

# Texture generation for archaeological reconstructions

Oleg Iakushkin, Anna Fatkina, Dmitry Selivanov,  
Alexander Degryarev, Daniil Malevaniy

# Introduction



- Get surface texture of an object from it's segment, but not from the whole image

Method is divided into two parts:

1

- Obtaining a squared area from object's photo which we can use as a groundwork for creating the material

2

- Obtaining normal, bump, diffuse, ambient occlusion and spectral maps to produce the material needed for rendering

- Substance B2M  
(bitmap to material)
- Awesome Bump



**SUBSTANCE**  
B2M

**Awesome**  
BUMP

# Obtaining the basic texture for the material

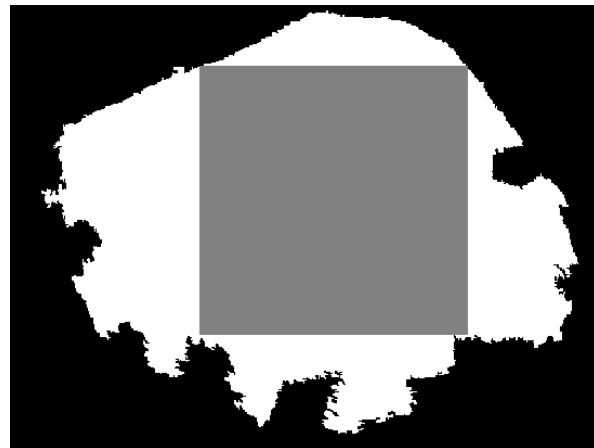


## First step

- Divide the picture into foreground and background parts.
- Get the square of maximum size which is inscribed in the foreground.



Input image



Texture region

# Obtaining the basic texture for the material

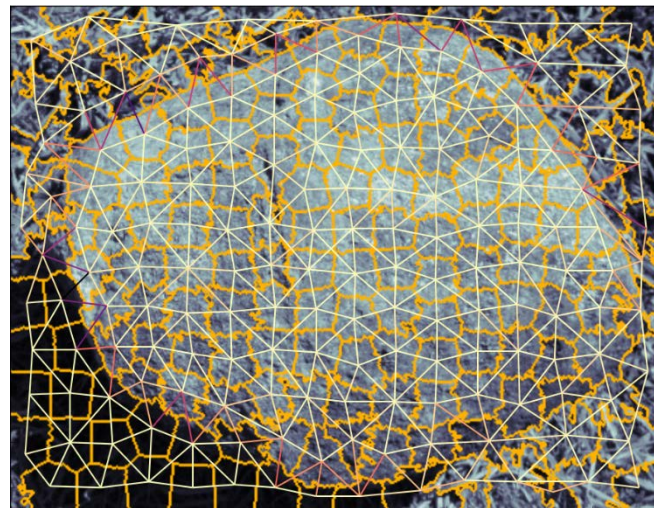


## First step — SLIC

- SLIC was used for preliminary segmentation



Preliminary segmentation

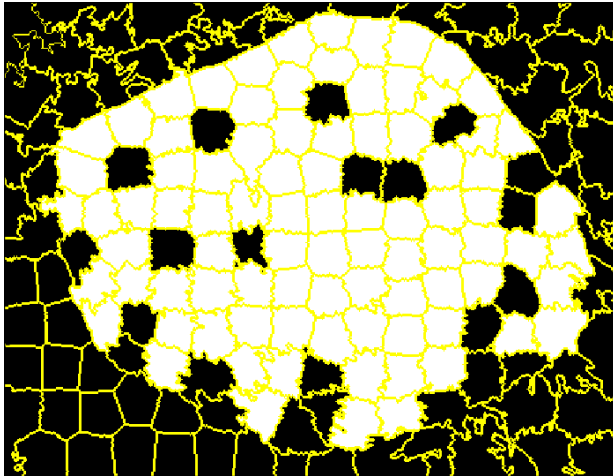


Adjacency graph

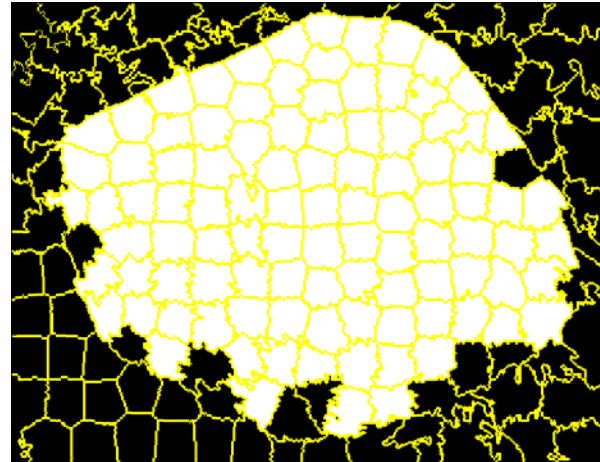
# Obtaining the basic texture for the material



## First step — binary mask



before mask filtering



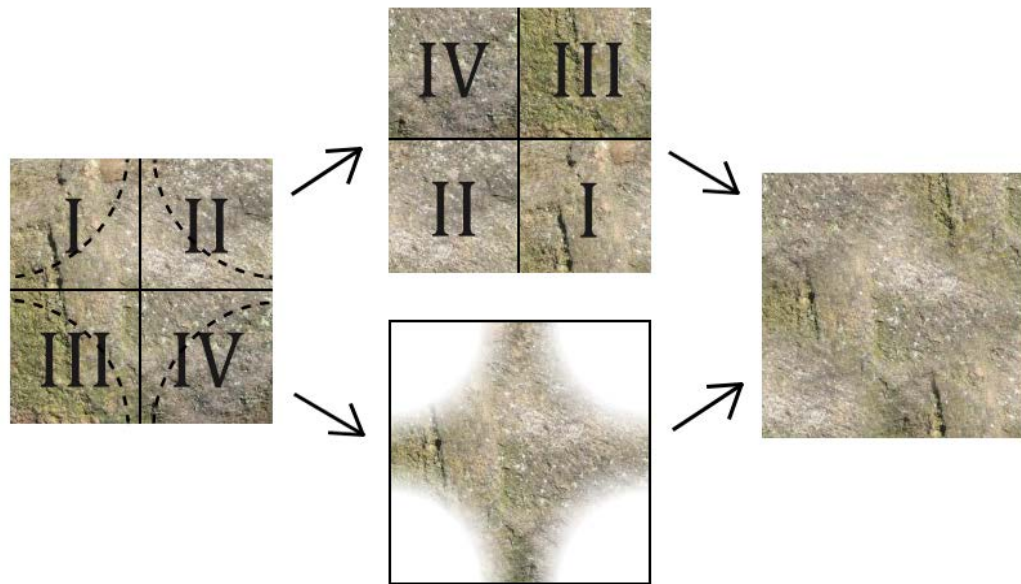
after mask filtering

# Producing the material



## Second step — seamless diffuse map

- Different parts of image are combined the way it shown in the frame.
- All other maps are generated from the received seamless diffuse map.



# Producing the material



Map generation:

- Normal map
- Bump map
- Ambient occlusion map
- Specular map

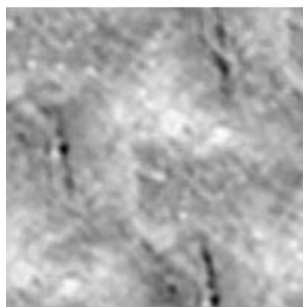
basic



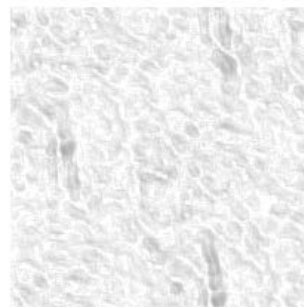
diffuse



normal



bump



Ambient occlusion



specular





1

- Scikit-image was used as a library for Image Processing

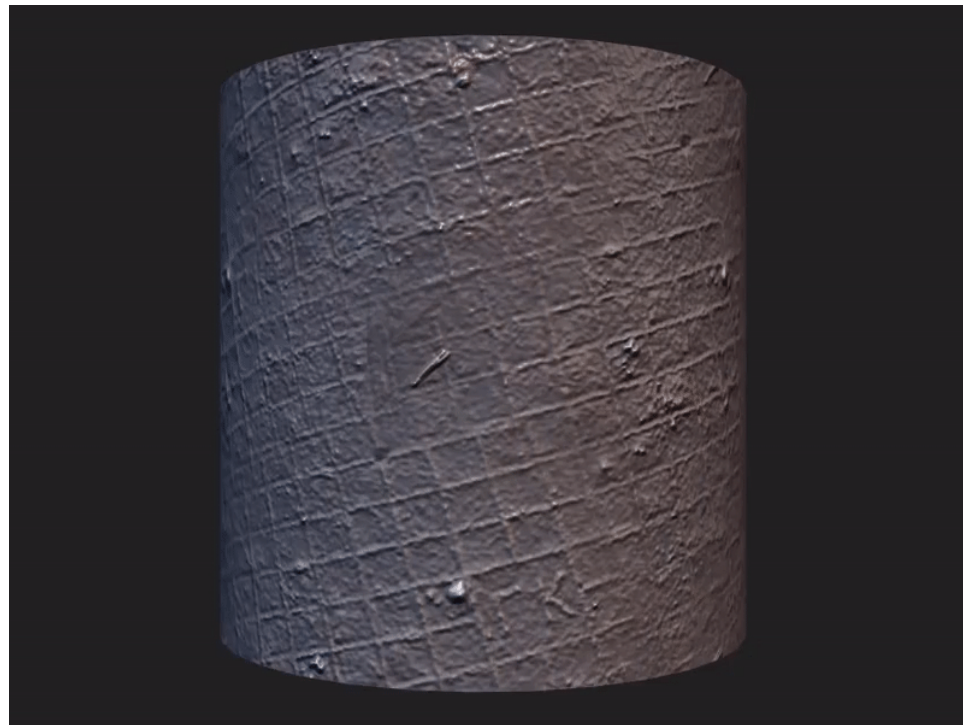
2

- Map generation method is similar to AwesomeBump implementation

# Succeeded cases and failed cases

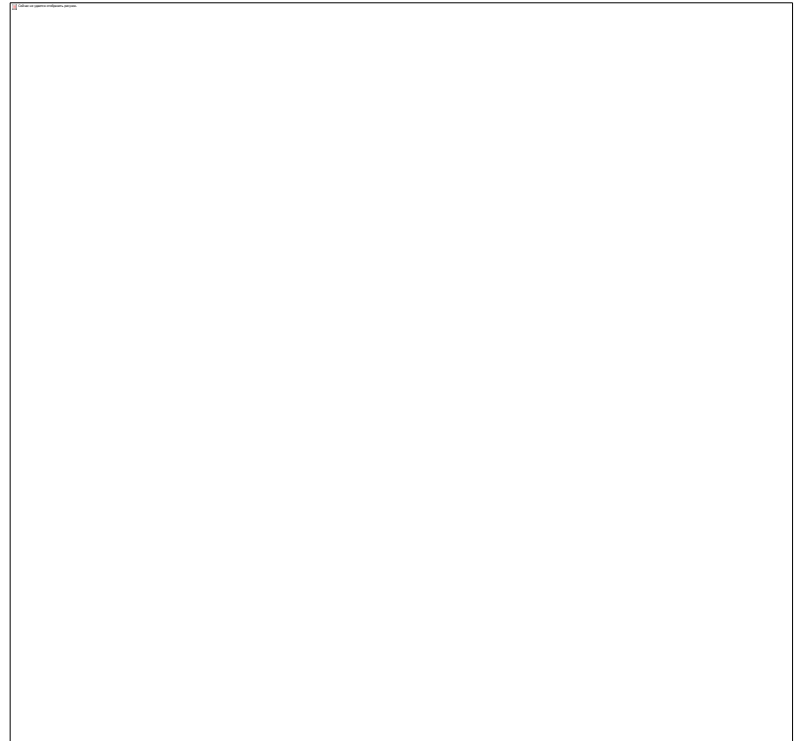


# Succeeded cases and failed cases

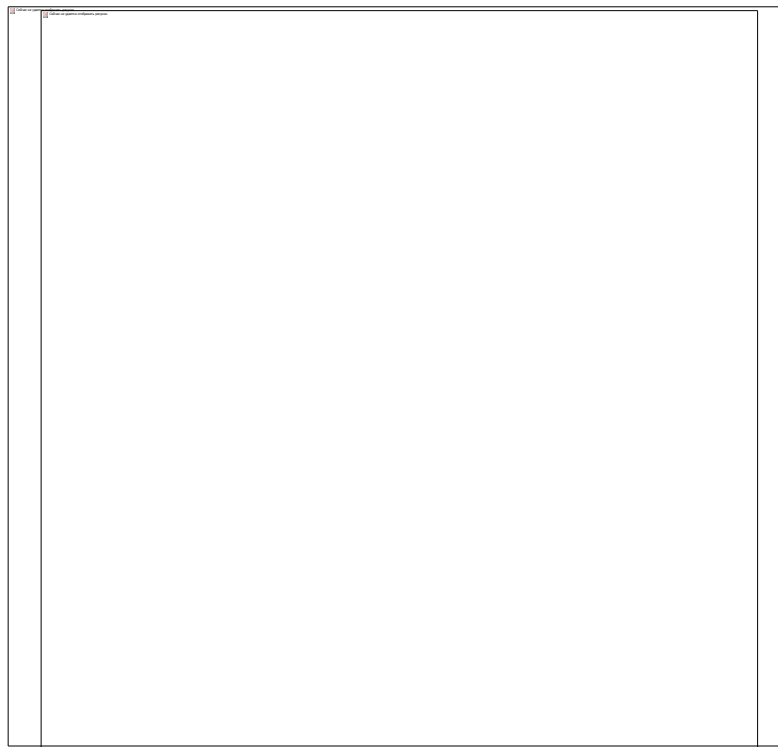
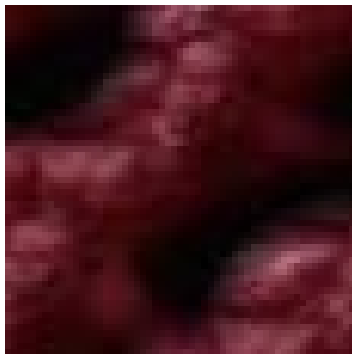




# Succeeded cases and failed cases

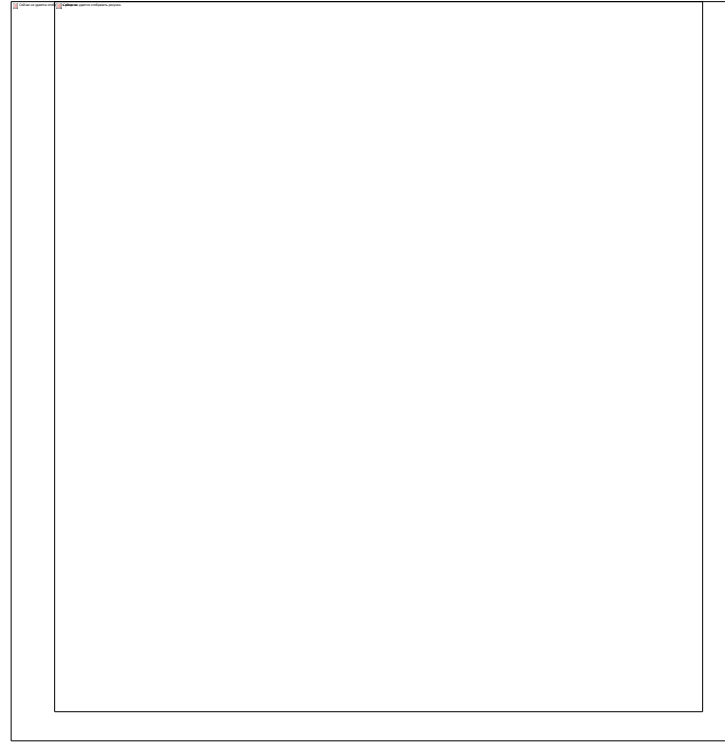


# Succeeded cases and failed cases





# Succeeded cases and failed cases



# Conclusion



The described method allows to build a surface material ready for use in a render from a single image of an object. It uses the features of the task, in particular the uniformity of the texture of the object.

In addition, the accuracy of separating photos into the foreground and background can be greatly improved by applying machine learning techniques.



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Thank you for your  
attention!



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