



Automated Stereoscopic Image Conversion and Reconstruction

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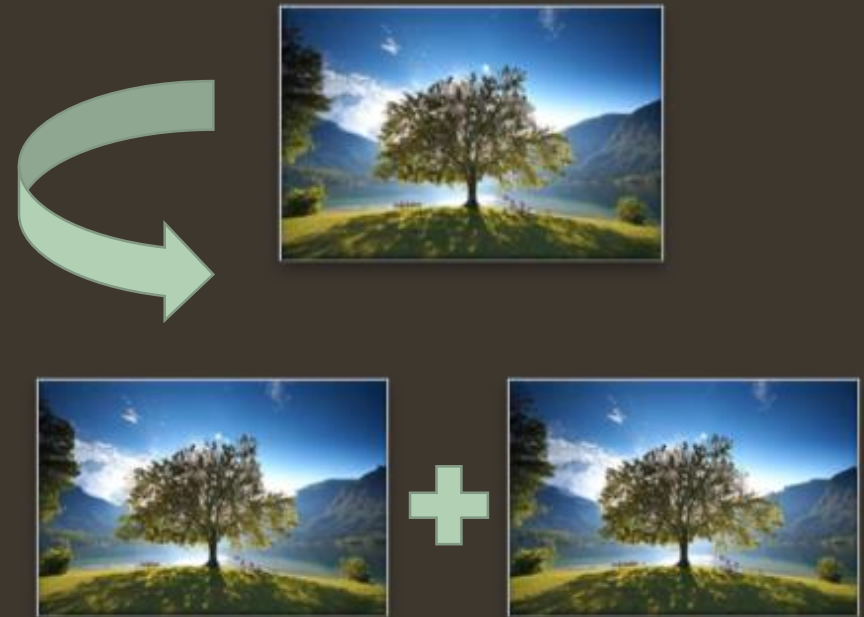


3D Reconstruction

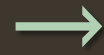
Multiple View Angles → 3D Model



Single View → Stereoscopic 3D Image Pair



3D Reconstruction

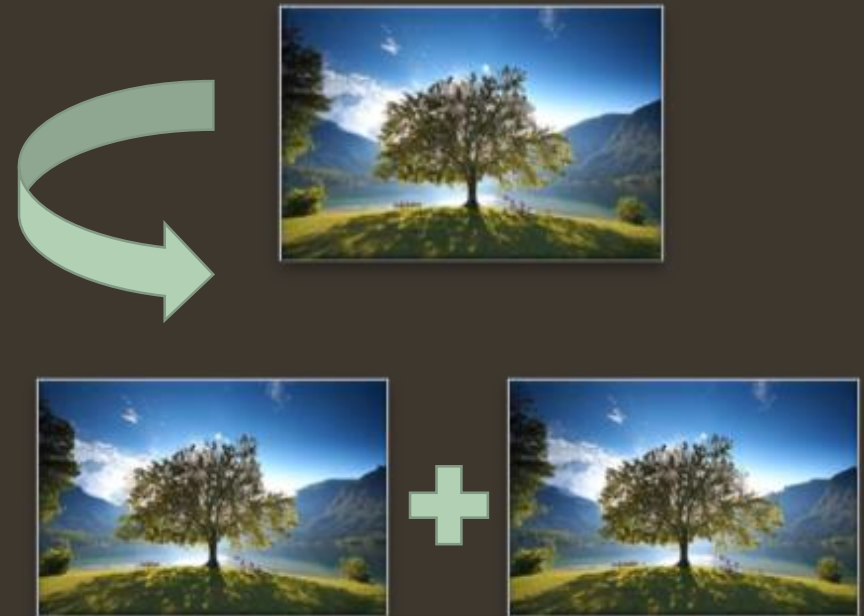


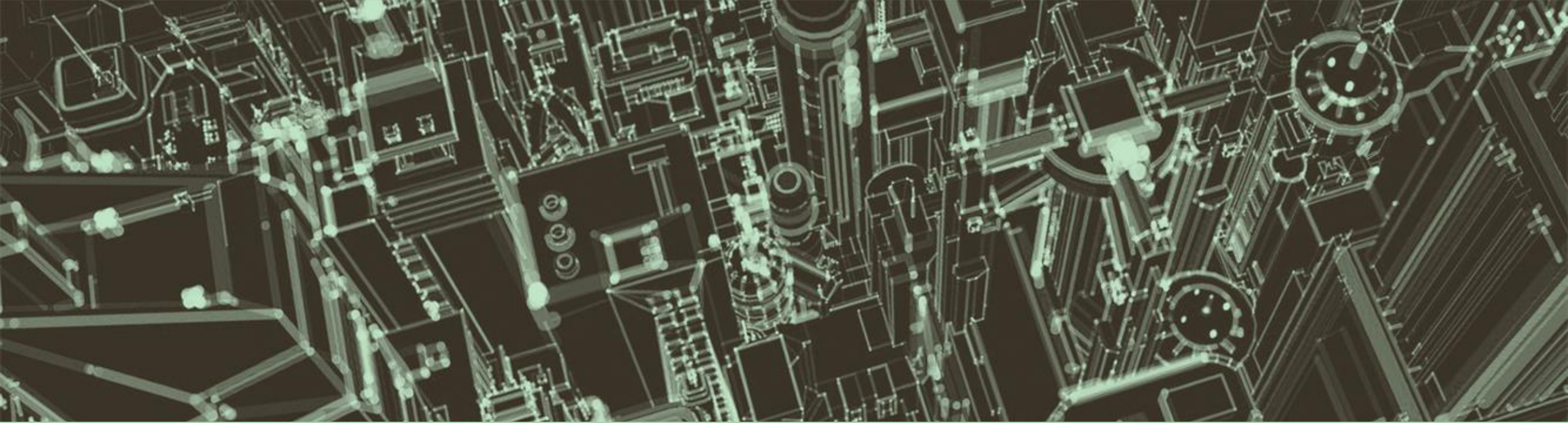
3Dify

Multiple View Angles → 3D Model



Single View → Stereoscopic 3D Image Pair



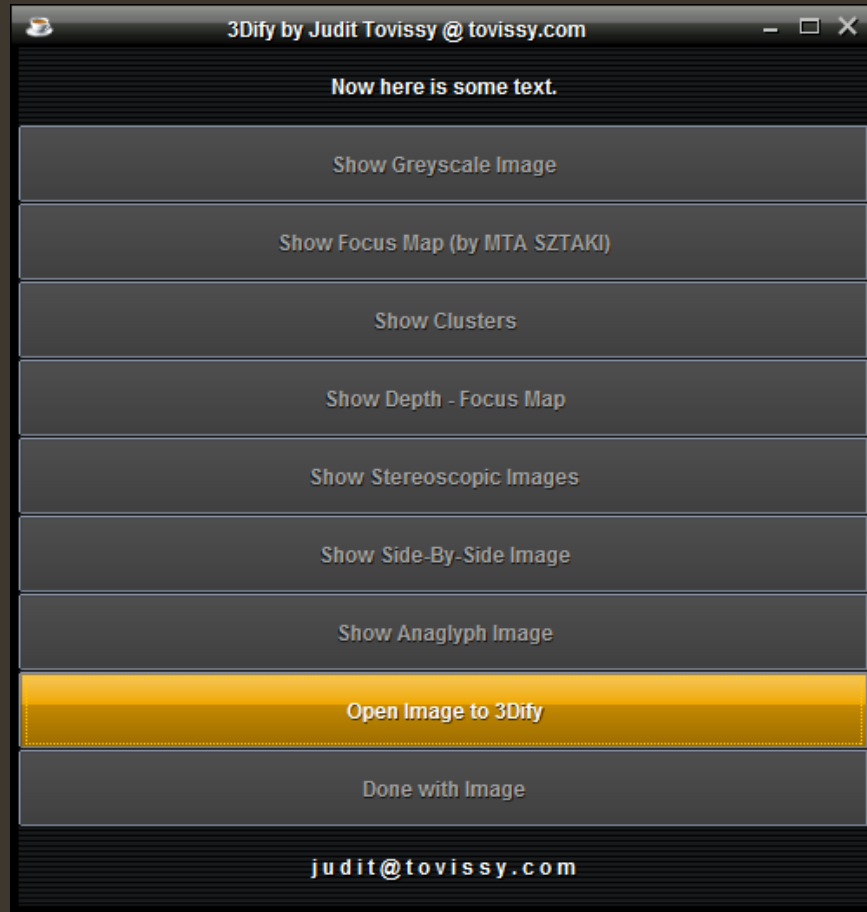


3Dify

Software Prototype Tool

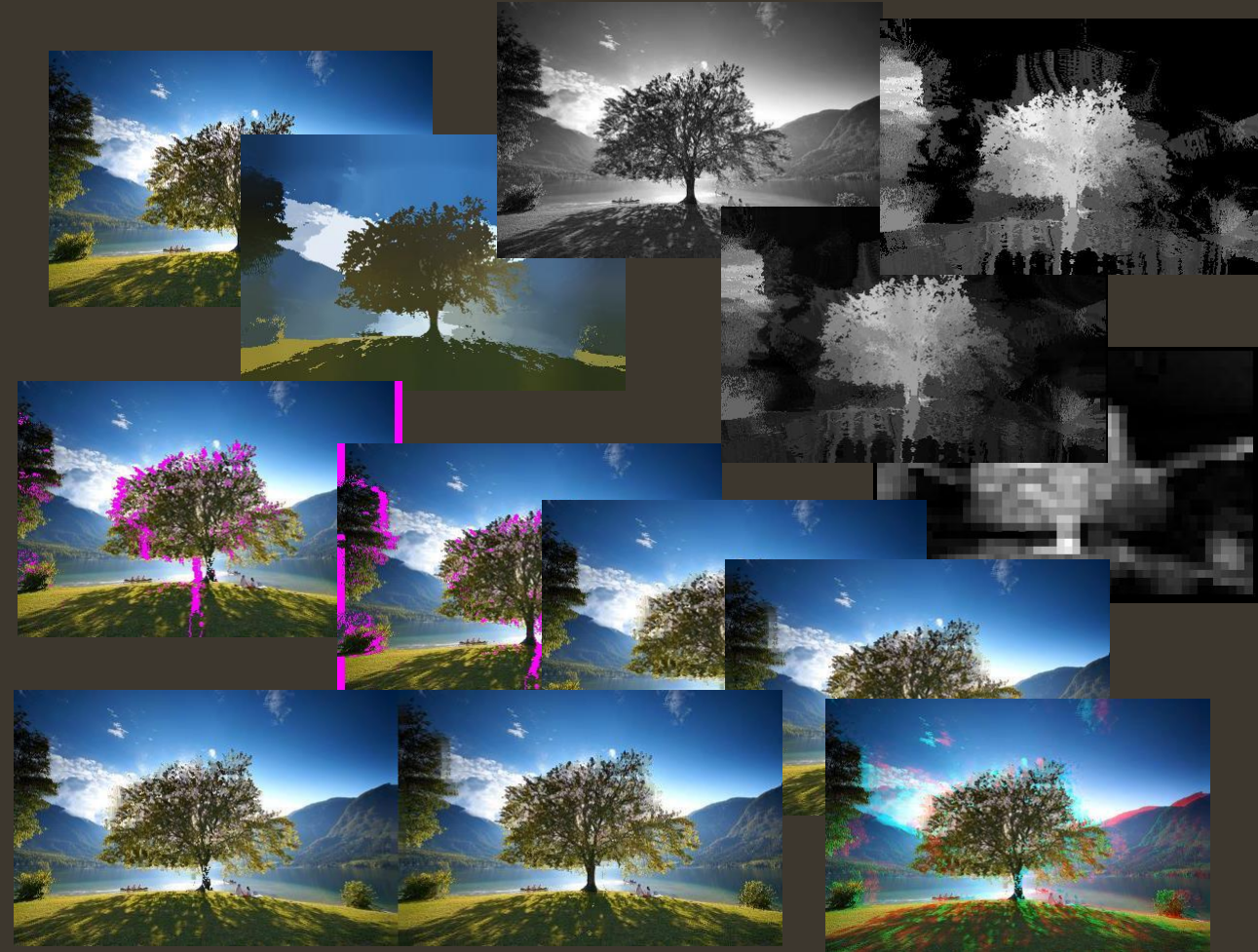


3Dify GUI



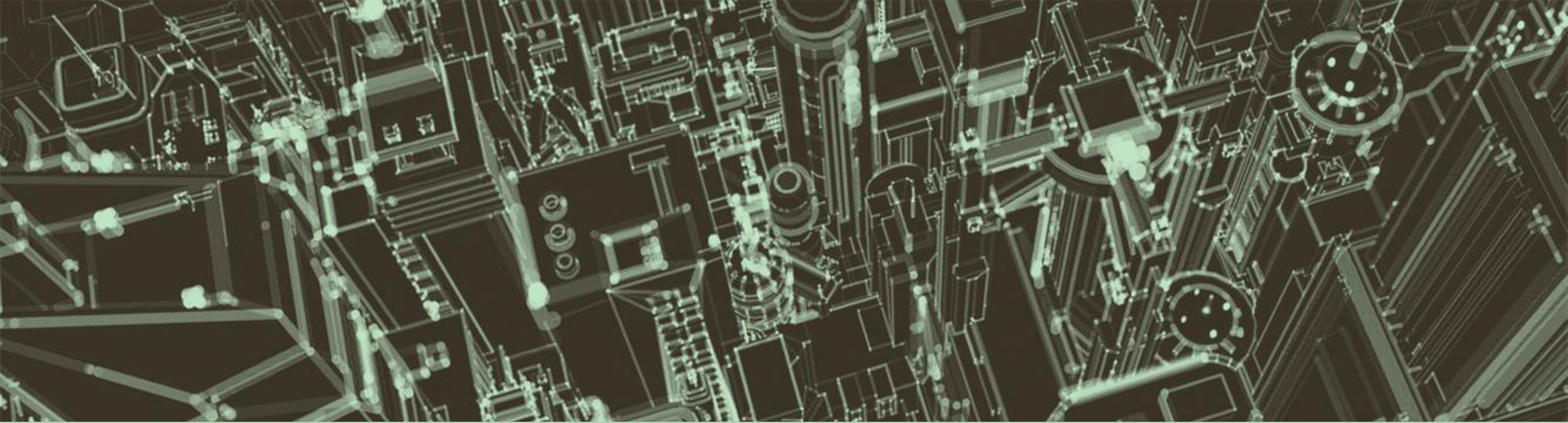
- Easy but powerful interface
- Demonstrate the process

3Dify Process



3Dify Results





Conversion Process

How does 3Dify work?

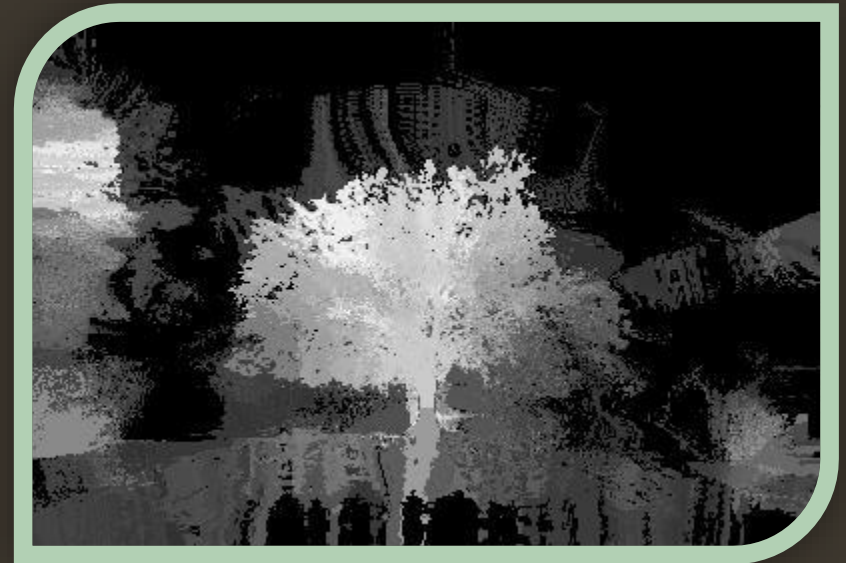


Distance Representation

Color Map



Distance / Depth / Z Map



Premises

I. Focus

- Objects **in focus** are likely to be closer to the camera than others

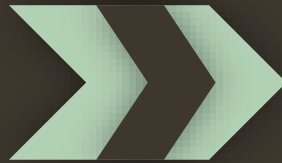
II. Brightness

- Objects that are **brighter** are likely to be in the foreground of an image

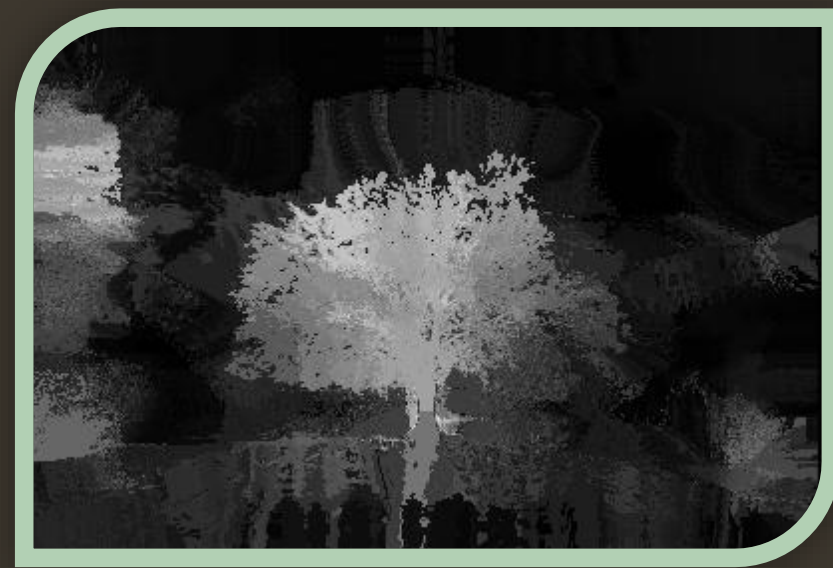
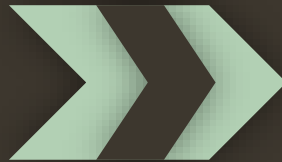
Steps of the Conversion Process



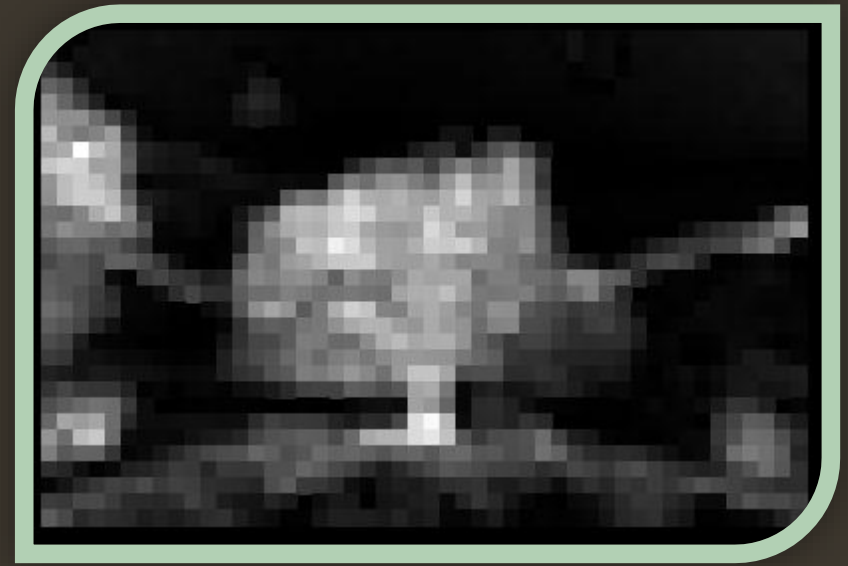
1. Clustering



2. Brightness Map



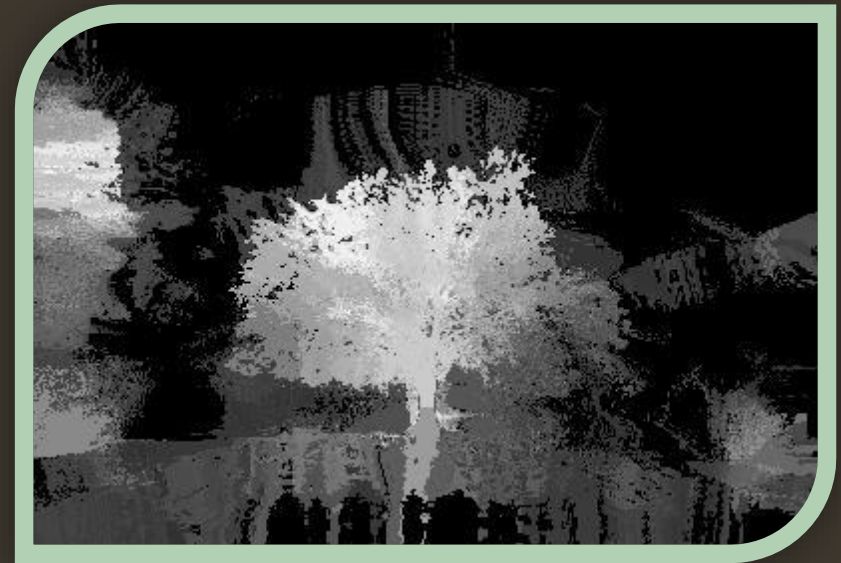
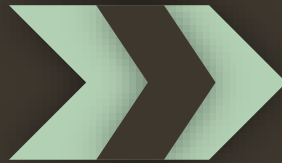
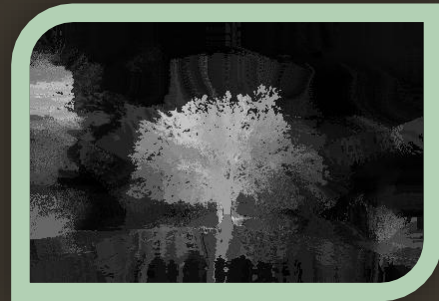
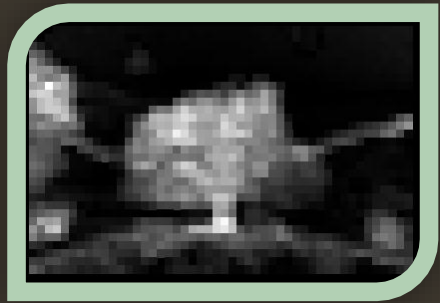
3. Focus Map (by MTA SZTAKI)



4. Depth-Focus Map

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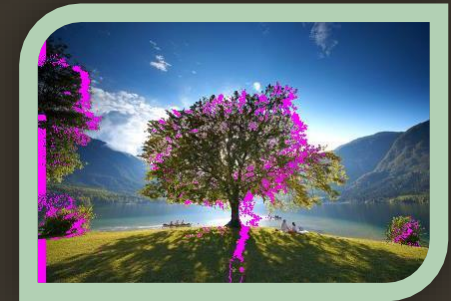
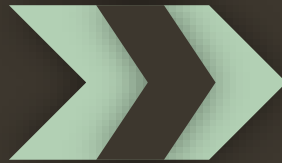
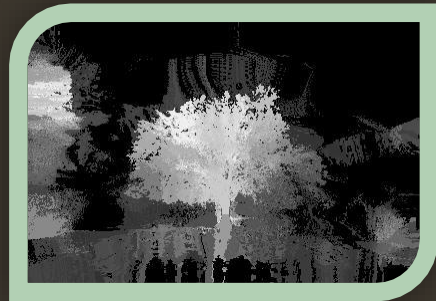
Final Z-Map



5. Original + Z-Map

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Converted Pair



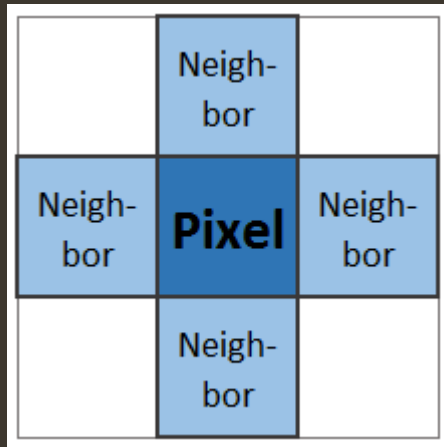
Steps of the Reconstruction Phase



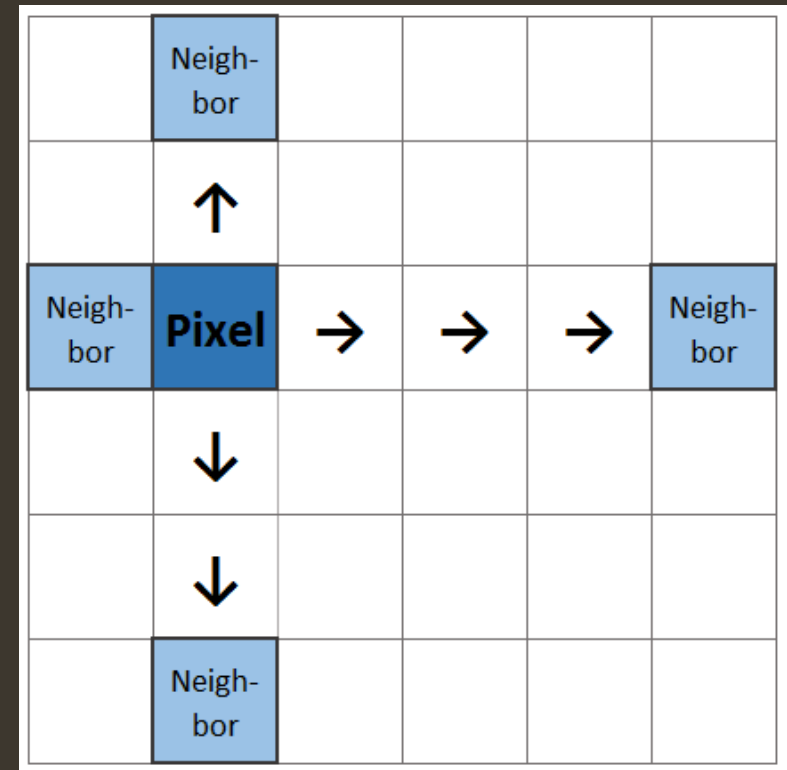
1. Data Gathering by Stencil Filtering

Von Neumann Neighborhood

- Cellular Automata



Recursive Von Neumann Stencil (RVNS)

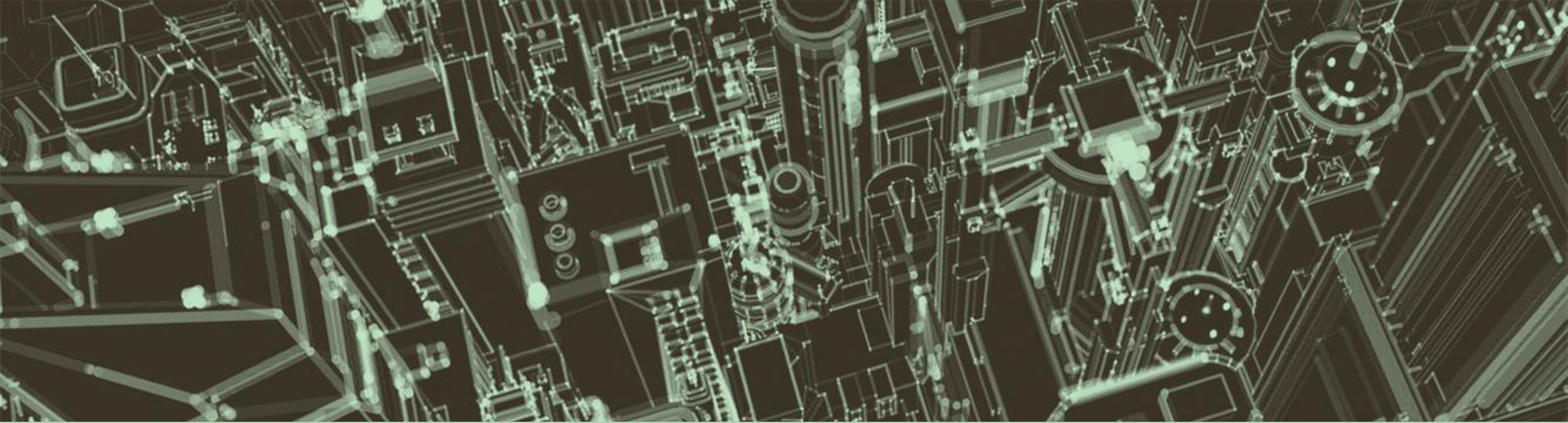


2. Data Filtering by Median Filtering Kernel



Resulting Stereoscopic Image Pair





The Vision for 3Dify

Beyond Today



Applications of 3Dify



3DIFY YOUR PHOTOS 3D KÉPEK A FOTÓIDBÓL

3D reconstruction is a both time-consuming and resource-heavy task when done manually, often requiring skills of the artistic kind. With this little knowledge getting during this presentation you can easily make your memories on photo to come alive.

This presentation is about introduce a software prototype that is able to convert a single two dimensional image into a stereoscopic image pair. The prototype uses methods of image analysis and self-developed algorithms to aid the reconstruction of pixel information between 2D-3D conversions, the details of which will be discussed in depth. The prototype obtains Estimated depth values from a single still image and computes a most likely recreation of the original scene in the image based on regional clustering, lighting and camera focus information.

Reconstruction of missing information in the images is solved by the presented innovational concept of Stencil Filtering, which introduces the new concept of a Recursive Von Neumann Stencil, uniting approaches of pixel graphics and 3D rendering into a novel, powerful tool. Stencil Filtering is discussed in depth and its further independent applications are presented, as well.

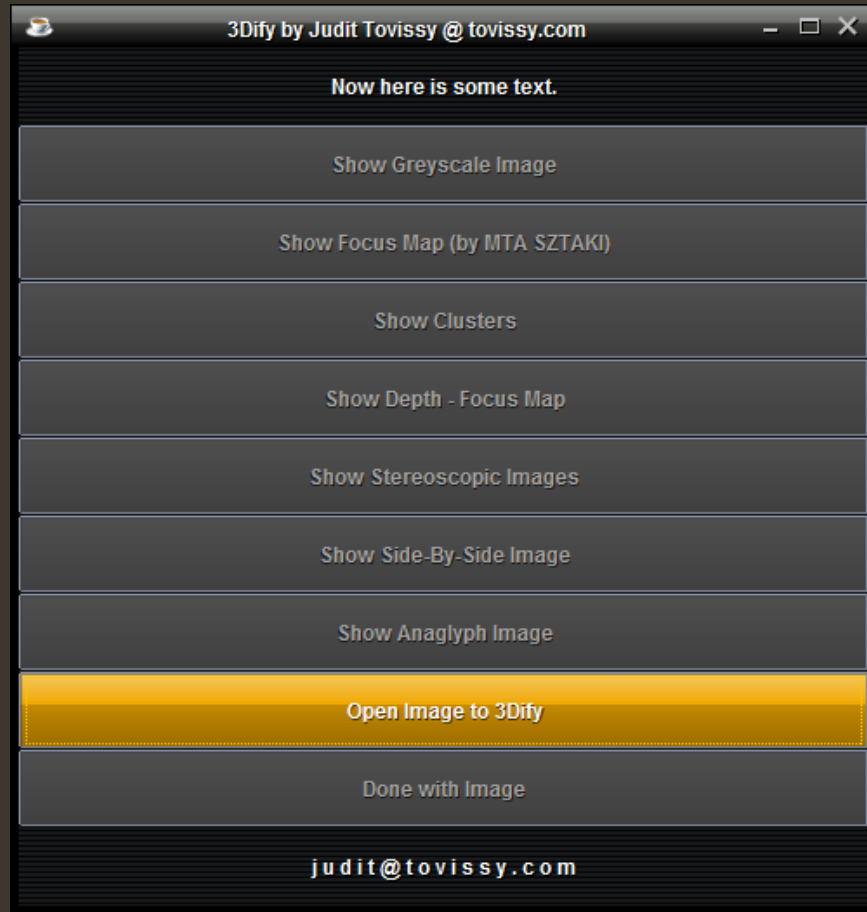
Presented by: Judit Tóvissy



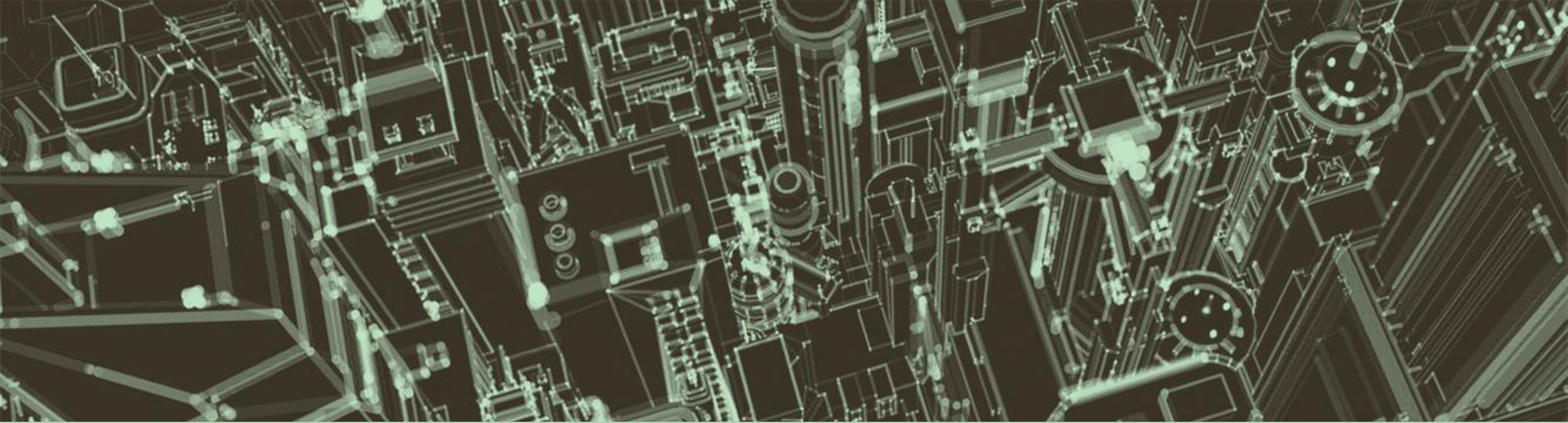
KUTATÓK
ÉJSZAKÁJA
2017.09.29.

<http://tovissy.com/> | Design by: Vanda Magyar

Next for 3Dify...



- Comparative Methods
- Configurability
- Statistical Depth Map
- Machine Learning



Thank you for your attention!

<http://tovissy.com>

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