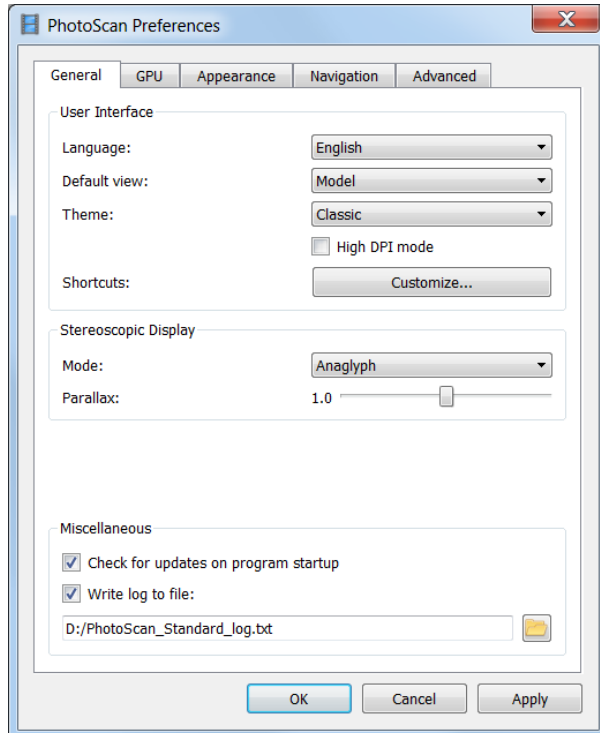


Tutorial for Beginners:

3D Model Reconstruction with Agisoft PhotoScan 1.4

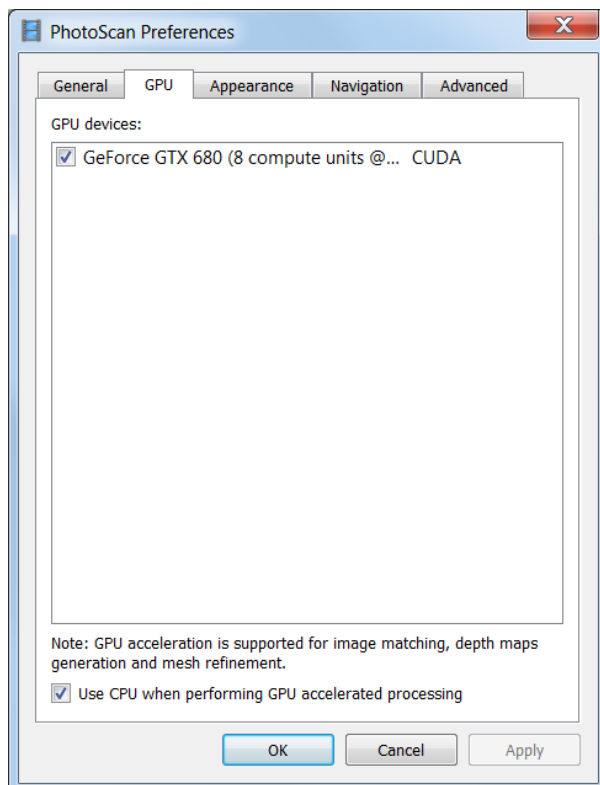
PhotoScan Preferences

Open *PhotoScan Preferences* dialog from *Tools* menu using corresponding command.



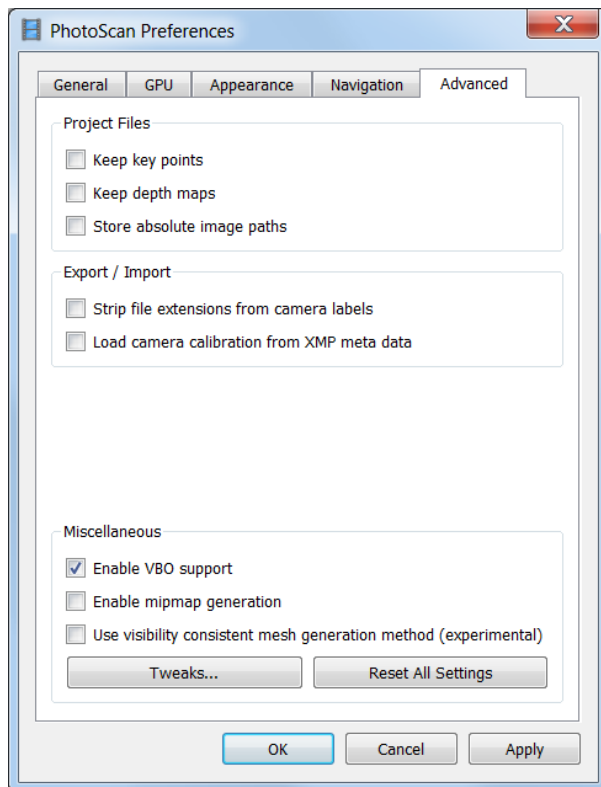
Set the following values for the parameters in the *General* tab:

- **Default view:** Model
- **Stereographic display Mode:** Anaglyph
- **Stereographic display Parallax:** 1.0
- **Check for updates on program startup:** enabled
- **Write log to file:** specify directory where Agisoft PhotoScan log would be stored (in case of contacting the software support team it could be required)



Set the parameters in the *GPU* tab as following:



- Check on any GPU devices detected by PhotoScan. PhotoScan supports the following GPUs: CUDA enabled devices with compute capability 2.0 and higher or OpenCL 1.1 and higher enabled devices, for more information please refer to User Manual.
- **Use CPU when performing GPU accelerated processing:** enabled when only one GPU device is detected.
- **Use CPU when performing GPU accelerated processing:** disabled when two or more GPU devices are detected, as using CPU in this case could slow down processing significantly.



Set the parameters in the *Advanced* tab as following:

- **Keep key points:** disabled
- **Keep depth maps:** disabled
- **Store absolute image paths:** disabled
- **Strip file extensions from camera labels:** disabled
- **Load camera calibration from XMP metadata:** disabled
- **Enable VBO support:** enabled
- **Enable mipmap generation:** disabled
- **Use visibility consistent mesh generation method (experimental):** disabled

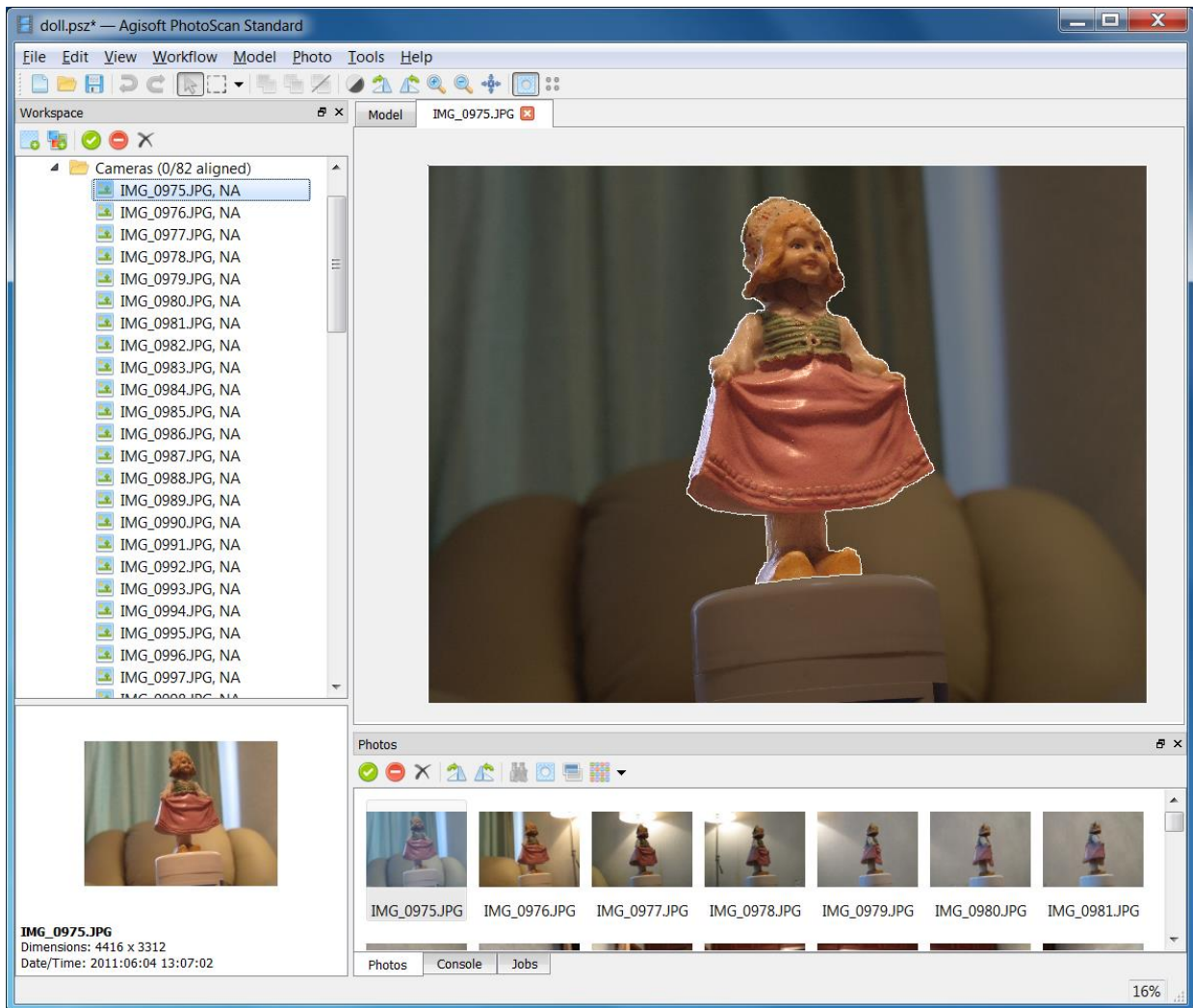
Add Photos

To add photos select the  Add Photos... command from Workflow menu or click  Add Photos button on Workspace toolbar. In the *Add Photos* dialog browse the source folder and select files to be processed. Click *Open* button.

Mask Photos

To achieve good reconstruction results it is necessary to mask all irrelevant elements on the source photos (background, turntable, accidental foreground, etc.).

Open a photo with an irrelevant element in Photo View double-clicking on the photo in the Photo pane.



Choose one of the selection tools from the downfolding list on the Toolbar: Rectangular Selection for rectangular shape irrelevant elements; Intelligent Scissors – to select irregular shaped area in the photo; Intelligent Paint – to paint the selection with the mouse. To mask uniform background of the image use Magic Wand tool. First, click the Magic Wand button on the Toolbar, then click inside the uniform area to be masked. To change the border of the automatically selected area, click inside the area to be added to the selection.

Save the mask clicking Add Selection button from the Toolbar.

To alter the current mask use other selection tools together with Add Selection / Subtract Selection buttons on the Toolbar.

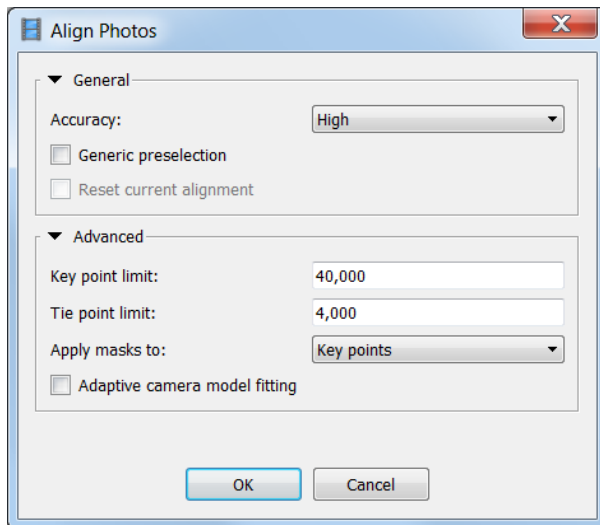
Repeat the described procedure for every photo where background (irrelevant elements) should be masked.

Masked areas could be ignored at Align Photos processing stage (check Constrain features by mask option in Align Photos dialog) and are always ignored at Build Dense Cloud and Build Texture stages.

Align Photos

At this stage PhotoScan refines the camera position for each photo and builds the sparse point cloud model.

Select *Align Photos* command from the *Workflow menu*.

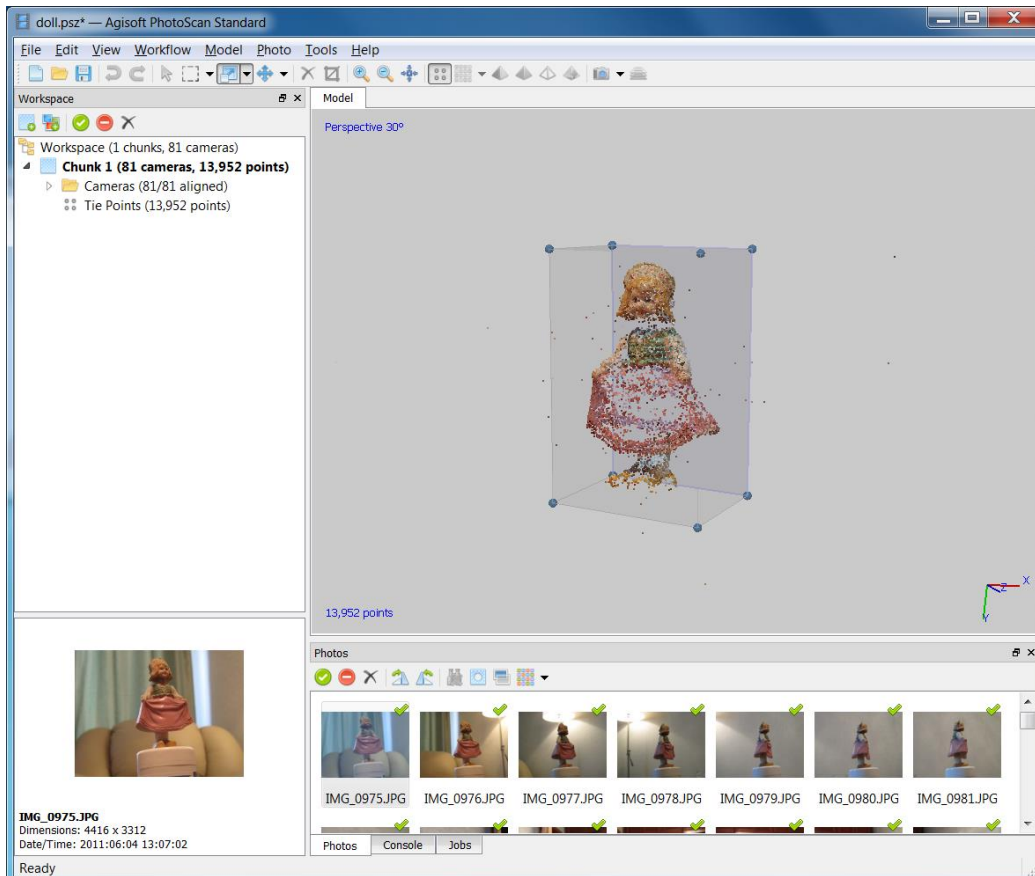


Set the following recommended values for the parameters in the *Align Photos* dialog:



- **Accuracy:** High (lower accuracy settings can be used to get the rough camera positions in the shorter time)
- **Generic preselection:** Disabled (if project contains big number of photos the parameter can be switched to Enabled for faster processing)
- **Key point limit:** 40000
- **Tie point limit:** 4000
- **Apply masks to:** Key points
- **Adaptive camera model fitting:** Disabled

Click *OK* button to start photo alignment.

Set Bounding Box



After photo alignment is finished, refine bounding box position and orientation to fit the object, as it defines the limits of reconstruction area.

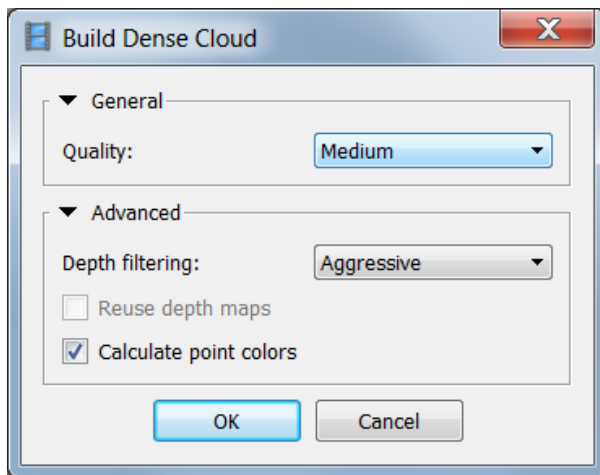
Bounding box is resizable and rotatable with the help of  *Resize Region* and  *Rotate Region* tools.

This step is optional since PhotoScan automatically calculates bounding box dimensions and location. But it is recommended to check if any correction is needed, because geometry reconstruction step deals only with the point cloud inside the volume.

Build Dense Cloud

Based on the estimated camera positions the program calculates depth information for each camera to be combined into a single dense point cloud.

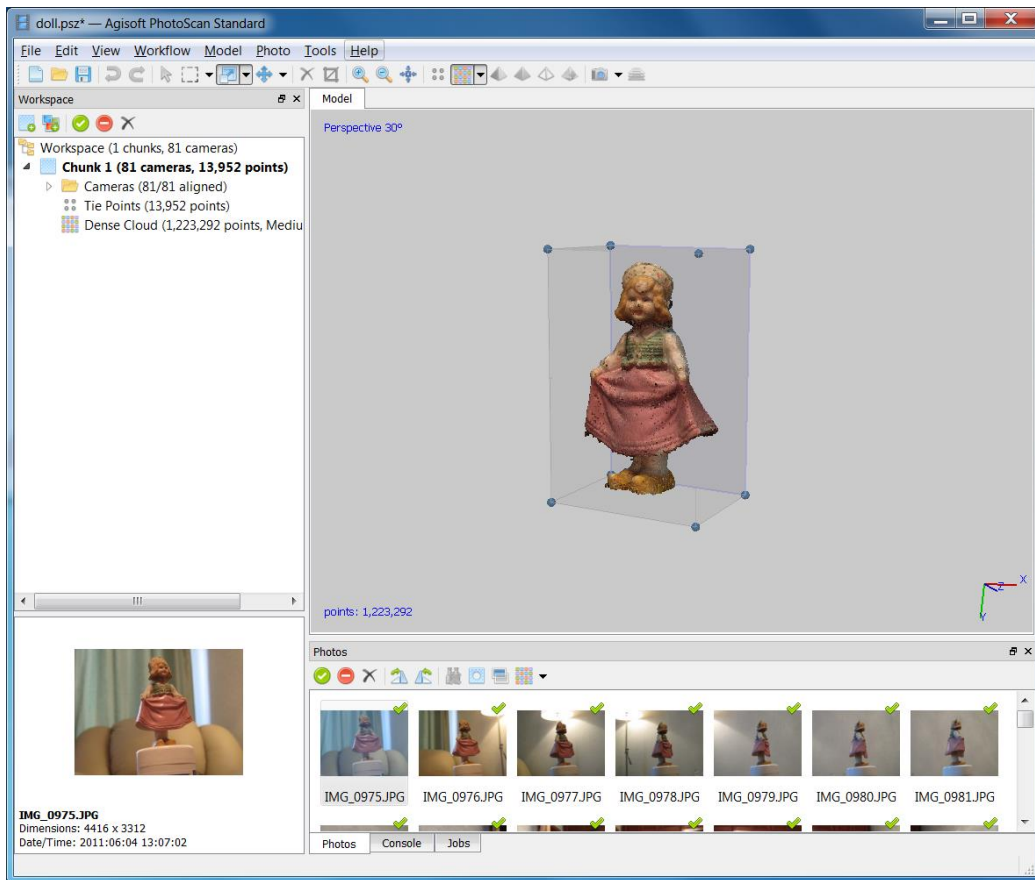
Select *Build Dense Cloud* command from the *Workflow menu*.



Set the following recommended values for the parameters in the *Build Dense Cloud* dialog:

- **Quality:** Medium (higher quality takes quite a long time and demands more computational resources)
- **Depth filtering** Aggressive (if the geometry of the scene to be reconstructed is complex with numerous small details on the foreground, then it is recommended to set Mild depth filtering mode, for important features not to be sorted out)
- **Calculate point colors:** Enabled

Click OK button to start building dense point cloud.

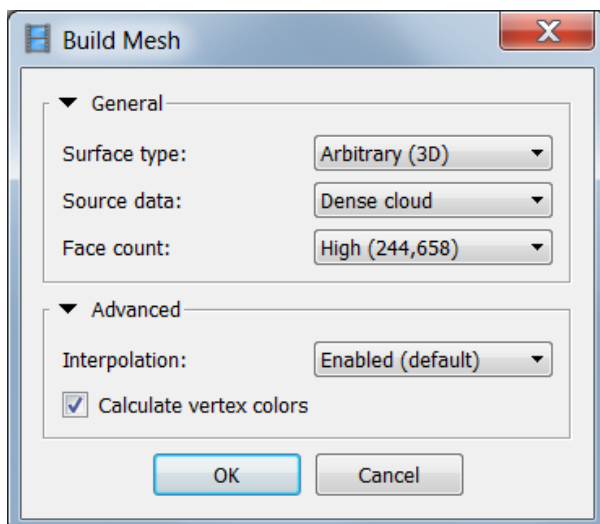


Points from the dense cloud can be removed with the help of selection tools and *Delete/Crop* instruments located on the Toolbar.

Build Mesh

After dense point cloud has been reconstructed it is possible to generate polygonal mesh model based on the dense cloud data.

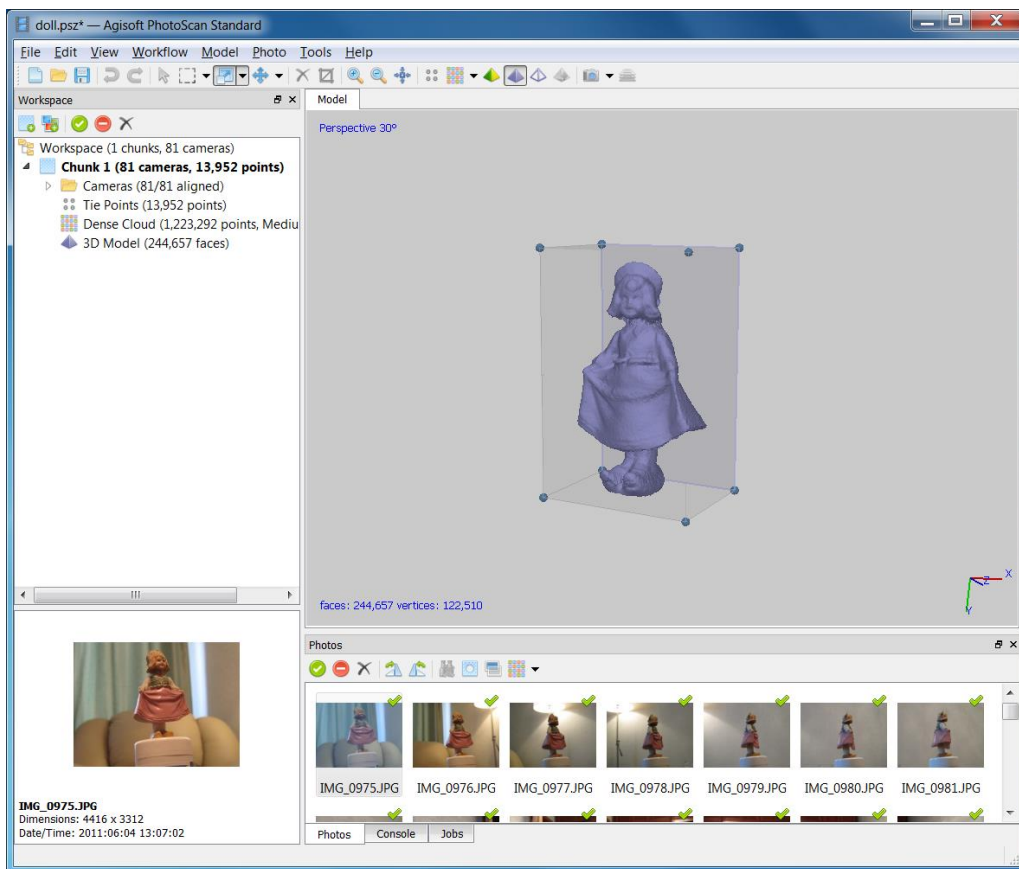
Select *Build Mesh* command from the *Workflow* menu.



Set the following recommended values for the parameters in the *Build Mesh* dialog:

- **Surface type** Arbitrary
- **Source data:** Dense cloud
- **Polygon count:** High (maximum number of faces in the resulting model. The values indicated next to *High/Medium/Low* preset labels are based on the number of points in the dense cloud)
 - **Interpolation:** Enabled (default)
 - **Calculate vertex colors:** Enabled

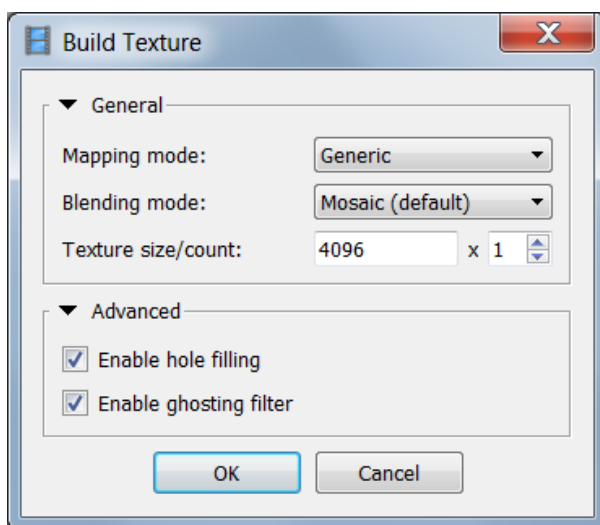
Click *OK* button to start mesh reconstruction.



Build Texture

This step could be skipped if untextured model is sufficient as the final result.

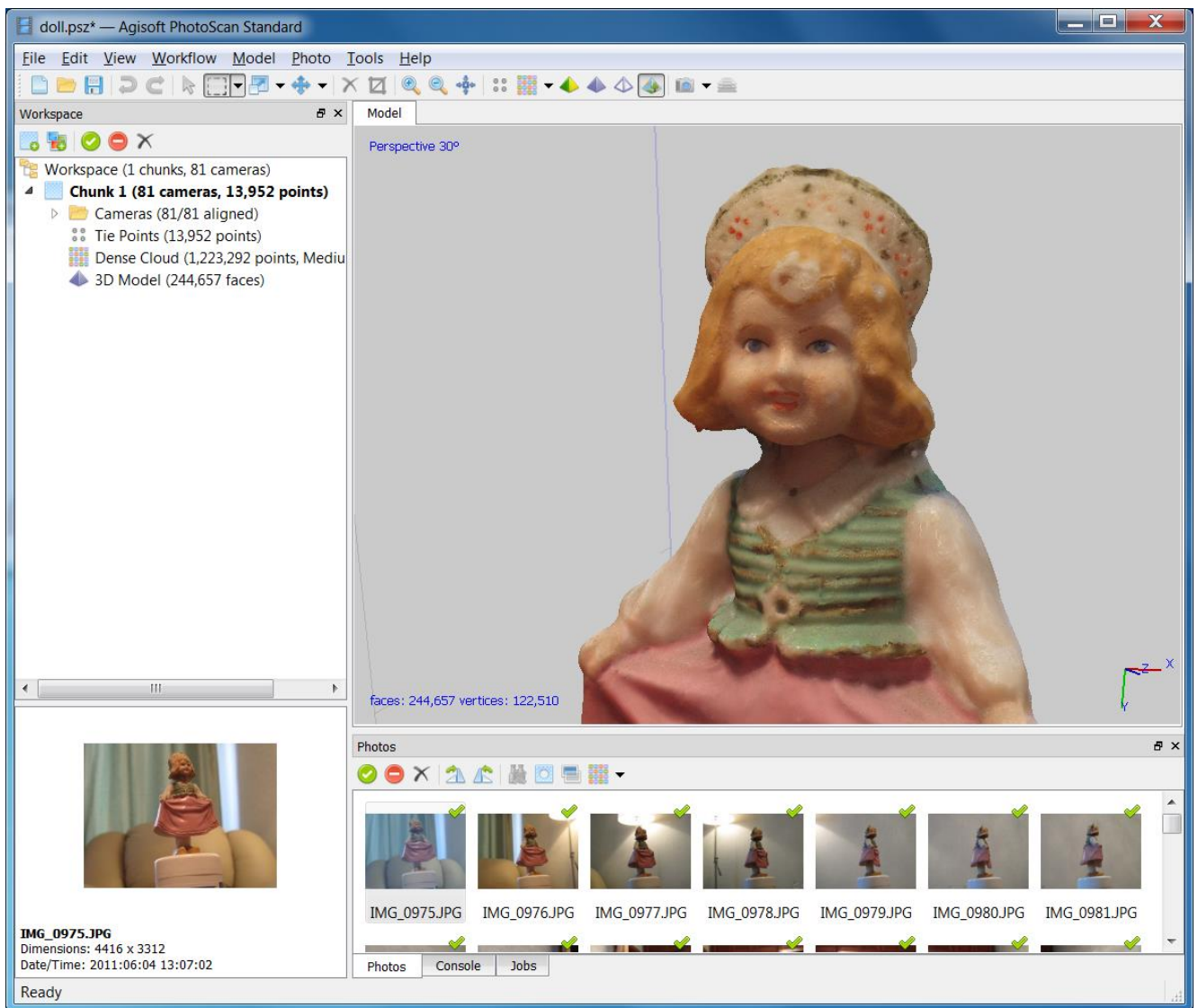
Select *Build Texture* command from the *Workflow* menu.



Set the following recommended values for the parameters in the *Build Texture* dialog:

- **Mapping mode:** Generic
- **Blending mode:** Mosaic
- **Texture size/count:** 4096 x 1 (width and height of the texture atlas in pixels and determines the number of files for texture to be exported to. Exporting texture to several files allows to archive greater resolution of the final model texture, while export of high resolution texture to a single file can fail due to RAM limitations)
- **Enable hole filling:** Enabled
- **Enable ghosting filter:** Enabled

Click *OK* button to start texture generation.

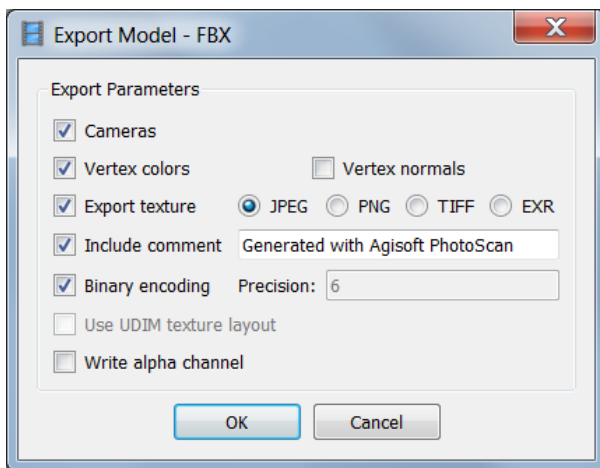


Export Model

In case the model should be exported to the file, select *Export Model...* command from the *File* menu.

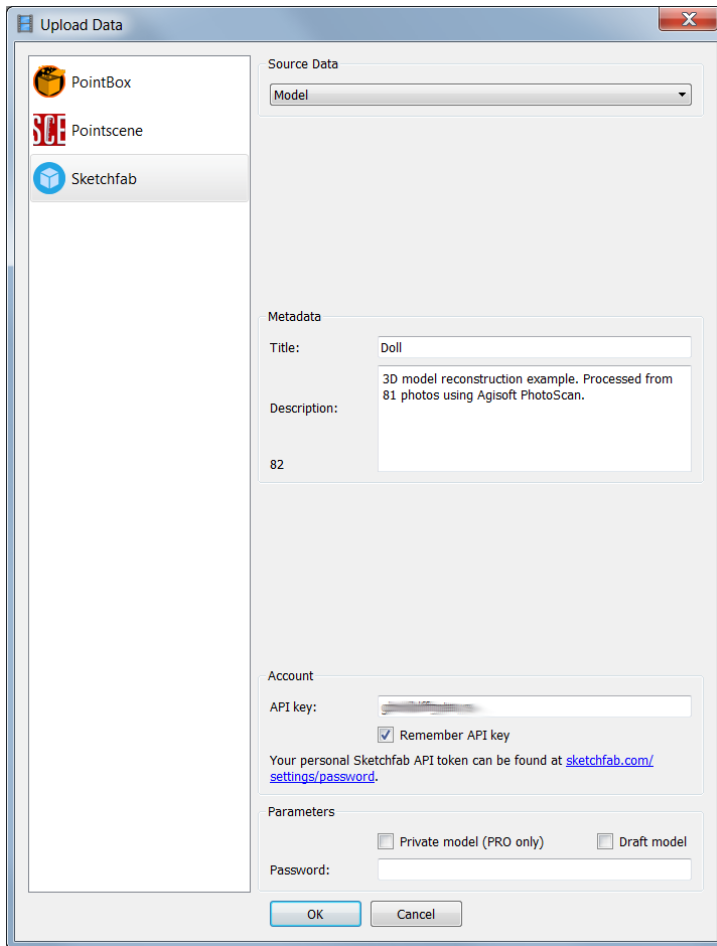
In the *Save As...* dialog select the folder for the model to be saved in, print in the file name and choose preferred file type from the list. Click *Save* button.

In the *Export Model* dialog indicate the desired export parameters. Note that the list of available exporting parameters depends on the selected file format.



Note: Exported texture will be stored in the same folder as the 3D-model with the same file name (file type is selected by user).

PhotoScan supports direct model and point cloud (both dense and sparse) upload to [Sketchfab](#), [Pointscene](#) and [PointBox](#) resources. To publish your model online use Upload Data... command from the File menu.



Note: To apply correct model orientation in space use *Rotate Object* tool prior to model upload.