



Scene2Model Modelling Tool

Documentation

Software version: v0.1.0

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1 Introduction to the Scene2Model approach

The aim of the Scene2Model approach is to combine haptic storyboards, made out of paper figures, with conceptual and diagrammatic modelling. The main feature thereby is an automatic transformation from physical representation into a digital model. The haptic storyboards are placed on a table and afterwards an application identifies the used figures and their position and creates a digital representation in a computer-aided modelling tool. The haptic figures and the modelling tool are intended to be used in workshops for creating new products or services. The participants use the paper figures to define and discuss their problems/solutions, by show casing the customer interaction with new or existing product and services. The automatic generated digital model can than be saved and distributed to different involved parties. It can also be adapted and enriched with additional information.

In the context of this service and this document two terms are used: storyboard and scene. With scene one key moment of a user story is meant, which is visualized by using one setting of haptic figures or one model created with the computer-based tool. A storyboard on the other is a composition of one or more scenes to tell a whole story of key moments.

The modelling tool for the Scene2Model approach was implemented with the ADOxx modelling platform (www.adoxx.org) and is a tool for creating digital storyboards. The representation of the modelling objects and the paper figures are based on the SAP Scenes toolkit (<https://experience.sap.com/designservices/approach/scenes>). The SAP Scene toolkit consists of paper figures, which can be used to create user stories. The creators of the Scene2Model modelling tool dont possesses the right of the pictures. The rights belong to SAP SE.

The aim of this documentation is to give a guide to use the specific functionalities of the Scene2Model modelling tool implementation.

Disclaimer: The offered tool is an experimental prototype and no guaranty is given that every offered functionality works completely.

2 Requirement

In this section the requirements for running the modelling tool without the recognition of the marker itself are discussed. The computer must be able to run Windows and the prototype was tested on a laptop with the following hardware specifications:

- processor: Intel[®] Core[™] i7-6700HQ CPU
- speed: 2.6 GHz
- installed RAM: 8 GB
- resolution: 1920 x 1080
- network: WLAN (protocol: 802.11n)

The modelling tool itself was tested on Windows 10 (but is not limited to this Windows version).

3 Installation

The installation folder can be found on the OMiLAB online platform under:

- <http://austria.omilab.org/psm/content/scene2model/download?view=download>

The downloaded .zip folder must be extracted and afterwards the *setup.exe* application must be started.

For issues during the installation process, please visit <https://www.adoxx.org/live/installation-guide-15> for detailed instructions and solutions.

During the first start of the modelling tool, it is possible that Windows firewall reports that the tool wants to open a connection. This access must be granted if the automatic transformation should be used.

4 After the Installation

After the installation the tool can be started and used as an ADOxx modelling tool. But if the automatic transformation from the haptic paper figures to the digital model should be used, the tag recognition software and the physical environment must be set up. More information can be found on the OMiLAB project page (<http://austria.omilab.org/psm/content/scene2model/info?view=home>).

Furthermore, the modelling tool needs to be configured, if the automatic transformation should be used. The configuration files can be found in the installation folder of the Scene2Model modelling toolkit. In standard implementation this folder can be found under: `C:\ProgramFiles(x86)\BOC\Scene2Model_ADOxx_SA`. There the Scene2Model folder with the following files can be found:

- `config.properties`
- `setGlobalVar.asc`
- `s2mOnto.ttl`
- `scene2model.jar`
- `stopScene2model.jar`

For transformation of the haptic figures in their digital representation a second application is needed. This application will be called Transformation Application in this documentation. The Transformation Application will be started on the same device as the modelling tool.

During the start of the modelling tool, the information from the `setGlobalVar.asc` file is loaded and the `scene2model.jar` will be started. The `setGlobalVar.asc` file contains four lines with information, needed by the ADOxx modelling tool. The two ports `serverPort` and `serverEndPort`, where the first specifies the port on which the automatic started Java application can be called, to gather the information of the paper figures. The second port is needed for the automatic stopping of the Java application. These two ports must be identical with the ports given in the `config.properties` file, which is described later on. The `serverURL` string specifies under which base URL of the REST service from the Java application can be found. It is not needed to change the URL, if the modelling tool is used in its standard installation. Finally, the `autoStartServ` variable can be used to set, if the Transformation Application should be started automatically with the modelling tool or not. If it should start automatically the value 1 must be entered, otherwise 0 should be chosen.

The defined ports must be changed if they are already used on the computer. If the ports are available, the configuration files must not be adapted. The standard port for the communication between the modelling tool and the additional Java application is 2222.

The *scene2model.jar* starts the Transformation Application, which manages the information of the paper figures. This application loads the *config.properties* file during the start-up. This file contains the following parameters:

- *serverPort*: This defines under which port the ADOxx modelling tool can gather the information for the automatic transformation of the paper figures. This must be the same as *serverPort* given in the *setGlobalVar.asc* file.
- *stopServerPort*: This defines the port, which can be used to automatically stop the Transformation application. This must be the same as *serverEndPort* in the *setGlobalVar.asc* file.
- *websocketAdress*: This defines the address under which the WebSocket of the tag recognition, for the stationary setting, can be consumed. This port must be adjusted with the installation of tag recognition software, which must be set up separately.
- *mobileSettingAdress*: This defines the address, under which the data of the mobile demonstration scenario, can be gathered. The address and the port (standard: *standrad:8080*) can be changed, the rest must stay the same.
- *ontologyPath*: This defines in which subfolder of the ADOxx installation folder and under which name the ontology is saved.

The *s2mOnto.ttl* file contains an ontology in turtle format. This ontology contains the additional information which is needed to create the modelling objects in the ADOxx modelling tool. The paper figures are recognised over an extra attached marker. For the stationary setting, the marker is placed on the bottom of the figures and faces downwards. For the mobile one, the markers facing upwards. These markers only provide an ID (as integer) and the information on the connected modelling objects is saved in this ontology. The assignment of the tag ID to the modelling objects can be changed in the ontology. The changes will be used after a restart of the additional Java transformation application.

The last file in the folder is called *stopScene2model.jar* and is used to close the Java application, during the closing of the ADOxx modelling tool.

5 Using the modelling tool

5.1 Scene2Model Transformation

If the physical environment and the tag recognition application are set up, the modelling tool can automatically transform the haptic scene into a digital model. Therefore, a scene model must be opened. Afterwards the *Create scene from stationary setting* in the *Scene2Model* menu item must be clicked (cf. figure 5.1). This triggers the automatic generation of a model from the haptic figures. If no error message is occurred and no modelling object is visible, it is possible that the objects are created outside of the shown drawing area. In that case the zoom out function can be used to see the generated objects. It should be considered that all objects in the scene model are deleted before the next ones are created. Made changes to an existing scene model will be lost.

5.2 Creation of a Storyboard/Process Map

The modelling tool offers the functionality to automatically create storyboard models or process map models. Storyboards consists of objects which contain links to the different the scenes. In a process map, the processes which used in the different scenes are shown in one combined model.

The logic for both functionalities are equal. A scene model must be opened to enable the triggering of the automatic creation. Afterwards, scene models in the same Model group (or folder) are taken in alphabetical order and are processed subsequently.

The functions can be found in the *Scene2Model* menu item (cf. figure 5.1).

5.3 Starting/Stopping the transformation application

The Transformation Application, handling the transformation from the haptic scenes to the digital model, can be started and stopped within the modelling tool. Therefore, two entries in the Modelling space (number 1 in Figure 5.1) under the *Extras* menu entry are available. The entries are called: *start S2M server* and *stop S2M server*.

Further, the Scene2Model modelling tool, can be configured, to start the transformation application automatically or not. Therefore, a value in the *setGlobalVar.asc* file from the sub-folder *Scene2Model* of the Scene2Model tool installation folder must be changed. In this file a variable (line) with the name *autoStartServ* can be found. Its value determines the automatic start of the transformation application. If it should start automatically the value 1 must be entered, otherwise 0 should be chosen.

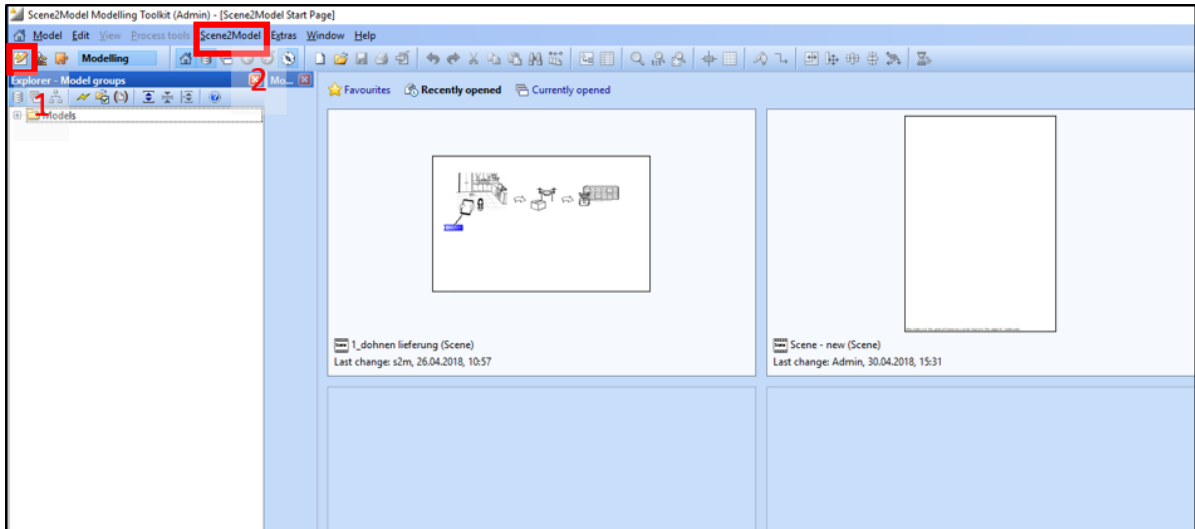


Figure 5.1: Modelling space of the ADOxx Scene2Model modelling tool

5.4 The mobile demonstration scenario

For the Scene2Model modelling tool, a mobile scenario for demonstration purposes is available. It allows users to take a photo of paper figures with tags and transform it into a digital and diagrammatic model of the size of an A4 sheet. The size is chosen, because the paper figures should also be placed on a given A4 paper sheet. To use this functionality, the Scene2Model modelling tool must be downloaded and installed and in addition the OMiTAG application must be started. OMiTAG is the software, which handles the tag recognition in a picture or a video stream. It must be installed on a Linux-based operating system and was tested on Fedora 28.

5.4.1 Preparing the OMiTAG software

To ease the testing of the Scene2Model tool, the OMiTAG software is prepared as a virtual machine image. The usage was tested with the VirtualBox application. The image of the virtual machine can be downloaded from <http://austria.omilab.org/psm/content/scene2model/downloadlist?view=downloads>.

Afterwards the VirtualBox application, especially the network properties, must be configured, so that the web resources, located on the virtual machine, can be called. This configuration can vary, depending on the used host system. The virtual machine was tested on a Windows 10 host system, with the following network properties. These can be changed in the *Network* section after pressing the *Settings* button.

For the test scenario, for the *Attached to* property the *NAT* value was chosen. Further, adaptations to the *Port Forwarding* under the *Advanced* section were made. The following two rules were added.

The first row forwards the request sent to localhost to the port *8080* of the virtual machine, where the web page for taking the picture can be opened. This is important

Name	Protocol	Host IP	Host Port	Guest IP	Guest Port
http	TCP		8080		8080
ssh	TCP		1111		22

for using the mobile demonstration scenario, which is described more detailed in section 5.4.2.

The section row ensures that the virtual machine can be connected over a ssh connection, if further configurations should be made. The virtual machine itself have no graphical interface, but only the command line. For a login, the following credentials can be used:

- username: user
- password: pass

5.4.2 Using the mobile demonstration scenario

Using the mobile demonstration scenario for automatically generate digital and diagrammatic models, first the OMiTAG software (cf. 5.4.1) and the transformation application (cf. 5.3) must started.

Also, the paper figures (with the upward facing tags) and the A4 sheet must be placed on a flat surface. Afterwards, a photo of the sheet and the paper figures must be taken, using a web page of the OMiTAG application. The address to the web page, is depended on the configuration. For the configuration, proposed by this documentation, the web page can be found under:

- localhost:8080/cam.html

This page can either be used with the host device or with an external device, if the host and the external device are in the same network and can reach each other. The web page was tested with the *Firefox* browser on the host device and with a connected smart phone. With the *Google Chrome* browser, it might will not open because of security restrictions.

After the picture is taken, an ID (as integer) is shown on the web page, with which the data of the photo can be found later on.

To transform the physical model into its digital representation, the function must be triggered in the Scene2Model modelling tool. It can be found under *Scene2Model -> Create Scene from mobile setting*. After triggering the transformation, a window is shown, in which the ID, returned from the web page, must be entered. Afterwards, the digital representation is shown on the drawing area.

6 Contact

6.1 Technical Contact

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