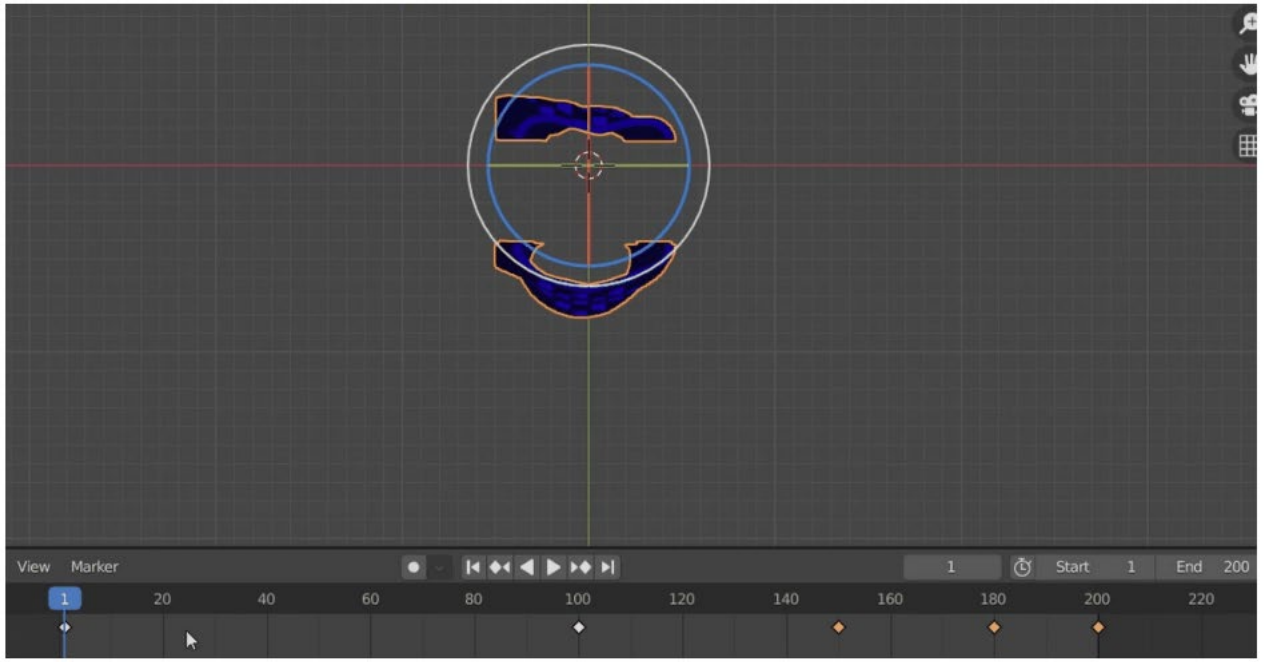
Here is preview of another object where we created another animation:



We can also create more complex animations.

Once we have the objects created, we need to save them and export them into Glb file for Android.

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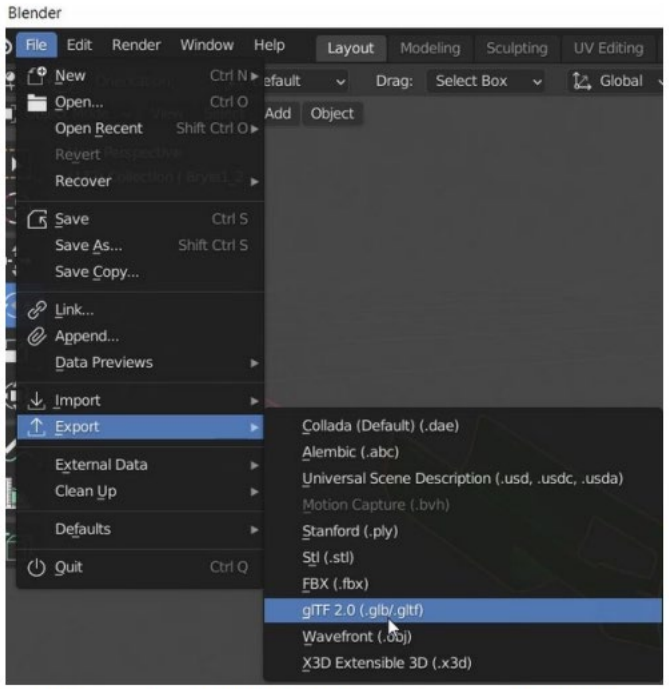

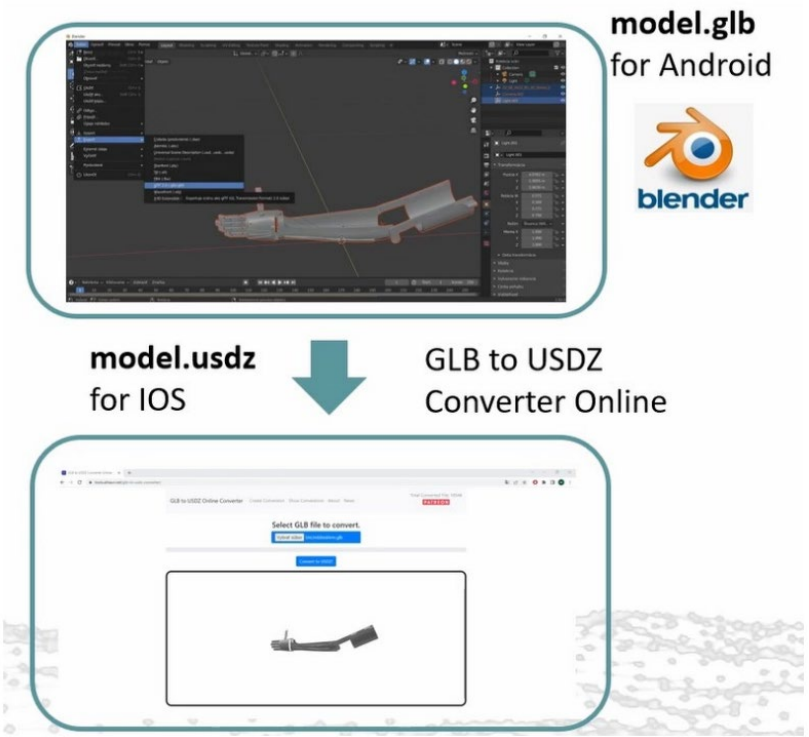

Or we can use the USDZ format, which is for IO OS, we can find the online core value converter for such.

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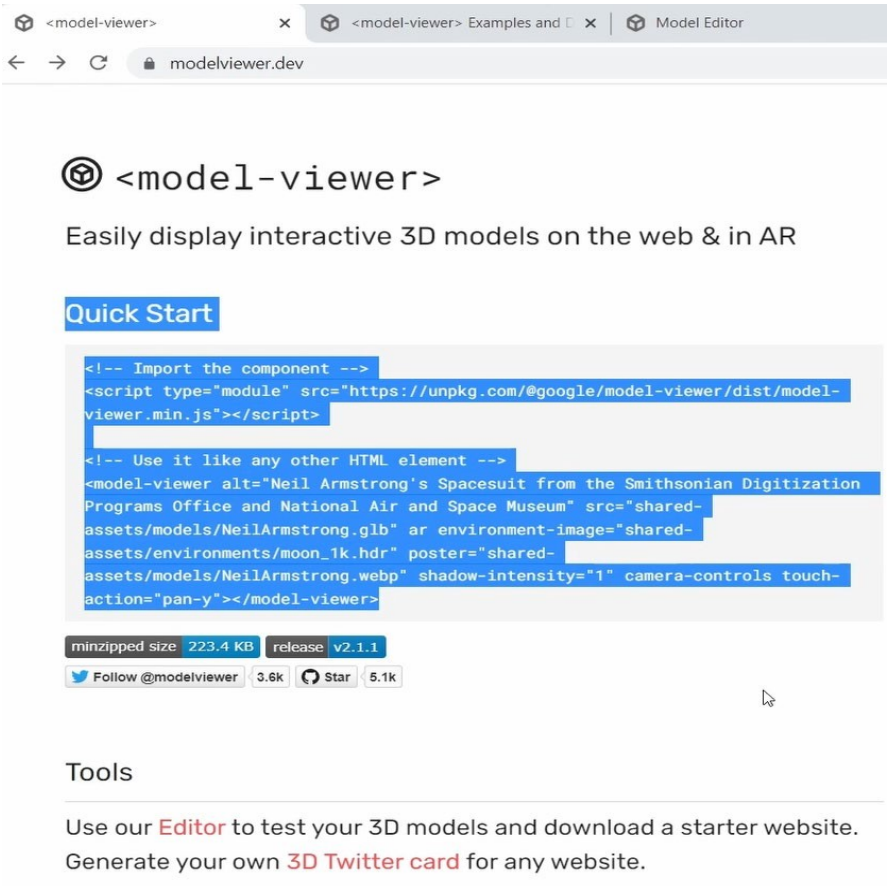
2.2. Creating website to display AR models

Once we have the individual models, we use the web interface WEB APP – 3D Viewer, which is used to create preview of the 3D models using the HTML code.

At www.modelviewer.dev we have the documentation and examples. This documentation is right iterated to the specific model viewer. And we can utilize the editor https://modelviewer.dev/editor/ where we can test our code, there are some examples from where we can get an inspiration.



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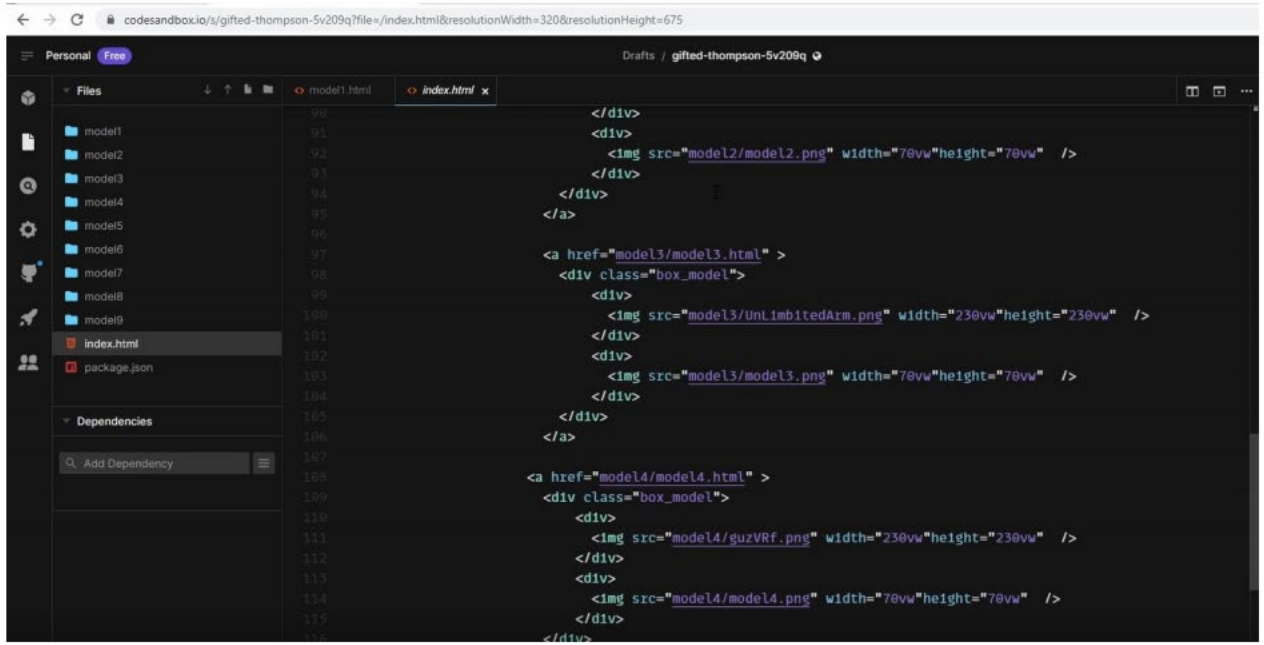
Once we have the code, we need to publish it. Either this could be own web server or it could be a code sandbox where we will publish our code. It's free it only requires registration at https://codesandbox.io/

There we can start a website. Here in our example we can see specific environment where we have index, which is a main site.



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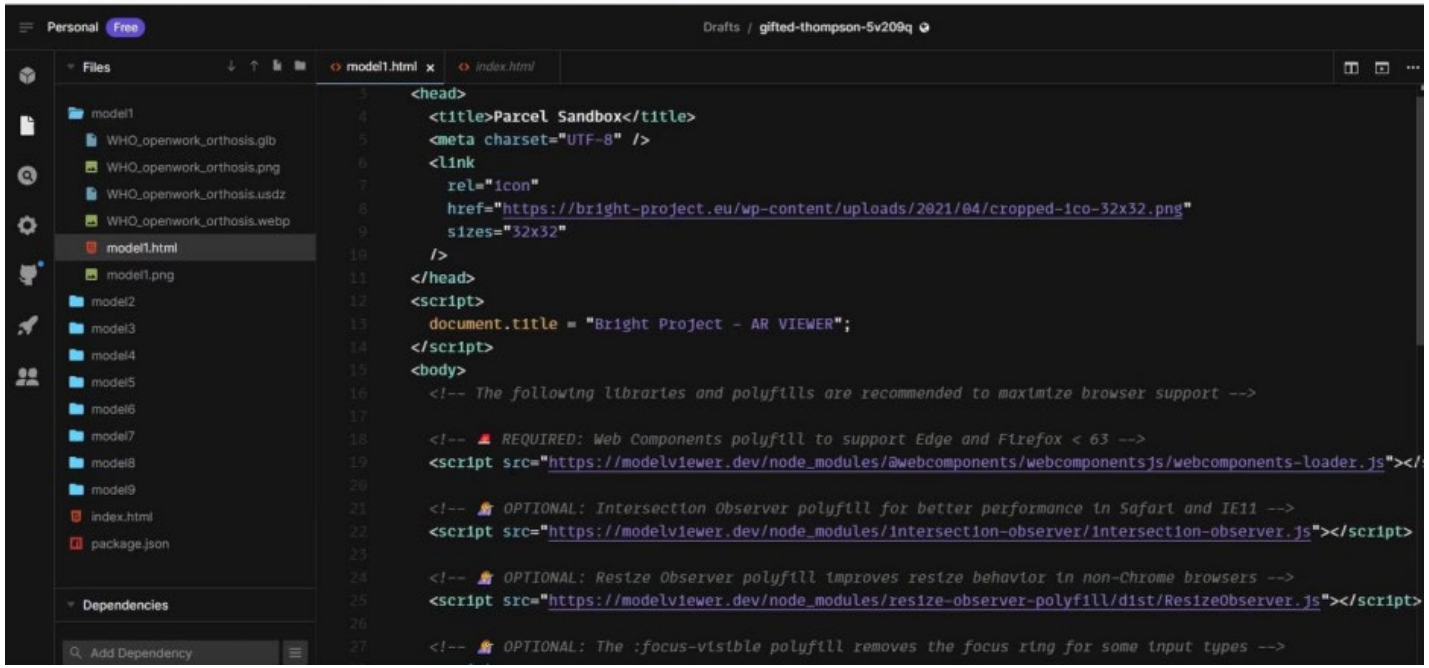
The sub site of the first object contains individual code as well.

The site will generate from 3Dmodel html code a model displayed in augmented reality, either Android or iOS. Which we can click, we can rotate it and interact with.



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