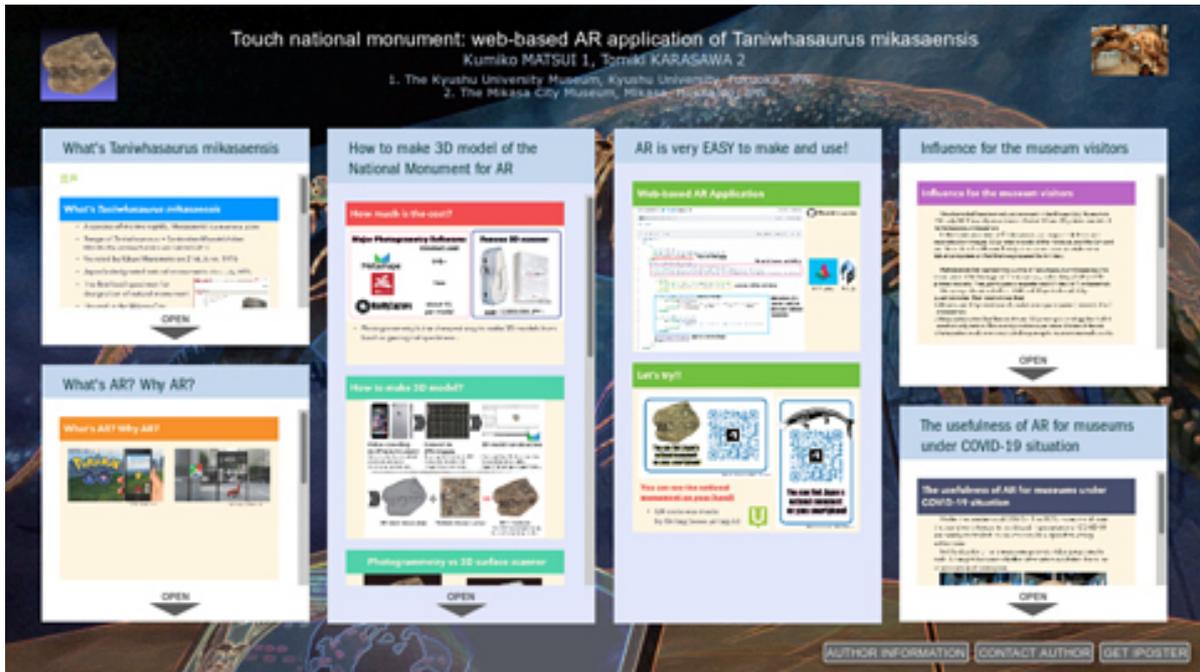


Touch national monument: web-based AR application of Taniwhasaurus mikasaensis



Kumiko MATSUI 1, Tomiki KARASAWA 2

- 1. The Kyushu University Museum, Kyushu University, Fukuoka, JPN,
- 2. The Mikasa City Museum, Mikasa, Hokkaido, JPN



PRESENTED AT:



JpGU - AGU Joint Meeting 2020

For a Borderless World of Geoscience
Japan Geoscience Union, American Geophysical Union

WHAT'S TANIWHASSAURUS MIKASAENSIS

音声 (<https://www.dropbox.com/s/dl6q2ub47yzeb6o/Project%20-%207%3A11%3A20%2C%2021.33.mp3?dl=0>)

What's *Taniwhasaurus mikasaensis*

- A species of marine reptile, Mosasaurid (Caldwell et al. 2008)
- Range of *Taniwhasaurus* = Santonian-Maastrichtian (863-660 Ma; Jiménez-Huidobro and Caldwell, 2019)
- founded by Kikuo Muramoto on 21st, June, 1976
- Japan's-designated natural monuments (16th, July, 1977)
- The first fossil specimen for designation of natural monument
- Housed in the Mikasa City Museum, Mikasa, Hokkaido, JPN
- Specimen number MCM-M-0009



Taniwhasaurus mikasaensis

Diagnosis: Crest on the top of the skull

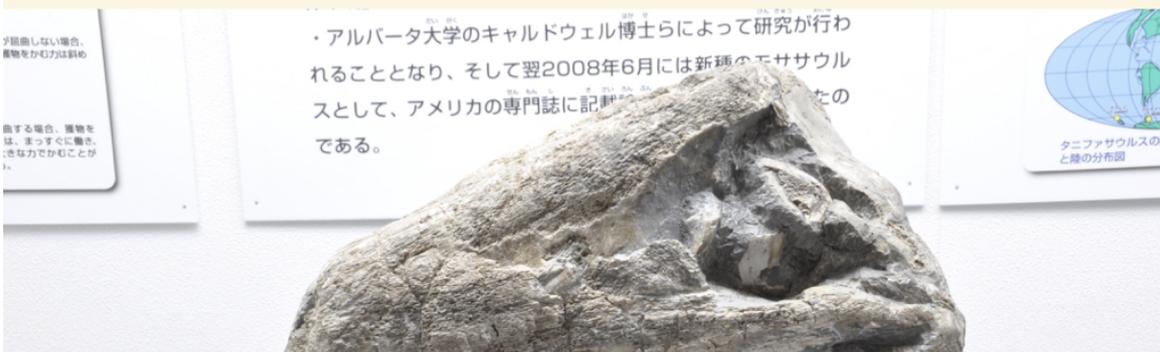


REPTILIA Linnacus, 1758
 SQUAMATA Oppel, 1811
 MOSASAURIDAE Gervais, 1852
 TYLOSAURINAE Williston, 1897
 TANIWHASAUROS Hector, 1874
 TANIWHASAUROS MIKASAENSIS Caldwell et al., 2008
 Holotype: MCM-M0009

Reconstruction model of *T. mikasaensis* exhibited in the Mikasa City Museum

Model Sculpter: Goro Furuta

Supervisor: Takuya Konishi (Ph.D)





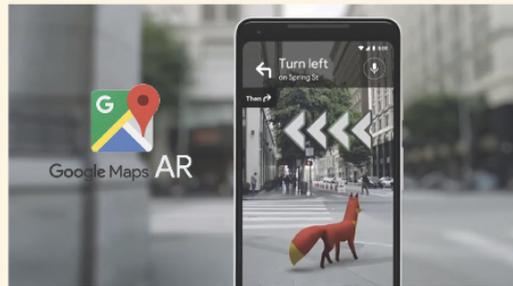
***Taniwhasaurus mikasaensis* MCM-M-0009**

WHAT'S AR? WHY AR?

What's AR? Why AR?

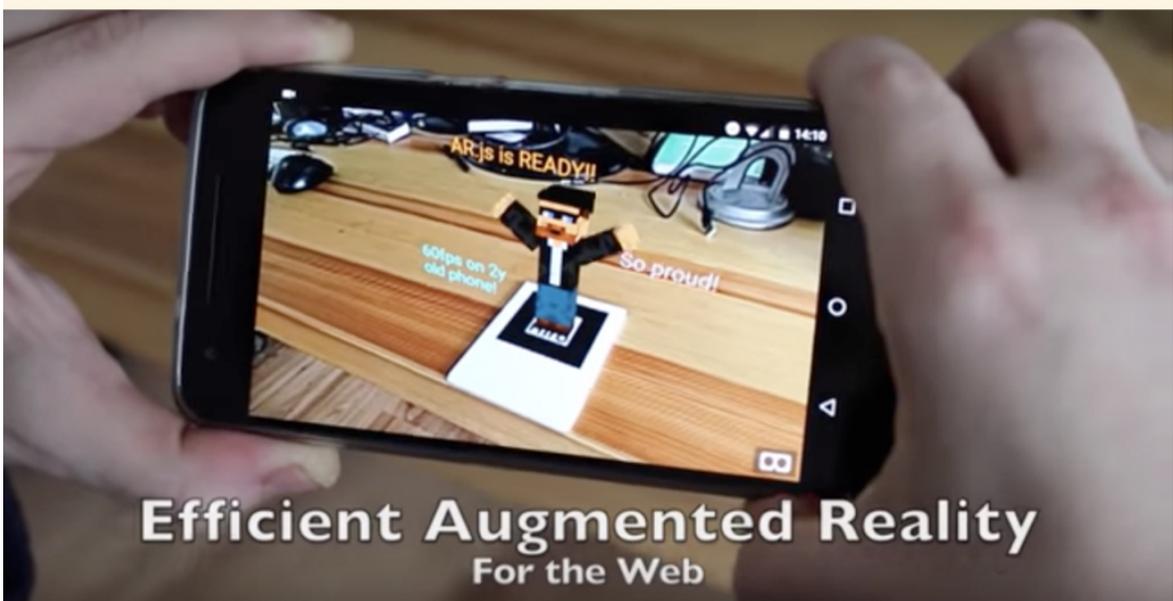


©Pokémon GO



©Google/Youtube

Web-based AR and Marker-based AR



<https://aframe.io/>

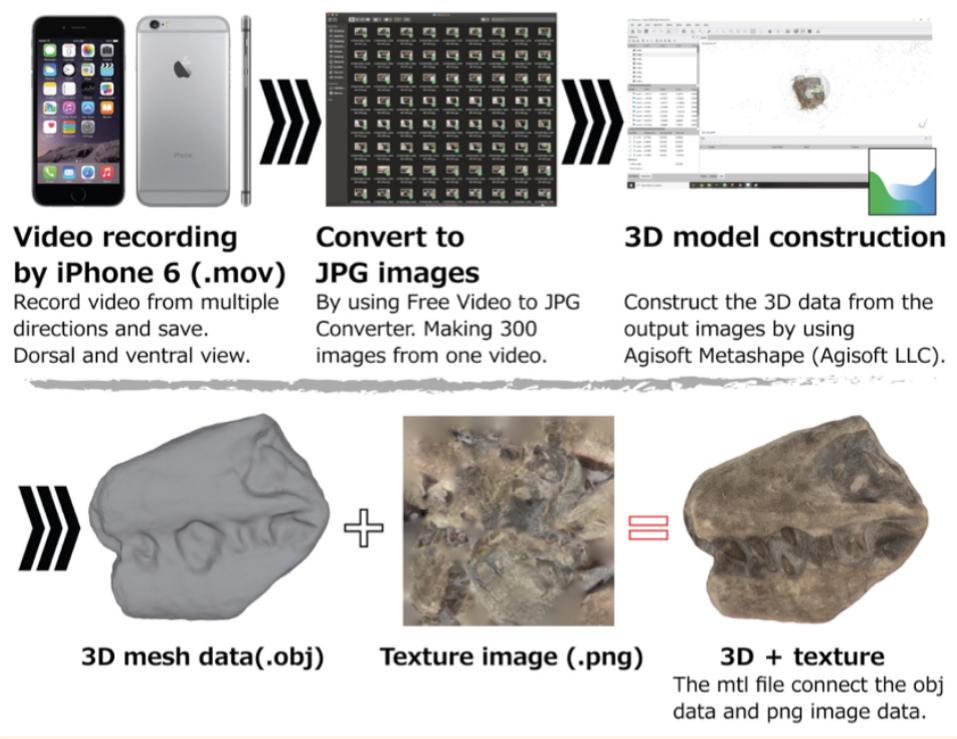
HOW TO MAKE 3D MODEL OF THE NATIONAL MONUMENT FOR AR

How much is the cost?

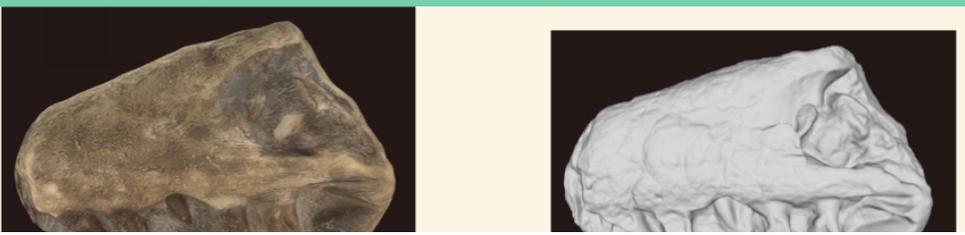
Major Photogrammetry Softwares		Famous 3D scanner	
		minimum cost	
	59\$~		cost : 3,500,000 JPY~
	Free		
	about 1\$ per model		

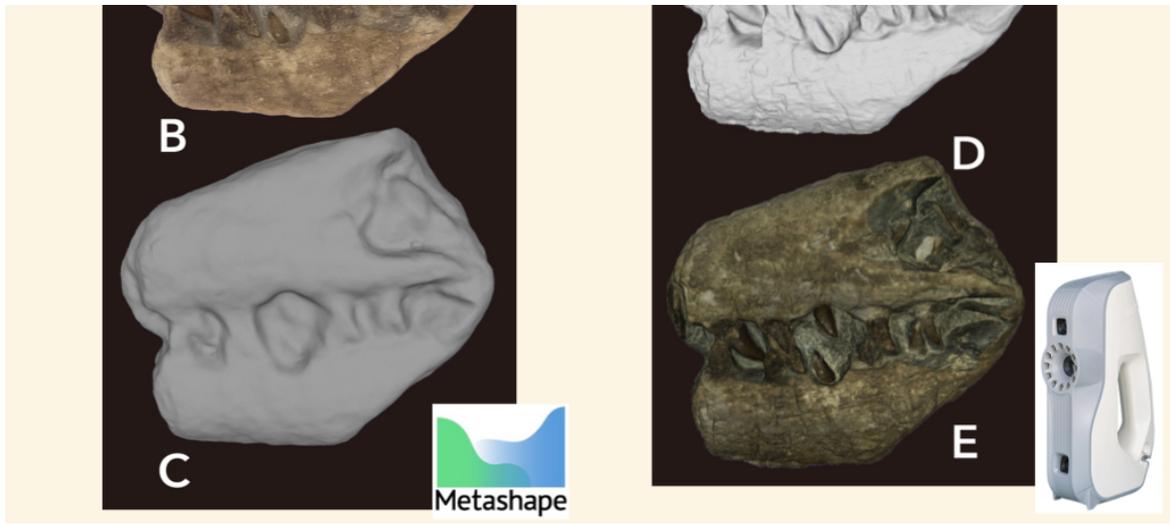
- Photogrammetry is the cheapest way to make 3D models from fossil or geological specimens .

How to make 3D model?

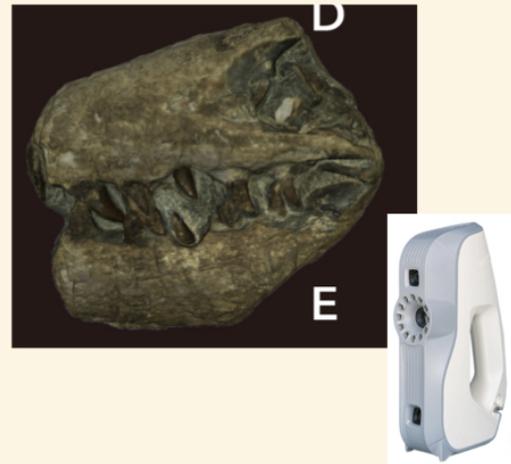


Photogrammetry vs 3D surface scanner





Not big differences in these two methods



- **Photogrammetry-based 3D model with texture data looks better than 3D scanner based one.**
- The 3D scanner is excellent for research applications where fine surface features are required

You can see this model in Skechfab!!

Sketchfab EXPLORE BUY 3D MODELS FOR BUSINESS

EDIT PROPERTIES EDIT 3D SETTINGS

SUGGESTED 3D MODELS

Taniwasaurus mikasaensis mesh+texture
3D Model

Kumiko Matsui 0 0

+ Add To < Embed > Share

Triangles: 180k Vertices: 90k [More model information](#)

Yezo-Mikasa-ryu, Japan-designated Natural monument housed in the Mikasa City Museum

Published 3 minutes ago
Uploaded with Agisoft Metashape exporter

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fossil paleontology reptiles mosasaurus vertebrate metashape agisoft paleontology-fossil

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The Smithsonian Institution
1 2.6k 60

Real-time Refraction De...
Sketchfab
25 16.8k 466

Vertebrate: Carcharocles...
Digital Atlas of Ancient Life
0 1.6k 39

Vertebrate: Tyrannosaur...
Digital Atlas of Ancient Life
2 8.6k 71

Mammuthus primigeniu...
The Smithsonian Institution
0 4.8k 66

Skull of Smilodon - Saber...
geolab.unilasalle
4 4.2k 49

(<https://sketchfab.com/3d-models/taniwasaurus-mikasaensis-meshtexture-a13e10d702fc4abca388e0b8d3942fce>)

AR IS VERY EASY TO MAKE AND USE!

Web-based AR Application

```

Branch: gh-pages 3d / WebAR / index.html Find file Copy path
taniwhasaurus Update index.html 9fa1913 11 minutes ago
1 contributor

33 lines (29 sloc) 1.4 KB Raw Blame History
1 <!DOCTYPE html>
2 <html>
3   <head>
4     <meta charset="utf-8">
5     <meta name="viewport" content="width=device-width,initial-scale=1">
6     <title>The Mikasa City Museum</title> Title of this App
7   </head>
8   <body style="margin:0px; overflow:hidden;">
9     <script src="https://aframe.io/releases/1.0.0/aframe.min.js"></script>
10    <script src="https://raw.githubusercontent.com/jeromeetienne/AR.js/2.1.3/aframe/build/aframe-ar.js"></script>
11    <a-scene arjs="detectionMode: mono_and_matrix; matrixCodeType: 5x5; sourceType: webcam; trackingMethod: best; debugUIEnabled: false">
12
13      <a-assets>
14        <a-asset-item id="3DModel3" src="tanipha2.obj"></a-asset-item> connect 3D & mtl data
15        <a-asset-item id="Material3" src="tanipha2.mtl"></a-asset-item>
16      </a-assets>
17
18      <a-marker type="barcode" value="5"> recognition of the marker
19        <a-obj-model src="#3DModel3"
20          mtl="#Material3" position="0 0.5 0" scale="10 10 10" rotation="0 0 0">
21        </a-obj-model> 3D model definition position size rotation
22      </a-marker>
23
24      <a-marker type="barcode" value="6">
25        <a-obj-model src="#3DModel3"
26          mtl="#Material3" position="0 0.5 0" scale="0.2 0.2 0.2" rotation="0 0 0">
27        </a-obj-model>
28      </a-marker>
29
30      <a-entity camera></a-entity> open camera App
31    </a-scene>
32  </body>
33 </html>

```

@taniwhasaurus



Let's try!!



You can see the national monument on your hand!

- QR code was made by Unitag (www.unitag.io)



INFLUENCE FOR THE MUSEUM VISITORS

Influence for the museum visitors

We attempted hands-on education event in the Mikasa City Museum in 13th July 2019 to verify educational effect of AR and 3D printed models of *Taniwhasaurus mikasaensis*.

In the hands-on corner of *T. mikasaensis*, we prepared skeleton and reconstruction images, 3D printed models of the holotype, and the QR cord and the makers for AR view. Participators can use own smartphones or tablet computers or iPad that we prepared for AR view.

Participators first learned the outline of *Taniwhasaurus mikasaensis*, the importance of the holotype of *T. mikasaensis*, and making of AR and 3D printed models. Then, participators experienced AR view of *T. mikasaensis*.

We survey educational effect of AR and 3D printed models by questionnaires. That result shows that;

1. AR view and 3D printed models makes more participators' interested in *T. mikasaensis*.
2. Many participators had known AR and 3D printing technology but hadn't used actually before. This event provides experience of state of the art.
3. Participators made more interested in joining to museum outreach events.

Age				
10s	20s	30s	40s	Over 50s
2	2	1	5	1

Habitat		
Mikasa City	Hokkaido (except for Mikasa City)	Others
3	9	0

Question / Answer			Non-answer / others
	yes	no	
Q1: Had you known "3D printer" before participate in this event?	9	2	
Q1-2: Had you used any 3D printer?	0	9	
Q2: Had you known "AR" before participate in this event?	7	4	
Q2-2: Had you used any AR?	3	4	
Q3: Have been to any museum frequently?	6	3	2
Q4: Had you known <i>Taniwhasaurus mikasaensis</i> before participate in this event?	6	5	
Q5: Does this event make you more interest in <i>Taniwhasaurus mikasaensis</i> ?	6	5	
Q6: Will you want to join to any event like today in future?	11	0	

The number of person
The number of person

THE USEFULNESS OF AR FOR MUSEUMS UNDER COVID-19 SITUATION

The usefulness of AR for museums under COVID-19 situation

Under the pandemic of COVID-19 in 2020, museums all over the world were forced to be closed. If prevalence of COVID-19 are barely controlled, museums should suspend touching exhibitions.

In this situation, many museums provide video programs in web. AR might become a further alternative exhibition because of avoidance of contagion.



Restriction of hands-on exhibition in the Mikasa City Museum

We are sorry to inform you that the content of your iPoster has changed in our database since your last save.

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To avoid losing any content, we recommend you open a new tab/window and access your iPoster again, and copy any missing content from this view to the new view. You will see the latest content saved in our database for your iPoster in the new view.

Because of maintenance we have just saved your content and will within a few minutes logout all users and restart our server. We will be back in a moment.

Sorry for the inconvenience!

Because of maintenance we will within a few minutes restart our server. We will be back in a moment.

Sorry for the inconvenience!

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LIVE SESSION

Meeting time:

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GO TO SESSION