ARC 3D Webservice

How to transform your images into 3D models

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Overview

- What is it?
- How does it work?
- How do you use it?
- Results

What does the 3D Webservice do?

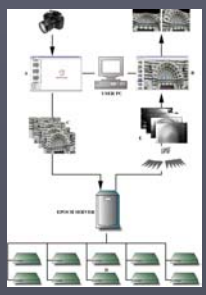


The ARC 3D Webservice allows you to transform your images into 3D models automatically. You only need a digital camera, a PC and access to the Internet.



images © Maurizio Forte, CNR Rome

What are the different steps?



- Step 1: Record a sequence of images of a scene or object
- Step 2: Upload the images to the ARC server
- Step 3: The server computes the 3D reconstruction
- Step 4: Download the results from the ARC website
- Step 5: Visualize the results

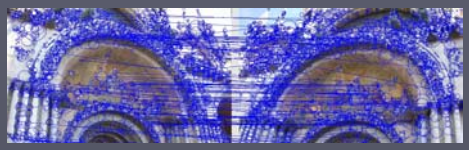
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How does it work?

- The 3D Webservice only uses images as input.
- Computer vision techniques are used to compute the results.
  - Automatic matching of images
  - Automatic computation of camera calibration
  - Automatic dense matching for depth map generation

Image Matching



- The entire process is based on finding matches between images.

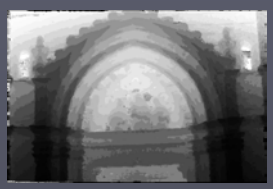
Record your pictures not too far apart, so the computer can match them easily!

Camera Calibration

- No prior knowledge on camera calibration is available, so all information must be recovered from the images
- It is therefore important that enough information is present in the images!
  - General motion of the camera
  - General structure in the scene
  - Enough overlap (only points that are visible in at least 3 images are useful)

See tips and tricks for more info

Dense Matching



- After recovery of the camera calibration, dense depth maps are computed
- These contain the depth of every pixel and a quality measure (how confident we are of each particular pixel)

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How do you use it?

- Obtain an account from the website
- Download and install the programs
- Use the upload program
  - Load your images
  - Upload them to the server
- Have a coffee
- Download the results from the server
- Visualize the results

Obtain an account



Surf to www.arc3d.be and navigate to Request Login

Obtain an account (2)



Fill in name, email address and the captcha form

Obtain an account (3)



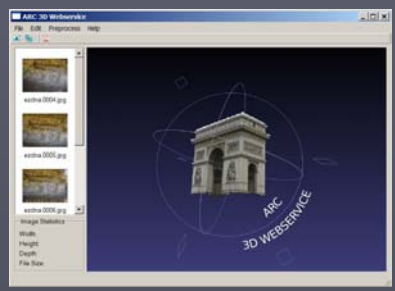
Your login information will be sent to your email address

Download and install

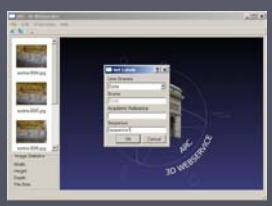


Install as Administrator in the default place or as normal user, specifying a writeable folder

Upload Client



Upload Client (2)



- Images selected by user
- Subsample to smaller size for faster upload and computation
- Authentication with server @ ARC
- Organization into scenes and sequences
  - Select or create a new scene
  - Supply a sequence label
  - Add academic reference if desired*

* If ARC decides to use your images in a publication, it will add this reference. See conditions on the ARC homepage.

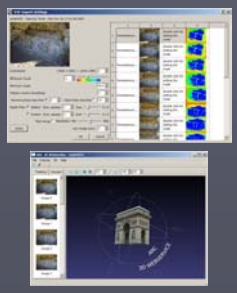
Have a coffee



Download the results

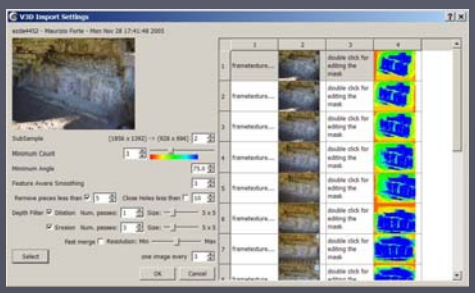
- The ARC service reports its result to you by email
- If the reconstruction has succeeded, a URL is specified from where you can download a zip file containing the results.
- If the reconstruction failed, some more information is given, including tips on how to improve the result.

Visualize the results



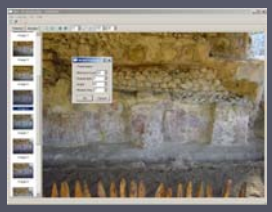
- Two tools are available for inspecting the results
- The ARC team recommends MeshLab, a tool developed by CNR-ISTI in Pisa, Italy
- A simple model viewer comes with the ARC installer

Visualize with MeshLab



Download MeshLab from meshlab.sf.net and read the documentation

Visualize with Model Viewer



- Download results from server
- Unzip file with images, cameras, depth and count maps
- Select one image on the left. Reconstruct 3D model for this specific depth map
- Parameters to tune:
  - Minimum quality (count)
  - Subsample for smaller models
  - Minimum angle w.r.t. viewing direction. This ensures that shearing angles are removed
  - Median filter size: larger filter for smoother (less noisy) models

Visualize with Model Viewer (2)



- Select the model tab and view the result in a 3D widget
- Texture comes from the original image
- Export to different formats (X3D, PLY, OBJ, VRML) is possible

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Temple of the Masks, Edzna






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Temple of the Masks, Edzna



Movie available at http://www.arc3d.be/edzna.mpg

Arc de Triomphe



Movie available at http://www.arc3d.be/arc.mpg

Eindhoven farm registration



Eindhoven farm complete model

