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OMiLAB Training Module 3

Conceptualisation
Design Thinking with Scene2Model
Theoretical Foundations

Agenda

- Learning Goals
- Motivation
- The OMiLAB Concept
- Design2Model
- Design Thinking: Storytelling
- The Scene2Model Tool
- Used Modelling Languages in Scene2Model
- The Scene2Model Tool in Action
- Download Scene2Model
- Getting Started with Scene2Model

Learning Goals

- Design thinking provides means for human designers to come up with good designs, but also to capture designs in design artefacts. A more detailed discussion of design thinking involves a notion about wicked problems being tackled, design principles for good design, design thinking methodologies as a commitment to a design mind-set, and the relation to conceptual modelling.
- Software for design thinking supports innovation. New methods and software tools for design thinking become possible thanks to technology that enable, e.g., crowd-sourcing during design, automated reasoning/validation, and version control. Scene2Model is such a software tool for design thinking that expands the borders of a traditional design thinking approach.

MOTIVATION

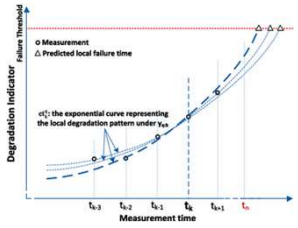
Motivation

How to Conceptualize, Implement, and Deploy New Business Opportunities in the Digital Age, e.g.

Need
Warranty cost generally increases exponentially with the increase of duration of warranty cover

Alternative
Long duration warranty or periodic replacement
- Drawback: high price

Value Proposition
Automatic replacement of parts based on smart models using real-time monitoring



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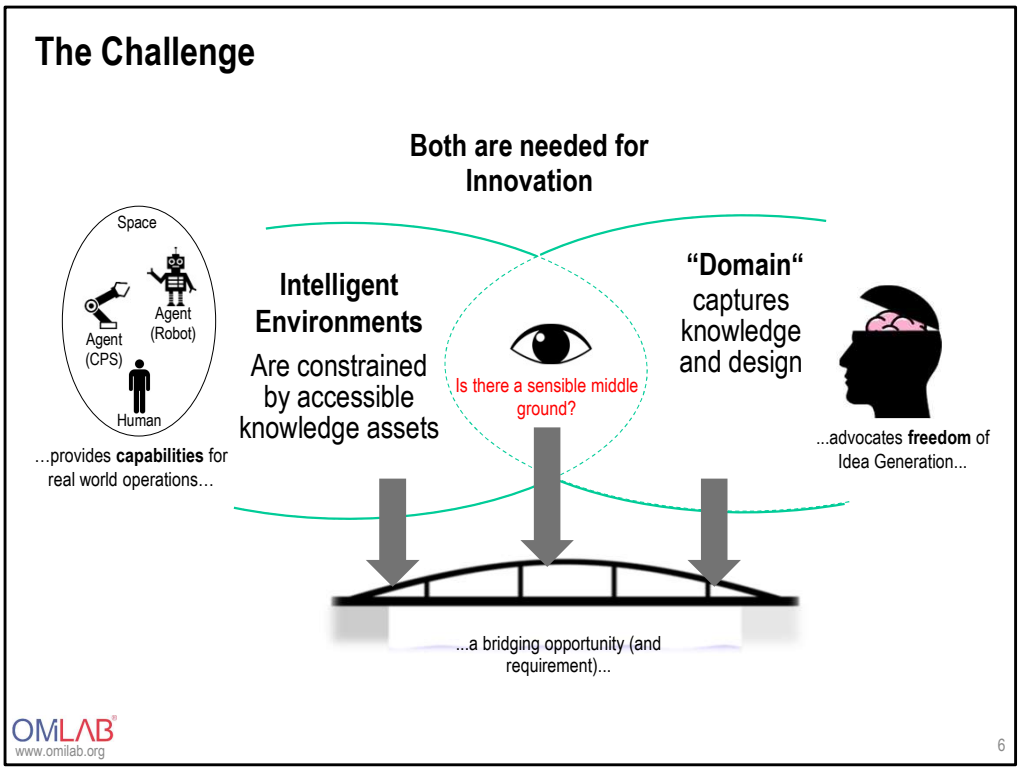
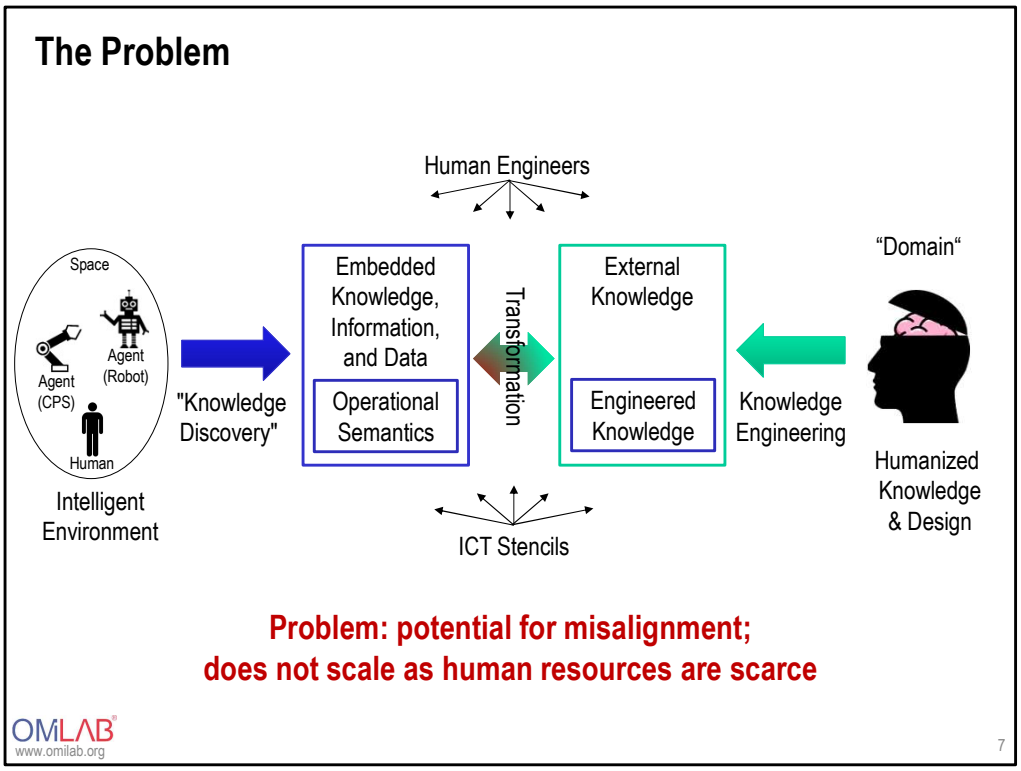


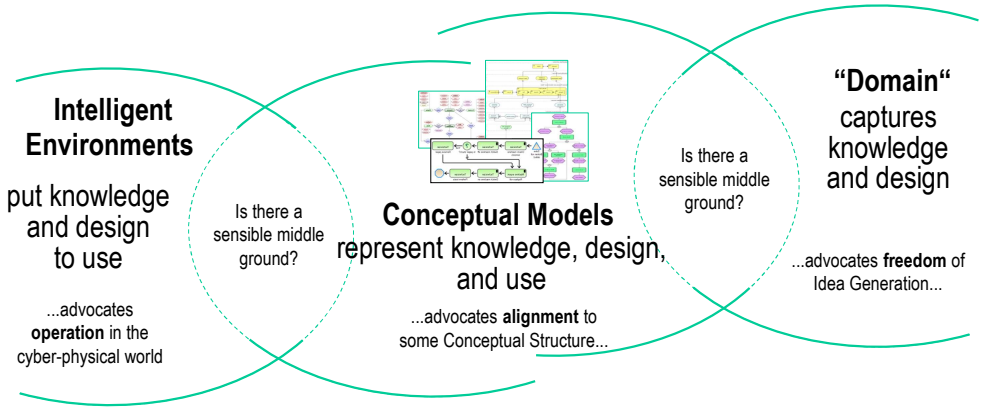
"Domain" in the railway case: optimize money? but consider safety, regulations, critical infrastructure uptime, quality of service (train speed) …
Intelligent Environment: highly adaptable, flexible, self-healing; Knowledge discovery: what are the agents doing, do they require maintenance, what are their capabilities and constraints
Intelligent Environment need knowledge: what, when, where is the problem? how to fix it? How to communicate actions (e.g., certificates)?
Innovation: A new company providing railway maintenance based on "domain" and environment



Human engineers implement solutions on an instance level based on ict stencils

Knowledge Engineer
Embedded Systems Engineer
Semantic Web Engineer

Approach



A Unifying Highly Descriptive Modelling Environment for the communication of Everything to Everything e.g. Service Design and Industrie 4.0

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THE OMILAB CONCEPT

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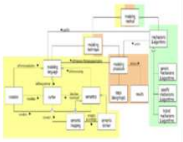
Concept

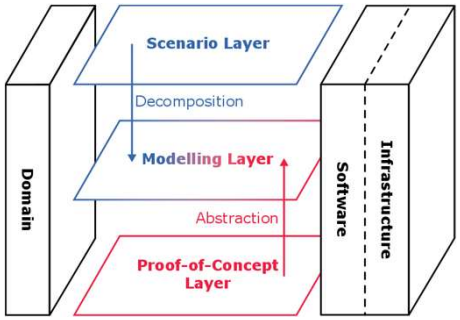
Domain-Independent Invariants

Digital Product Design Lab



The **Modeling Method** "seed concept"

The **Agile Modeling Method Engineering** lifecycle



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Concept Instance

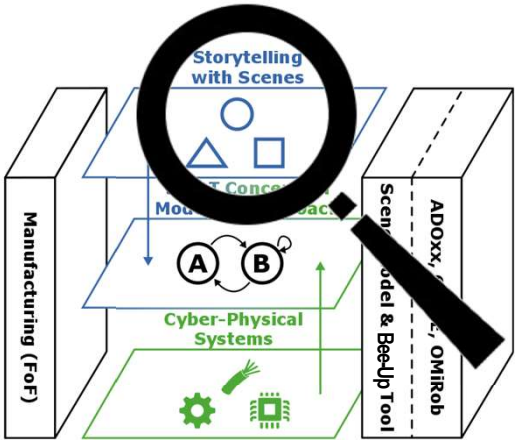
Design Thinking Layer

Concepts for Human Knowledge & Design

Conceptual Modelling Layer

Semantic Services for CPS Capabilities

Execution Layer



DESIGN THINKING

Characteristics

- Human-centered
- Promotes Creativity & Teamwork
- Iterative Steps
- Interdisciplinary teamwork (creative spaces, physical co-location, different disciplines)
- Creative (Simple, intuitive tools for unrestrained imagination)
- Agile
- Iterative Steps (“Fail early, fail often”)
- Tangible results (Minimal Viable Prototype)

T. Brown (2008): Harward Business Review June 2008. URL: http://5a5f89b8e10a225a44ac-cbed124c38c4f7a3066210c073e7d55.r9.cf1.rackcdn.com/files/pdfs/IDEO_HBR_DT_08.pdf

One Method for Design Thinking: Storytelling

- It is an “essential human activity” for sharing experiences.
- Storytelling helps explain the interconnections among people in situations and settings, teaching broad lessons that **engage real human beings**.
- **Empathy** is an essential and fundamental component in the process of storytelling.
- Stories generate questions and questions expand the breadth and depth of stories, leading to **innovative thoughts and ideas**.
- Storytelling becomes an important **tool for feedback**, which is the basis of the iterative process of prototyping that lead to solutions.
- Forms: digital storytelling, visual storytelling, storyboards, scenario generation, storytelling through videos, skits or plays, animation, talk and image, text or image.

Karen Collias (2016): Design Thinking and Storytelling. URL: http://knowwithoutborders.org/design-thinking-and-storytelling/

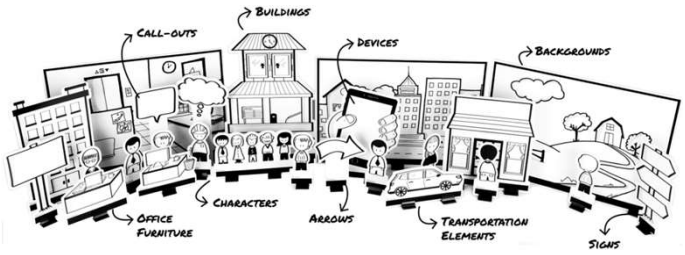
Storyboard

- A storyboard is a **part of storytelling** and is used for **visualizing and organizing ideas**.
- The storyboarding process was developed in Hollywood during the early 1930s for the first animated films.
- Using a storyboard transforms your information into a **visual story** and allows people to **experiment with changes** in the sequence or storyline during the creative process.
- Each scene of the film is drawn on paper and put in sequence on a large board. The team can see and arrange the order of the film before it's made.
- **Companies** (IBM, General Electric) **developed storyboarding as a planning tool** to coordinate the construction of proposals, reports and presentations.

The Art of Presentating Ideas (2015): The Storyboard Method. URL: www.english.thestoryboardmethod.com/

SAP Scenes

- SAP Scenes is an **instrument to create storyboards**.
- Scenes is a tool and a method to create **storyboards about products** and services fast, collaboratively and iteratively.
- It empowers business leaders and professionals of all industries to shape their ideas and scenarios in the form of fun illustrative stories without the need of refined drawing skills.



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SAP Design Services (2018): Every great experience starts with a great story. URL: www.experience.sap.com/designservices/approach/scenes
K Detken, M. Langholz, J. Austermeier, H. Lee & T. Biedermann (2016): Design Education Initiative Award. URL: https://designawards.core77.com/Design-Education-Initiative/49601/Scenes

SAP Scenes

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https://www.youtube.com/watch?v=UNhGyG9NUtE&feature=youtu.be

How to build Scenes

- Granularity
  - One scene should show one interaction relevant to the service/product you are providing
  - The number of objects is not limited (however think what is necessary for the service/product – don't' get literal)
  - The scene should contain enough information to be understood outside the innovation team (i.e. consider how to document and share information)
- Order
  - The scenes depict the customer's story (i.e. they will generally be ordered by sequence in time)

Think graphic novels.

DESIGN2MODEL

Design2Model Approach

- Humans engage in design thinking
  - Potential for problem solving
    - Abductive, creative, intuitive, innovative, …
  - Based on humanized knowledge and wisdom
  - Supported by design thinking methodologies

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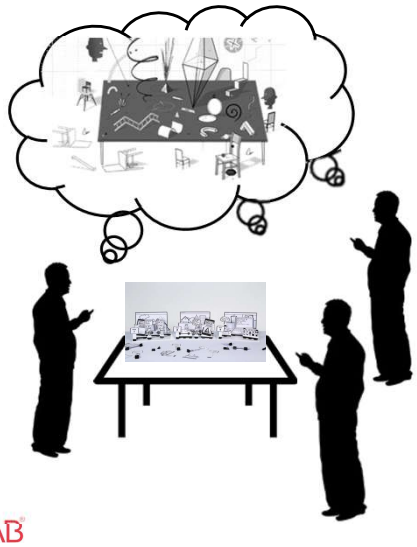
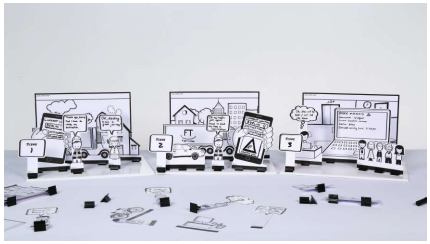
Design2Model Approach



- Humans build design artifacts (e.g., to understand end-user requirements)
  - Rapid Prototyping
  - Storytelling
  - Post-It Collaboration
  - Modulo
  - …



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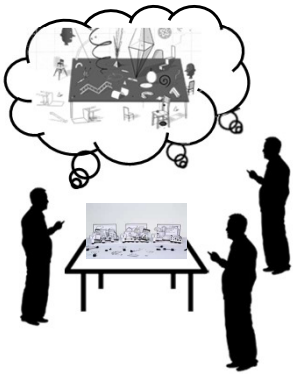
Design2Model Approach

Design Artifacts



Limitations for

- Agile
- Space and time independent
- Consolidated
- Traceable
- Operationalized
- …

Design2Model Approach – The Scene2Model Case

- How to overcome the limitations?
  - Through digitalization of design

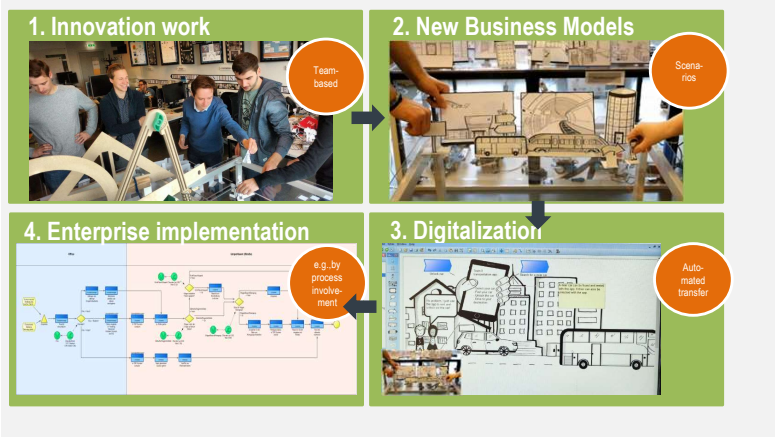
From haptic design artefacts….

- Innovative idea
- Prototyping with SAP Scenes: Storyboards
- Design Thinking artefacts: Haptic Results

…to software supported conceptual models

- Enterprise model extension
- Semantic links: Ontology
- Decomposition

Bridging Design Thinking and Conceptual Modelling in the Scene2Model Case



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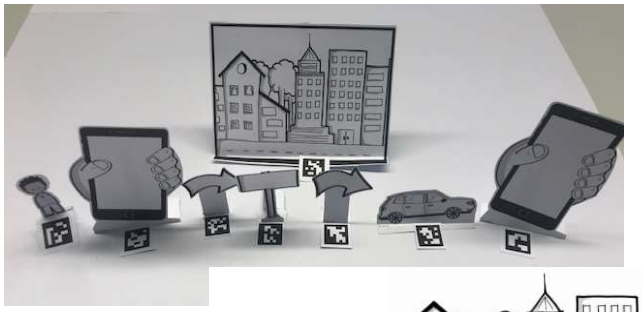
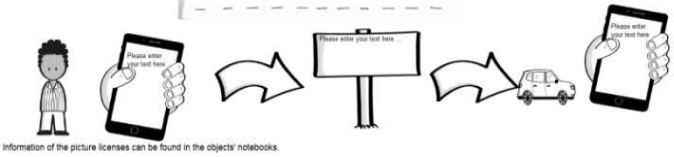
SCENE2MODEL TOOL

From the physical scene to the digital model





Information of the picture licenses can be found in the objects' notebooks.

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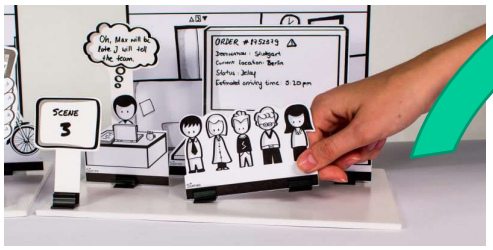
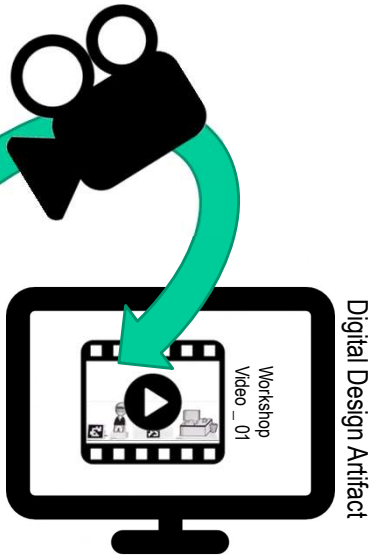
The Scene2Model Tool

1. Digitalize Design

Haptic Scenes





Digital Design Artifact

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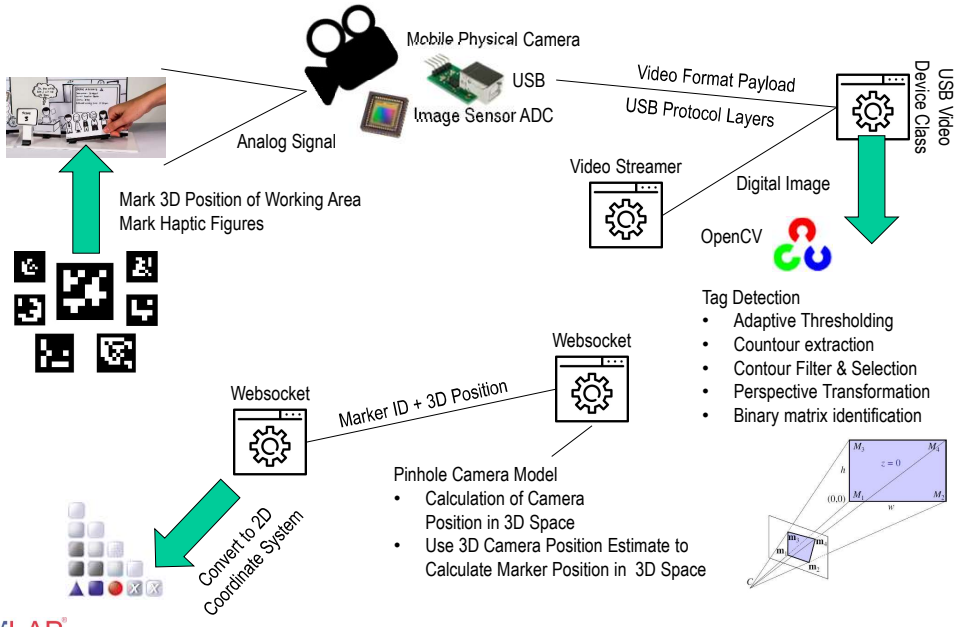
The Scene2Model Tool



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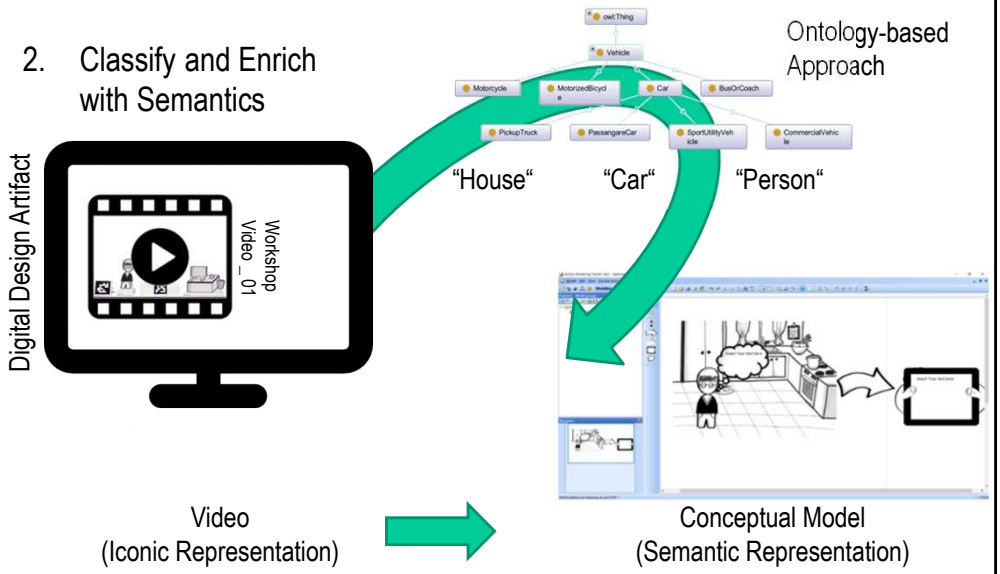
The Scene2Model Tool

2. Classify and Enrich with Semantics



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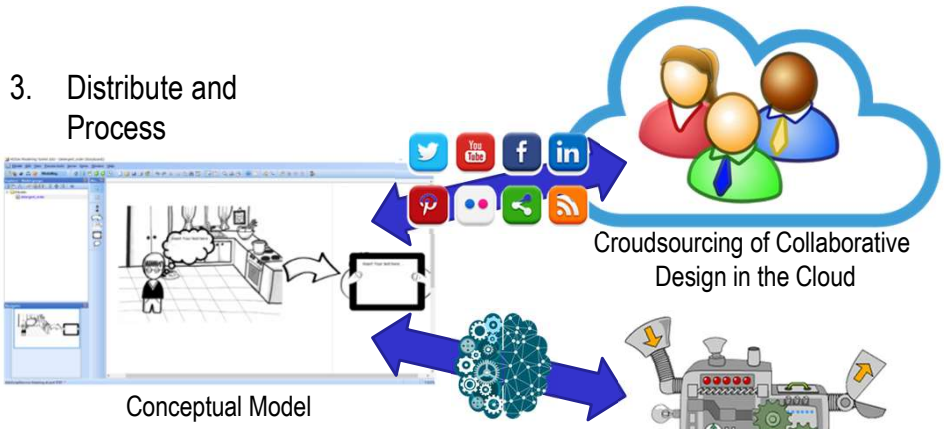
The Scene2Model Tool

3. Distribute and Process



Croudsourcing of Collaborative Design in the Cloud

Conceptual Model (Semantic Representation)

Computerized Design for "Smart" Capabilities, like Verification, Reasoning, …

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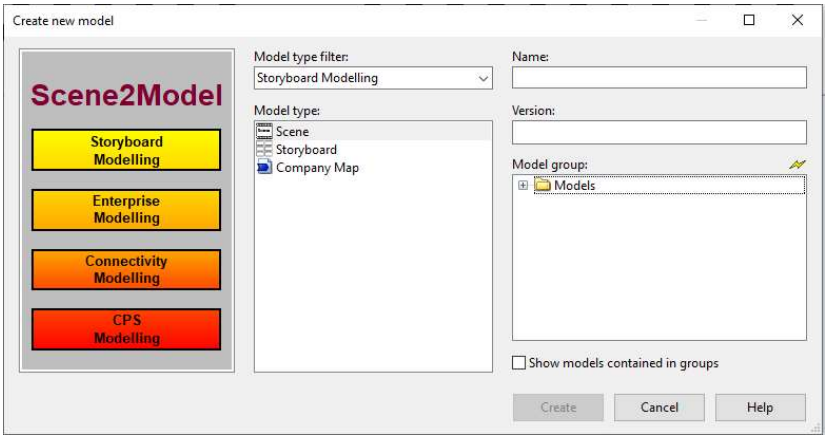
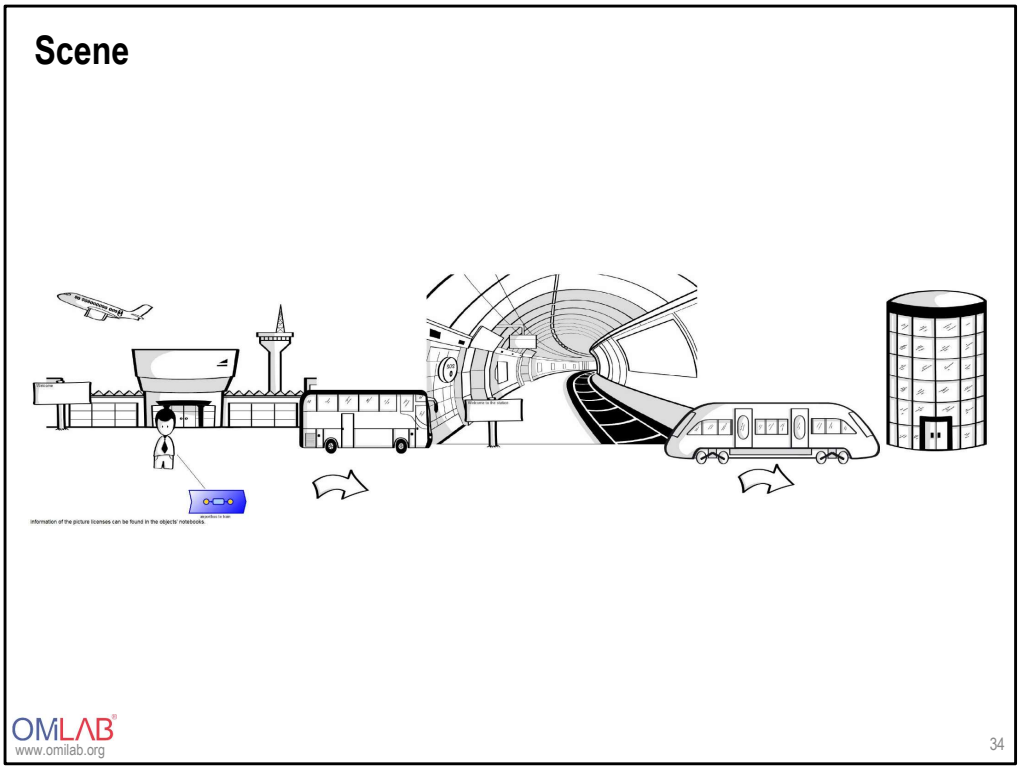
USED MODELLING LANGUEAGES IN SCENE2MODEL

Overview


Create new model
Scene2Model
Storyboard Modelling
Enterprise Modelling
Connectivity Modelling
CPS Modelling
Model type filter:
Storyboard Modelling
Model type:
Scene
Storyboard
Company Map
Name:
Version:
Model group:
Models
Show models contained in groups
Create
Cancel
Help

Scene

- The used modelling language conceptualizes the scene figures in order to enable the – automatic – import of physical scene models using a camera into a conceptualized model.
- The scene modelling language consists of:
  - Character
  - Team
  - Device
  - Sign
  - Arrow
  - Furniture
  - Transportation-Element
  - Building
  - Accessory
  - Background
  - Process
- All objects can be referenced with “has relation” to indicate a strong dependency. The process element can be linked with “executes” to link the process execution to a particular element.

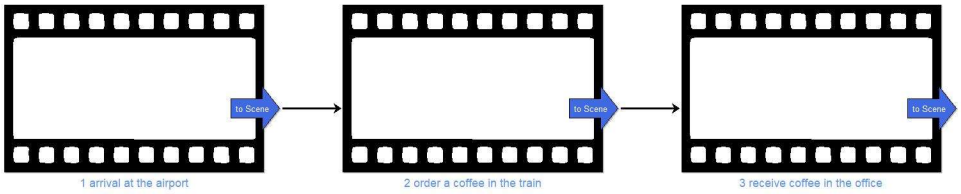


Arrive at the aiport – go to train terminal by bus – go by train to company

Story Board

- Groups the various scenes into a consistent story board
- Individual scenes can be seen as sub-models of the overall story board
- The story board can be seen as the aggregation of a set of individual scenes.
- The story board modelling language consists
  - Element “Scene”
  - Relation “next scene”
    to indicate a sequence in which the scenes are foreseen to be executed.

Story Board



1 arrival at the airport

2 order a coffee in the train

3 receive coffee in the office

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Company Map

- Identifies the processes that are needed to execute the scenes
- Invividual process are identified in the scene models and grouped in the company map which introduces a process-oriented view
- The identified processes from the varous scenes are collected and then assessed for their completeness
- The company map consists of different elements to structure the process

Elements
- Swim lanes (horizonally or vertically)
- Actor
- External Partners
- Performance
- Note

Relations
- Has process
- Value flow

Company Map

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THE SCENE2MODEL TOOL IN ACTION

Scene2Model Tool

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https://www.youtube.com/watch?v=kQoQtEME_ss&feature=youtu.be

DOWNLOAD SCENE2MODEL

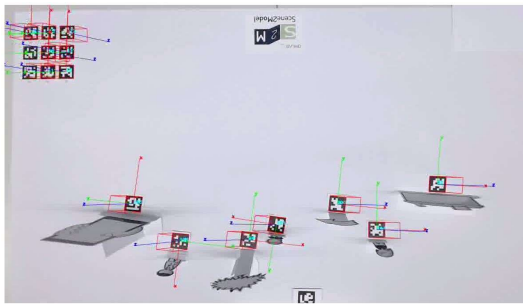
Download the tool

1. Visit https://austria.omilab.org/psm/content/scene2model/download?view=download and download the tool for your operating system.
   Scene2Moodel supports:
   - Windows XP, Vista, 7,8
   - Fedora 28, 29
   - MacOS Mojave (10.14.2)
   - Ubuntu 18.04 LTS, 18.10
2. Extract the package to a local folder
3. Run „setup.exe“ from the extracted folder to install the tool
4. In case of issues related to the setup, please visit ADOxx-installation guide or the FAQ on installation issues for detailed instructions and solutions or have a look at the support documents in the “dbinfo” folder.
   - ADOxx.org, https://www.adoxx.org/live/installation-guide-15
   - ADOxx.org, https://www.adoxx.org/live/faq/-/message_boards/category/19633

GETTING STARTED WITH SCENE2MODEL

Preparation

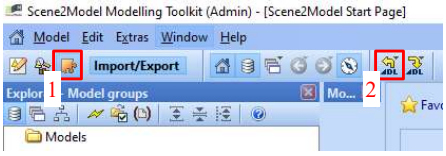
1. Place the canvas on a table. The canvas needs to contain the reference tags for the QR codes of the figures
2. A USB camera should be able to capture the QR tags.
   To test if the camera captures the tags, connect it to the Raspberry Pi and open http://<*RaspberryPi-IP*>:8090/ in a web browser (replace by the actual IP address)



Display in the web browser

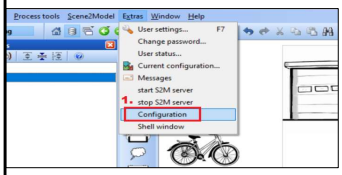
Test Scenario

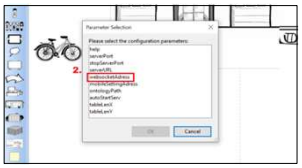
1. Download the test scenario (ADL file) from https://austria.omilab.org/psm/content/scene2model/downloadlist?view=downloads#43
2. Import the ADL files into the Scene2Model tool
3. You can play around with the test scenarios – adapt them, extend them,link them, create new models

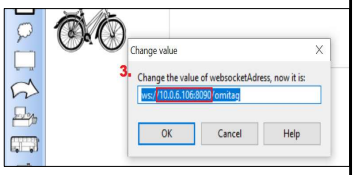


Create your own digital scene from physical a physical scene

1. Switch on the Raspberry Pi and connect it to the camera. Ensure that the camera is active.
2. Check if the IoT Adapter on the Raspberry Pi is up and running by accessing the web-server on: http://<*RaspberryPi-IP*>:8090/ (replace by the actual IP address)
3. Run the S2M Modelling Tool as an administrator
4. Ensure that the server that connects the Scene2Model tool and the tag recognition software is active. The menu called “Extra” in the Scene2Model tool allows to start and stop the “s2m” server.
5. Go to Extras, then Configuration
6. Here, go to the WebsocketAddress and change the IP-address to ws://<RaspberryPI-IP>:8090/omitag and click OK.







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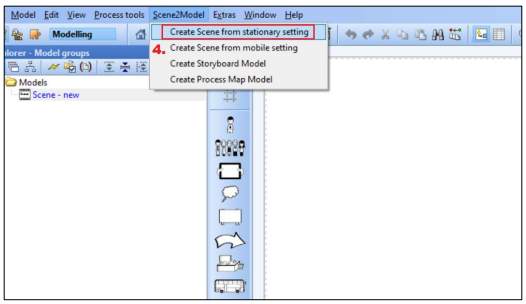
Create your own digital scene from physical a physical scene

- If everything is up and running, import the image in a new scene model using the Scene2Model menu and “Create Scene from stationary setting”.



- The software will recognize the figures that you have placed on the canvas and import the scene.

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Additional Information

- In order to run workshops in parallel, it is possible to consider a client-server installation of the Scene2Model environment. The results of each workshop group can then be shared with the other groups during the workshop.
- Extensions may be foreseen to support the analysis of the models of the past to identify similar models or identify common patterns.

You are now ready for your first Design Thinking Workshop Using Scene2Model with SAP Scene Figures

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Self-control questions

- What are the key concepts of design thinking?
- How to transform a design into a model?
- What is the Scene2Model Design Thinking Tool?
- What modelling languages does the Scene2Model Design Thinking Tool offer and how to use them?
- How to create a model based on a physical scene which was developed in a design thinking workshop?