VREVAL

Documentation & Result Analysis

Edited by

M.Sc. Olaf Kammler, René Weiser, Ekaterina Fukuchinma

olaf.kammler@uni-weimar.de | InfAR - Bauhaus-Universität Weimar | 08/2021

ABOUT DOCUMENATION & RESULT ANALYSIS

About Documentation

Eeach study must be well documented.
For the purpose of documenation, different achive files can be downloaded from the VREVAL website.

The following documentation / archive can be downloaded:

- Project
- Evaluation
- Participant Log
- Evaluation Results

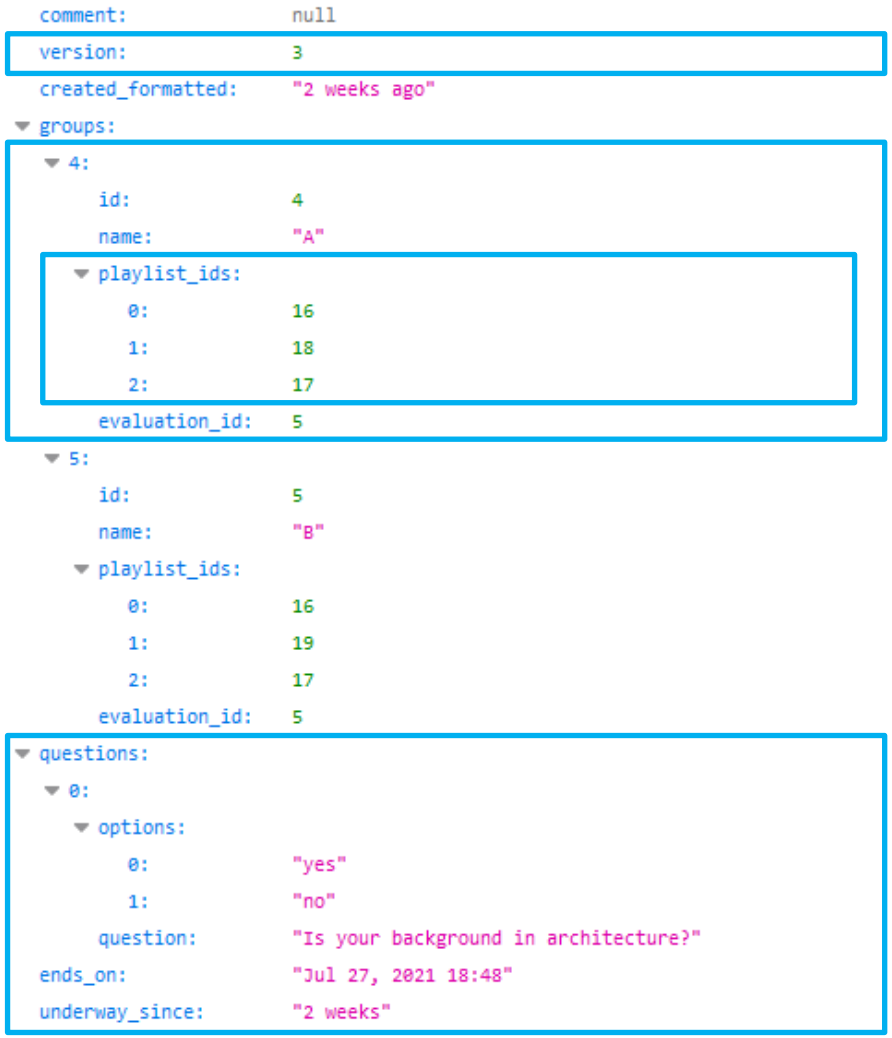
About Result Analysis

A key for a useful study is the evaluation and interpretation of the results.
Each task can get interpreted differently. It is very important, to know, that the basic result evaluation methods are, to dive even deeper into the analysis. If the basic result analysis process is known, even better research question can be asked.

1. DOCUMENTATION

Example: Project.json

The **project** archive is saved in the format json.



project snapshot version

group

used playlists by ID

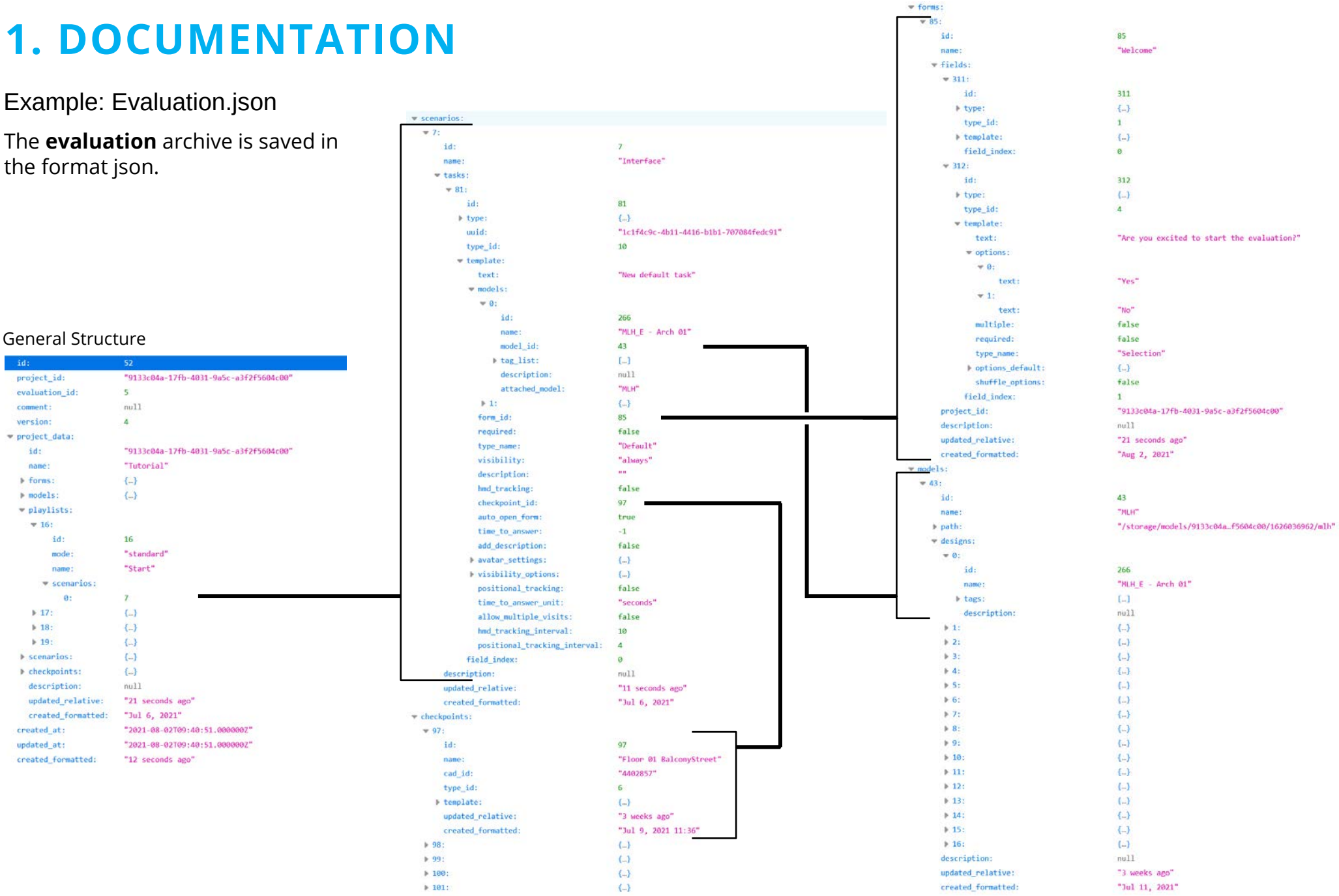
Classification Question

1. DOCUMENTATION

Example: Evaluation.json

The **evaluation** archive is saved in the format json.

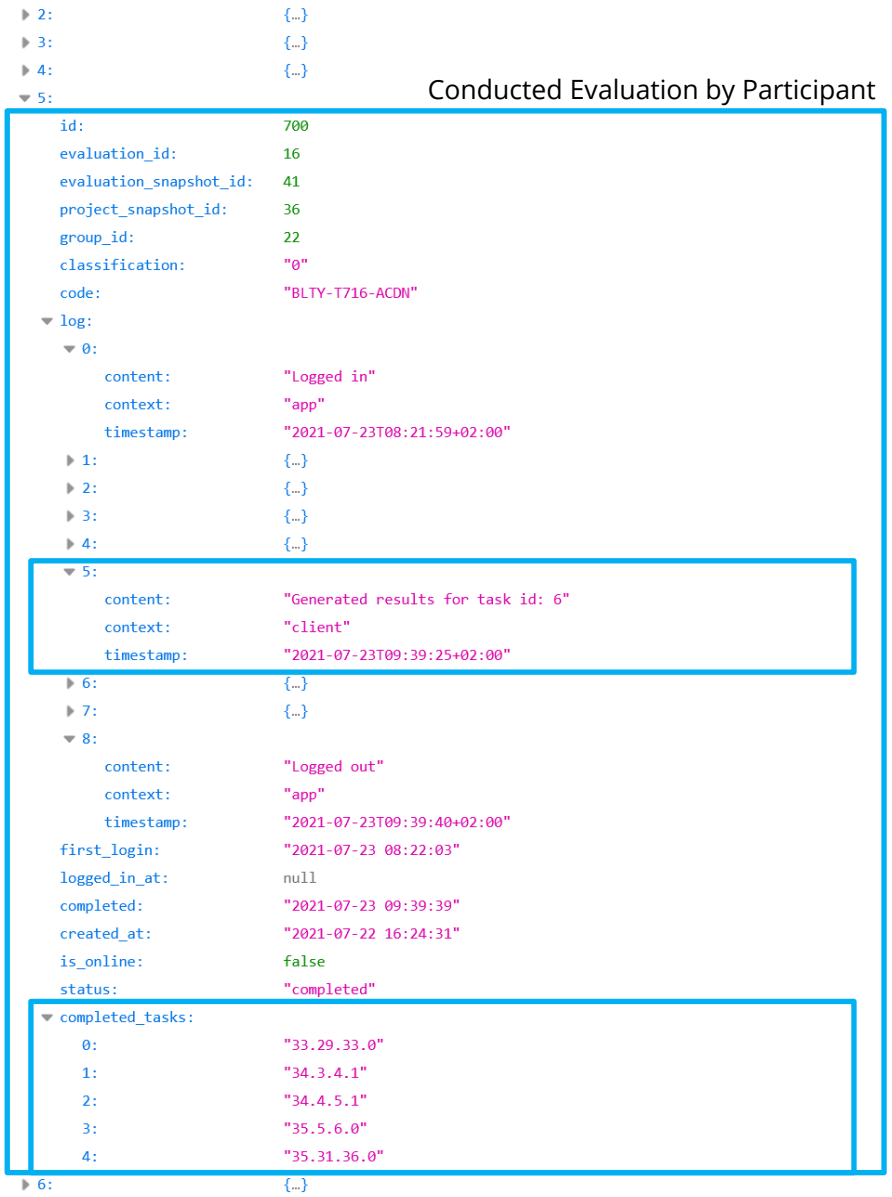
General Structure



1. DOCUMENTATION

Example: Participant_Log.json

The **participant log** is saved in the format json.



Log for actions during evaluation

- Start
- End
- Generated (saved) results
- Task Termination, Medical reason etc.

Log for completed task

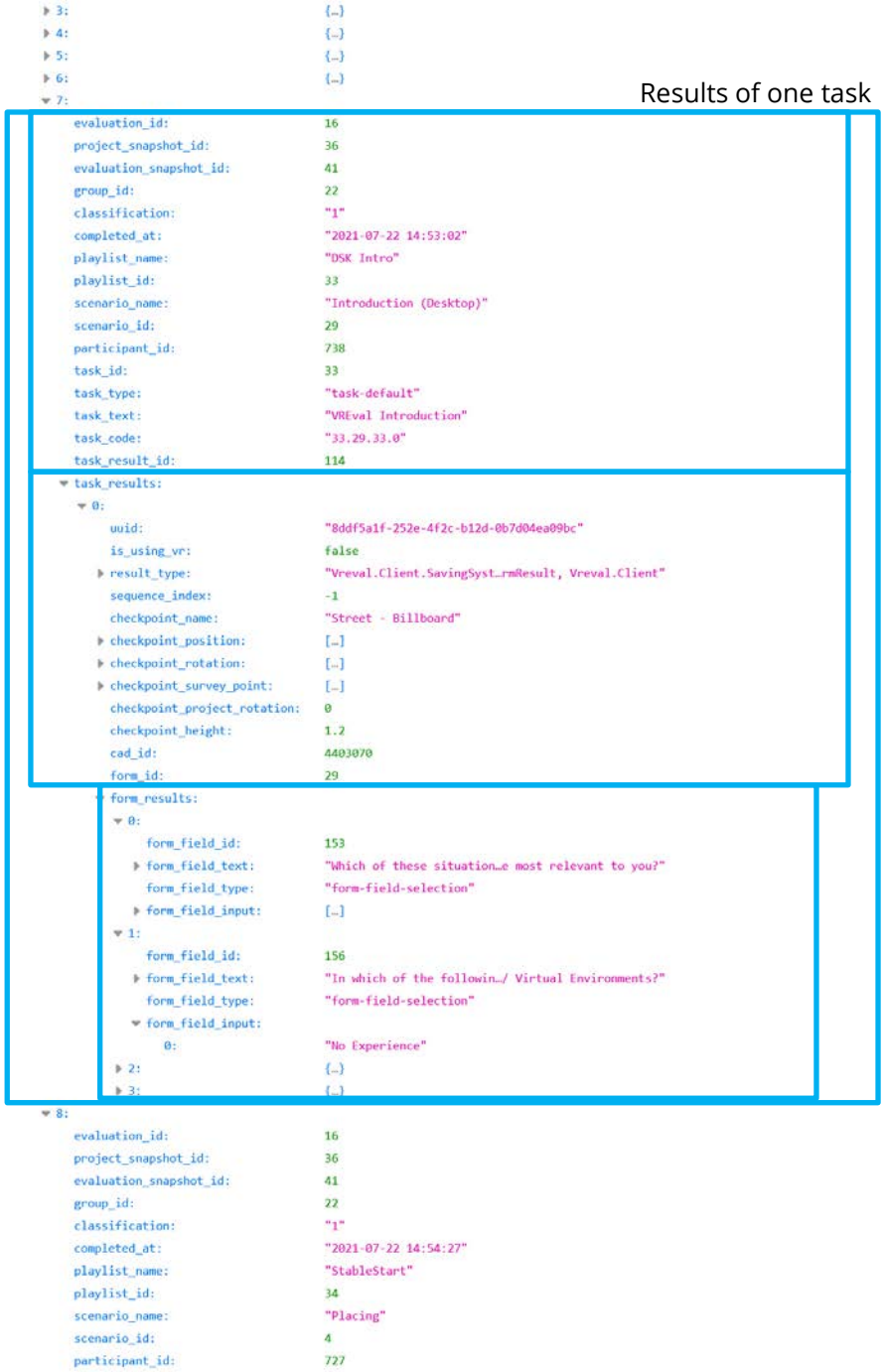
1. DOCUMENTATION

Example: Result.json

The **participant log** is saved in the format json.

Results, which are saved are the following:

- Form – Selection
- Form – Rating
- AB-Test
- Wayfinding – Trajectory, start & end point
- Placing – Marker Position
- Annotation – Marker Position and Form results (identification by UUID)



2. RESULT ANALYSIS

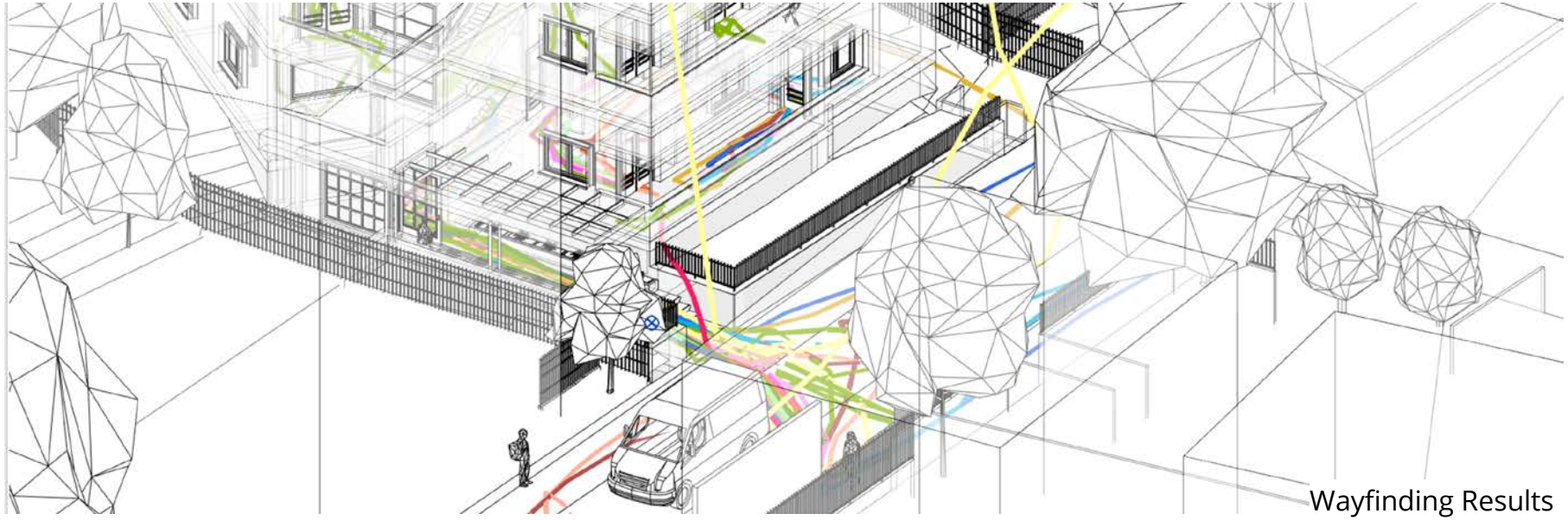
About

The json results will get modified for analysis in different ways.

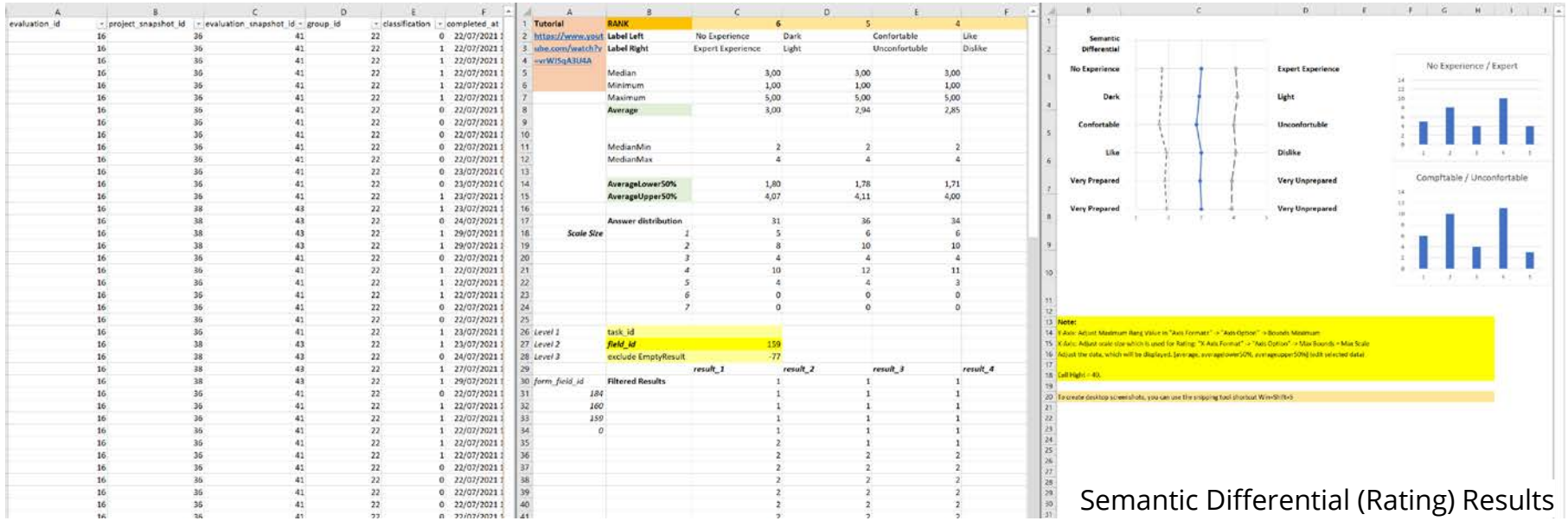
Results will get displayed in *Revit* or transformed to *Table Entries (CSV).*

Result types, which are saved, are the following:

- Form – Selection *for each task type*
- Form – Rating *for each task type*
- AB-Test
- Wayfinding – Trajectory, start & end point
- Placing – Marker Position
- Annotation – Marker Position and Form results (Selecting / Rating) (identification by UUID)



Wayfinding Results



Semantic Differential (Rating) Results

2. RESULT ANALYSIS

About

The study results can be downloaded from https://database.architektur.uni-weimar.de/
The study results can be found under the participation codes (evaluation is published).

The result file is saved in the format json. Per entry a task is saved.

To get the results displayed in Revit, Dynamo is used.

To analyse the queries, the json file must get translated to a CSV file. The CSV file is created by Dynamo as well. The CSV file can be opened and analysed in Excel.

The results in Revit or CSV Files will be only generated, if the specific family *VREVALResultMarker.rfa* is loaded.

Revit Family
General Family with the following instance parameter:
evaluation_id
project_snapshot_id
evaluation_snapshot_id
group_id
classification
completed_at

playlist_id
playlist_name
scenario_id
scenario_name
task__id
task_name
task_code

participant_id
UUID
sequence_index
checkpoint_name

result_form_field_id
result_results

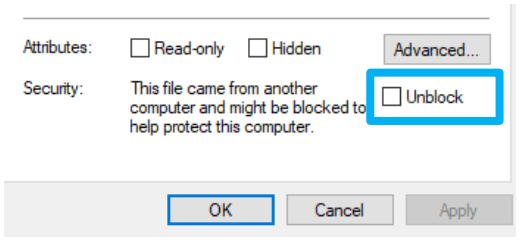
Marker

2.1 DYNAMO PACKAGE „VREVAL“

Install

Copy the unzipped VREVAL Package into the Dynamo Package folder.

Don’t forget to unblock the Zip File before extracting.
(right click at Zip File -> Properties)



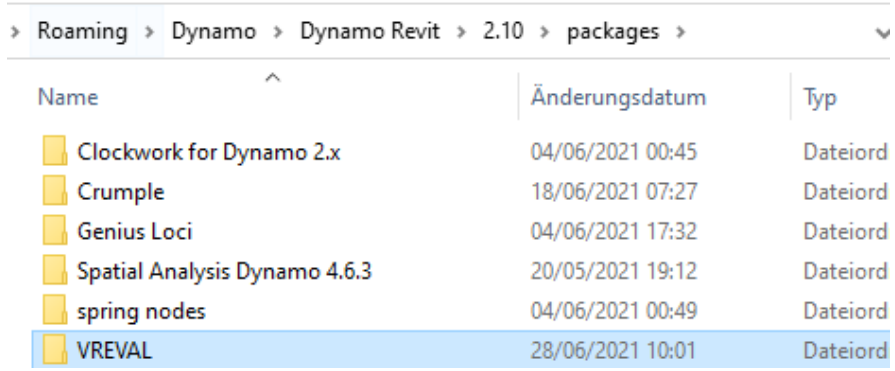
The default package folder is

%USERPROFILE%\AppData\Roaming\Dynamo\Dynamo Revit

And navigate to

\[DynamoVersion]\packages

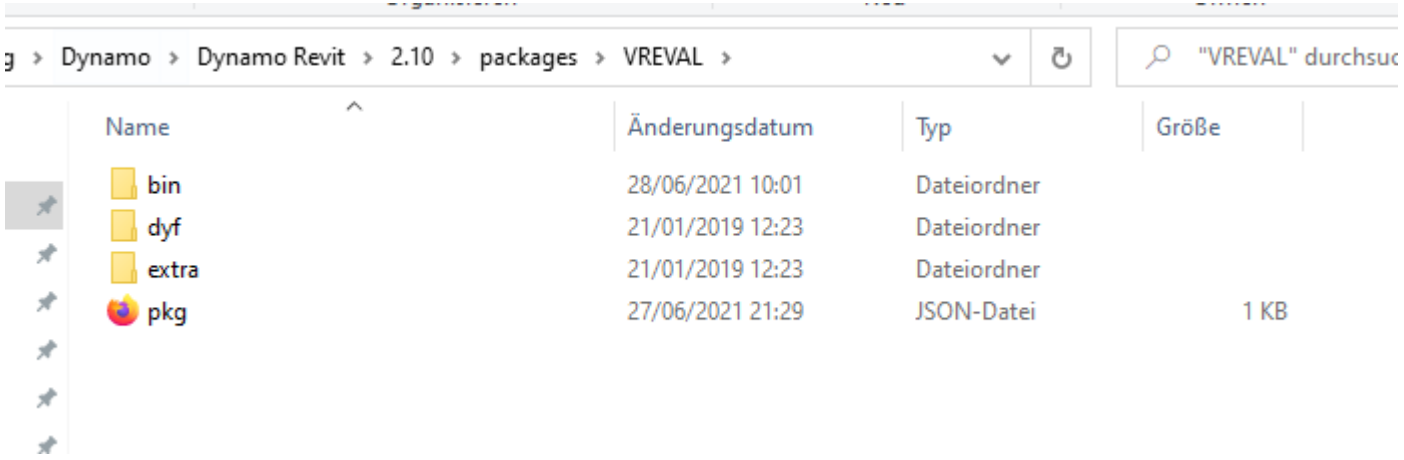
The structure must be maintained.



Dynamo Package Folder Structure

E.g.: The package content (Add-on) VREVAL is located in the folder VREVAL

The Dynamo Package has the following structure.



2.1 DYNAMO PACKAGE „VREVAL“

Filter

Result data can be filtered by:

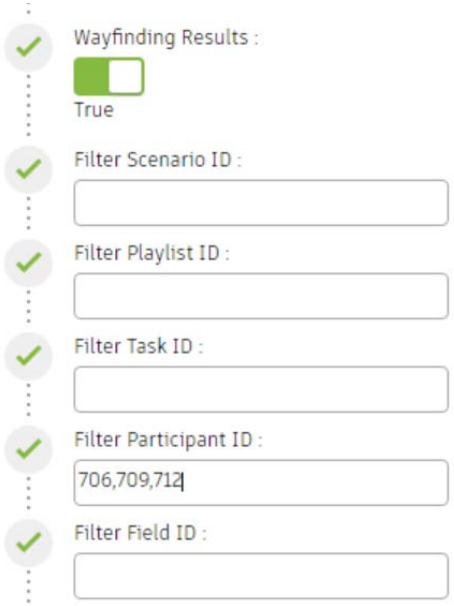
- Scenario ID
- Playlist ID
- Task ID
- Participant ID
- Field ID
- Result ID
- Sequence ID

To find out more about your data, first run the VREVAL Result Importer once and have a look over it.

Dynamo Player: Filter

The filter works through IDs.
If more than 1 ID is used, the IDs get separated by comma.

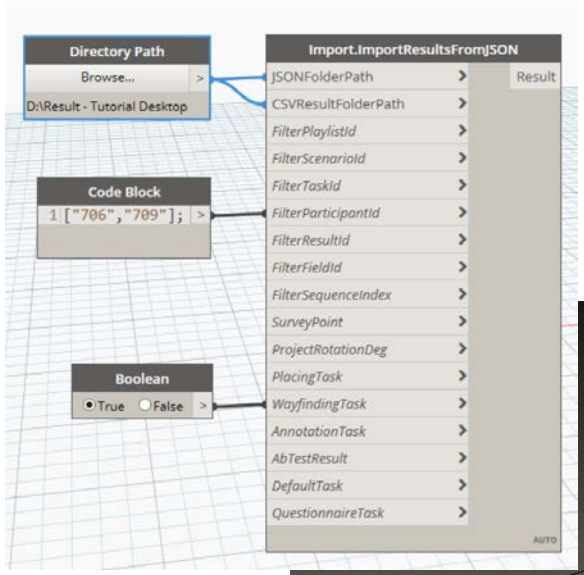
Example:
“*706,709,712*”

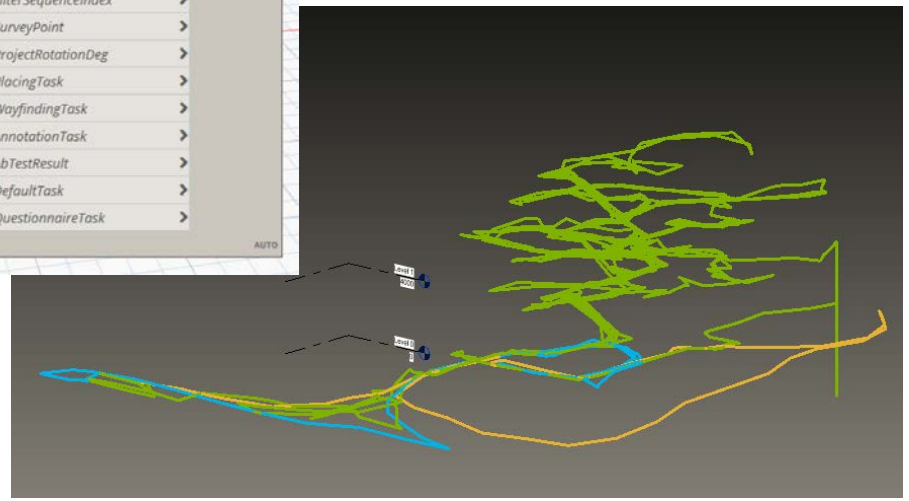


Dynamo Script: Filter

The filter works through IDs.
If more than 1 ID is used, the IDs get separated by comma. The ID must be a “string”. The IDs are collecting in a list [].

Example:
["706","709","712"];





2.1 DYNAMO PACKAGE „VREVAL“

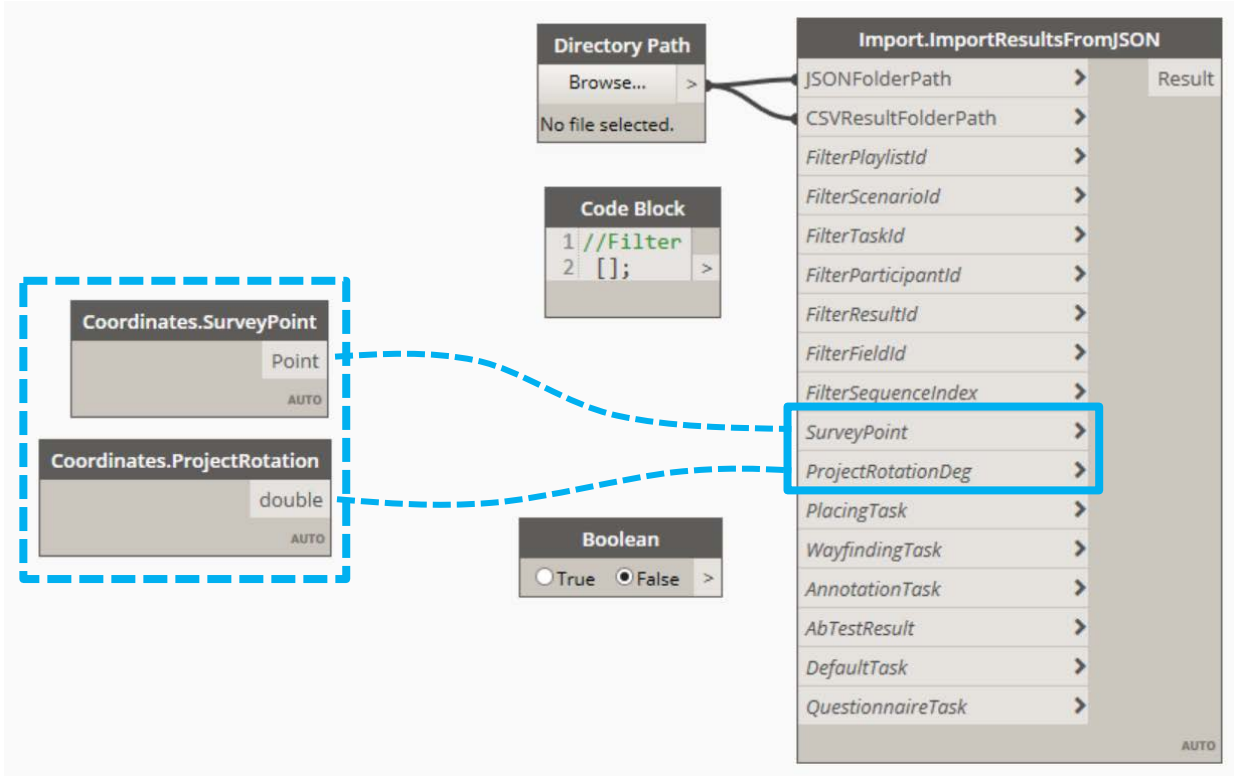
Survey Point & Project Rotation

By **default**, the Survey Point and Project Rotation correction is conducted for Wayfinding, Placing and Annotation Visualizations in Revit.

The Survey Point and Project Rotation gets read out form the json result file.

If a costume correction is required,

- for the survey point the *SurveyPoint* from the Revit File can be extracted or a user defined *Point* can be used.
- For the Project Rotation the *ProjectRotation* of the Revit file can be extracted or a user defined *Number* can be used.



3.1 RESULT ANALYSIS: FORM SELECTING

CSV

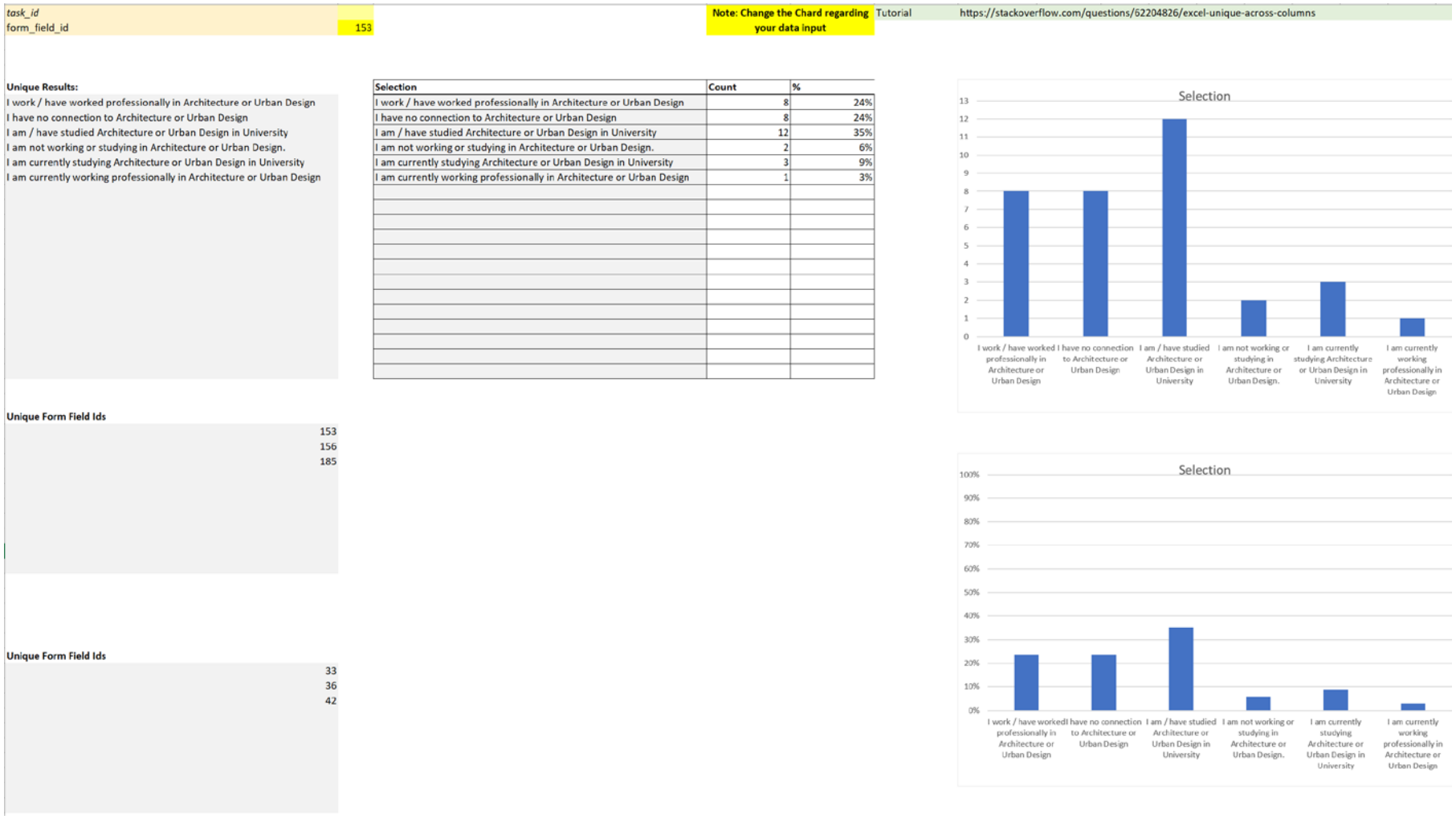
The CSV for Selecting is generated by a Dynamo Script (package VREVAL).

Selecting results are saved by each task type (Default, Questionnaire, ABTest, Wayfinding, etc.)

A Excel Template File *VR_Evaluation_Template_Selecting* can be used for predefined analysis. Copy the CSV data into the sheet *Selecting Results*.

The data can be filtered by **task_id** and **form_field_id**.

The diagrams can be modified.



task_id
form_field_id 153

Note: Change the Chard regarding your data input

Tutorial https://stackoverflow.com/questions/62204826/excel-unique-across-columns

Unique Results:

I work / have worked professionally in Architecture or Urban Design
I have no connection to Architecture or Urban Design
I am / have studied Architecture or Urban Design in University
I am not working or studying in Architecture or Urban Design.
I am currently studying Architecture or Urban Design in University
I am currently working professionally in Architecture or Urban Design

Selection	Count	%
I work / have worked professionally in Architecture or Urban Design	8	24%
I have no connection to Architecture or Urban Design	8	24%
I am / have studied Architecture or Urban Design in University	12	35%
I am not working or studying in Architecture or Urban Design.	2	6%
I am currently studying Architecture or Urban Design in University	3	9%
I am currently working professionally in Architecture or Urban Design	1	3%

Unique Form Field Ids

153
156
185

Unique Form Field Ids

33
36
42

3.2 RESULT ANALYSIS: FORM RATING

CSV

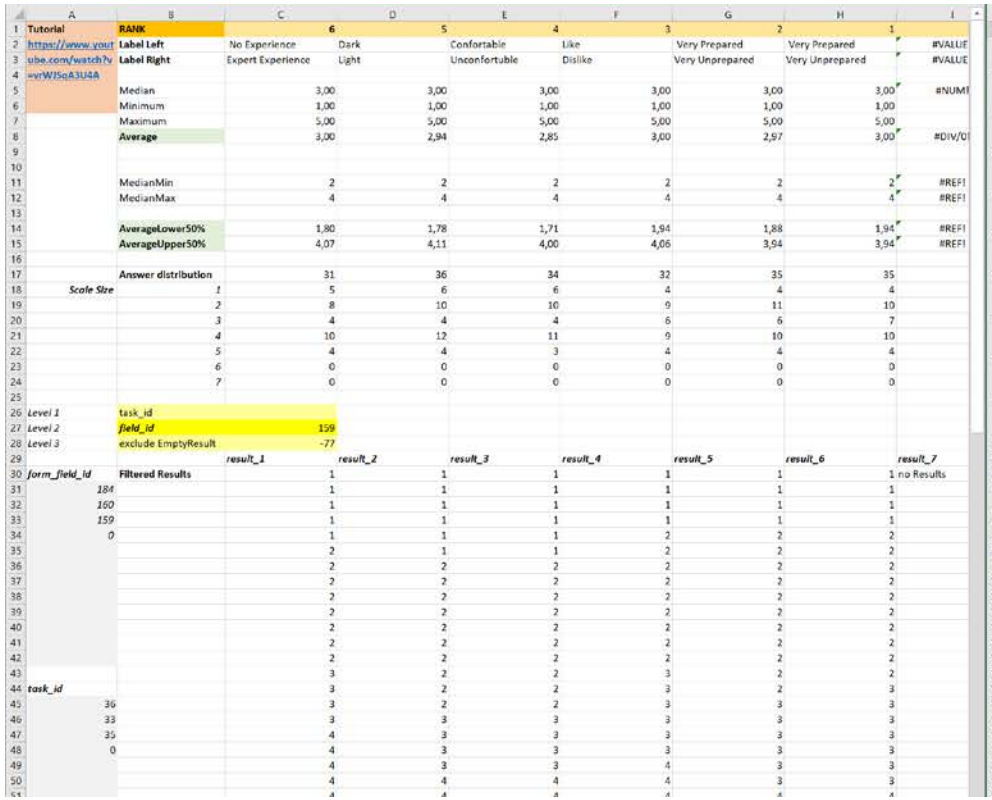
The CSV for Rating is generated by a Dynamo Script (package VREVAL)

Selecting results are saved by each task type (Default, Questionnaire, ABTest, Wayfinding, etc.)

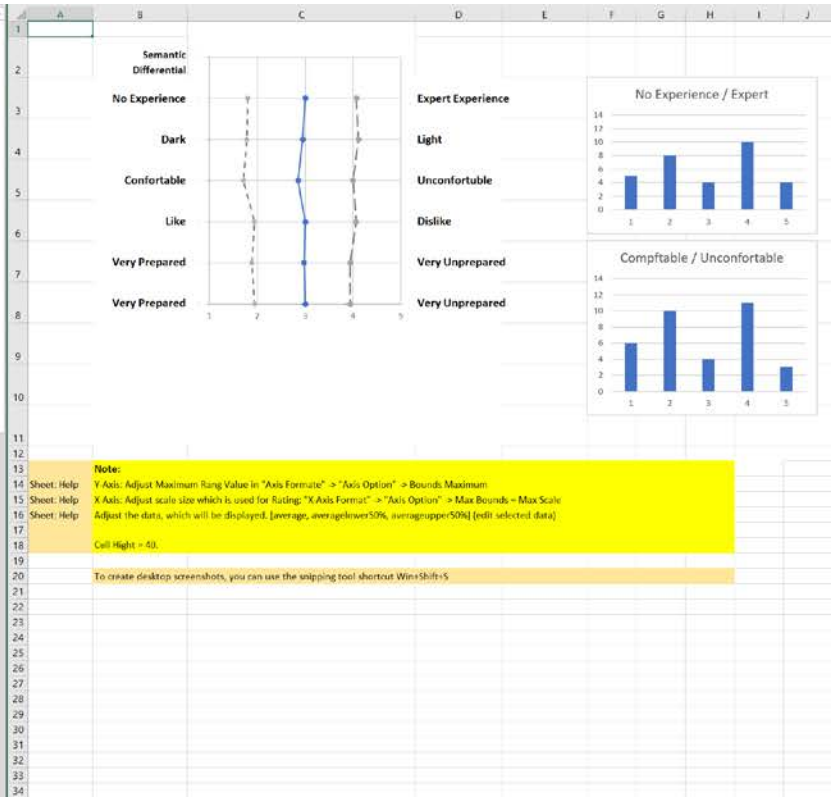
A Excel Template File *VR_Evaluation_Template_Rating* can be used for predefined analysis. Copy the CSV data into the sheet *Rating Results*.

The data can be filtered by **task_id** and **form_field_id** in the sheet Evaluation-Calculation.

The charts can be modified. More charts can be created.



	A	B	C	D	E	F	G	H	I
1	Tutorial	RANK	6	5	4	3	2	1	
2	https://www.yout	Label Left	No Experience	Dark	Confortable	Like	Very Prepared	Very Prepared	#VALUE
3	ube.com/watch?v	Label Right	Expert Experience	Light	Unconfortable	Dislike	Very Unprepared	Very Unprepared	#VALUE
4	=vrWJSqA3U4A								
5		Median	3,00	3,00	3,00	3,00	3,00	3,00	#NUMI
6		Minimum	1,00	1,00	1,00	1,00	1,00	1,00	
7		Maximum	5,00	5,00	5,00	5,00	5,00	5,00	
8		Average	3,00	2,94	2,85	3,00	2,97	3,00	#DIV/0!
9									
10									
11		MedianMin	2	2	2	2	2	2	#REF!
12		MedianMax	4	4	4	4	4	4	#REF!
13									
14		AverageLower50%	1,80	1,78	1,71	1,94	1,88	1,94	#REF!
15		AverageUpper50%	4,07	4,11	4,00	4,06	3,94	3,94	#REF!
16									
17		Answer distribution	31	36	34	32	35	35	
18	Scale Size	1	5	6	6	4	4	4	
19		2	8	10	10	9	11	10	
20		3	4	4	4	6	6	7	
21		4	10	12	11	9	10	10	
22		5	4	4	3	4	4	4	
23		6	0	0	0	0	0	0	
24		7	0	0	0	0	0	0	
25									
26	Level 1	task_id							
27	Level 2	field_id	159						
28	Level 3	exclude EmptyResult	-77						
29			result_1	result_2	result_3	result_4	result_5	result_6	result_7
30	form_field_id	Filtered Results	1	1	1	1	1	1	no Results
31	184		1	1	1	1	1	1	
32	160		1	1	1	1	1	1	
33	159		1	1	1	1	1	1	
34	0		1	1	1	2	2	2	
35			2	1	1	2	2	2	
36			2	2	2	2	2	2	
37			2	2	2	2	2	2	
38			2	2	2	2	2	2	
39			2	2	2	2	2	2	
40			2	2	2	2	2	2	
41			2	2	2	2	2	2	
42			2	2	2	2	2	2	
43			3	2	2	3	2	2	
44	task_id		3	2	2	3	2	3	
45	36		3	2	2	3	3	3	
46	33		3	3	3	3	3	3	
47	35		4	3	3	3	3	3	
48	0		4	3	3	3	3	3	
49			4	3	3	4	3	3	
50			4	4	4	4	3	3	



	A	B
13		Note:
14	Sheet: Help	Y Axis: Adjust Maximum Rang Value in "Axis Formate" -> "Axis Option" -> Bounds Maximum
15	Sheet: Help	X Axis: Adjust scale size which is used for Rating: "X Axis Format" -> "Axis Option" -> Max Bounds = Max Scale
16	Sheet: Help	Adjust the data, which will be displayed. [average, averagelower50%, averageupper50%] (edit selected data)
17		
18		Cell Hight = 40.
19		
20		To create desktop screenshots, you can use the snipping tool shortcut Win+Shift+S

3.3 RESULT ANALYSIS: AB TEST

CSV

The CSV for AB-Test is generated by a Dynamo Script (package VREVAL)

A Excel Template File *VR_Evaluation_Template_AB* can be used for predefined analysis. Copy the CSV data into the sheet *AB Results*.

The data can be filtered by **task_id** and **sequence_index.**

The charts can be modified. More charts can be created.

task_id	
sequence_index	2

Unique Results:

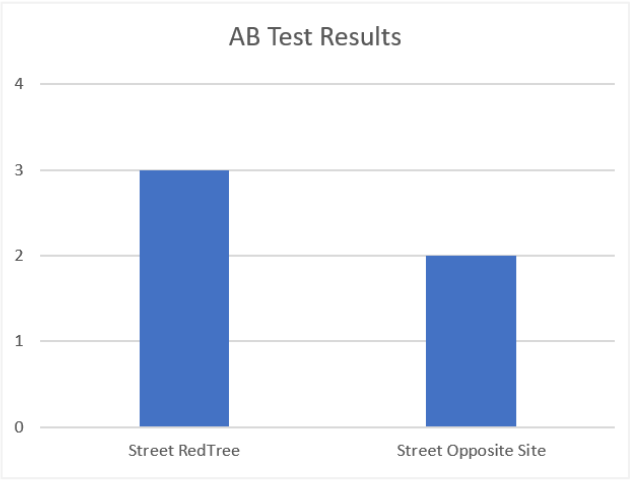
Street RedTree
Street Opposite Site

Model Names	Count	%
Street RedTree	3	60%
Street Opposite Site	2	40%

Note: Change the Chard regarding your data input

Filtered Results:

Street RedTree
Street Opposite Site
Street RedTree
Street Opposite Site
Street RedTree



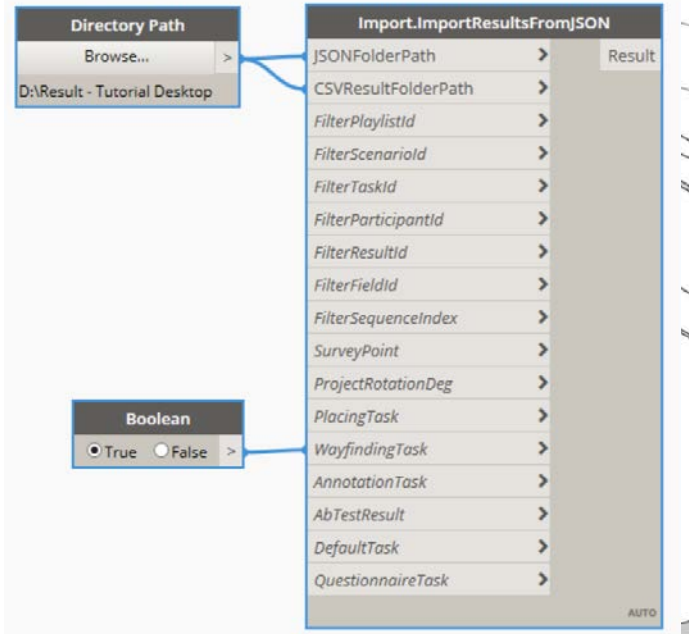
3.4 RESULT ANALYSIS: WAYFINDING

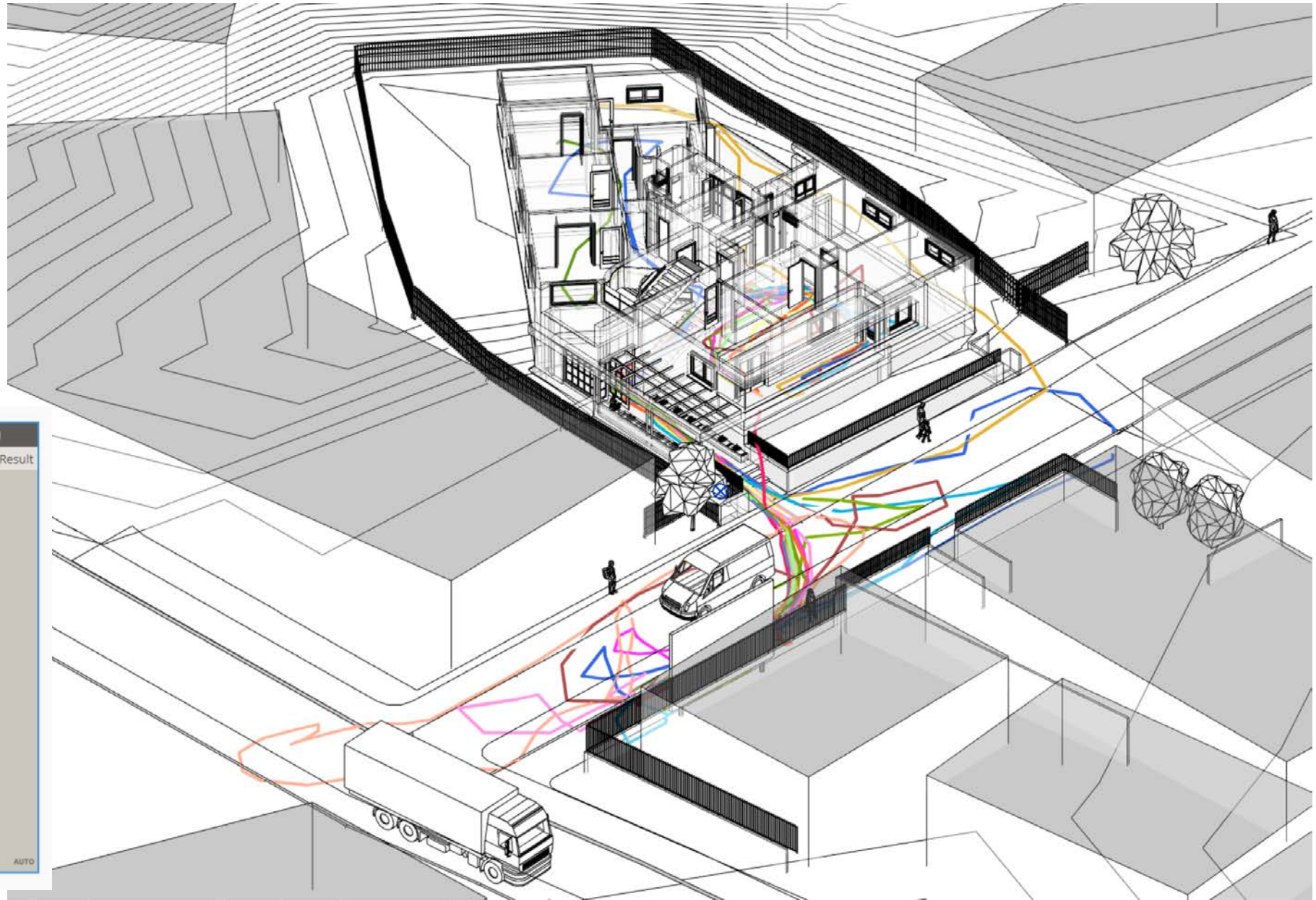
Revit

Wayfinding results are displayed as grouped lines. Per participant an individual colour is used.

With Dynamo more specific analysis like speed and HMD turns can be analysed.

<u>Recommendation</u>
Run the Dynamo script in manual mode.





3.4 RESULT ANALYSIS: WAYFINDING

CSV

Next to the travelled paths, a CSV file can be exported. The CSV file is generated by a Dynamo Script (package VREVAL).

Information about travelled to checkpoints and travel time can be calculated.

A Excel Template File *VR_Evaluation_Template_Wayfinding* can be used for predefined analysis. Copy the CSV data into the sheet *Wayfinding Results*.

The data can be filtered by Task ID.

The analysis tables can be modified.

Start Checkpoint by ID

Task ID	6			
	Sequence Index			
Participant ID	0	1	2	3
694	0	87	88	89
712	0	87	88	89
730	0	87	88	89
700	0	87	88	89
714	0	87	88	89
722	0	87	88	89
721	0	87	88	89

Start Checkpoint by Name

Task ID	6			
	Sequence Index			
Participant ID	0	1	2	3
694	car	street	tree	entrance
712	car	street	tree	entrance
730	car	street	tree	entrance
700	car	street	tree	entrance
714	car	street	tree	entrance
722	car	street	tree	entrance
721	car	street	tree	entrance

Time from Checkpoint to Checkpoint

Task	4			
	Sequence Index			
Participant ID	0	1	2	3
728	00:00:01	00:00:04	00:00:04	00:00:08
727	00:00:15	00:00:38	00:00:26	00:00:32
738	00:00:02	00:00:13	00:00:32	00:00:14
726	00:00:39	00:00:37	00:00:29	00:00:07
709	00:00:07	00:00:04	00:00:08	00:00:16
706	00:00:01	00:00:03	00:00:03	00:00:23
739	00:00:04	00:00:03	00:00:09	00:00:19
715	00:00:06			
719	00:00:01	00:00:37	00:00:03	00:00:19

End Checkpoint by ID

	Sequence Index			
Participant ID	0	1	2	3
694	87	88	89	86
712	87	88	89	86
730	87	88	89	86
700	87	88	89	86
714	87	88	89	86
722	87	88	89	183
721	87	88	89	86

End Checkpoint by Name

	Sequence Index			
Participant ID	0	1	2	3
694	street	tree	entrance	balcony
712	street	tree	entrance	balcony
730	street	tree	entrance	balcony
700	street	tree	entrance	balcony
714	street	tree	entrance	balcony
722	street	tree	entrance	backyard
721	street	tree	entrance	balcony

Start - End Checkpoint by ID

	Sequence Index			
Participant ID	0	1	2	3
694	0 - 87	87 - 88	88 - 89	89 - 86
712	0 - 87	87 - 88	88 - 89	89 - 86
730	0 - 87	87 - 88	88 - 89	89 - 86
700	0 - 87	87 - 88	88 - 89	89 - 86
714	0 - 87	87 - 88	88 - 89	89 - 86
722	0 - 87	87 - 88	88 - 89	89 - 183
721	0 - 87	87 - 88	88 - 89	89 - 86

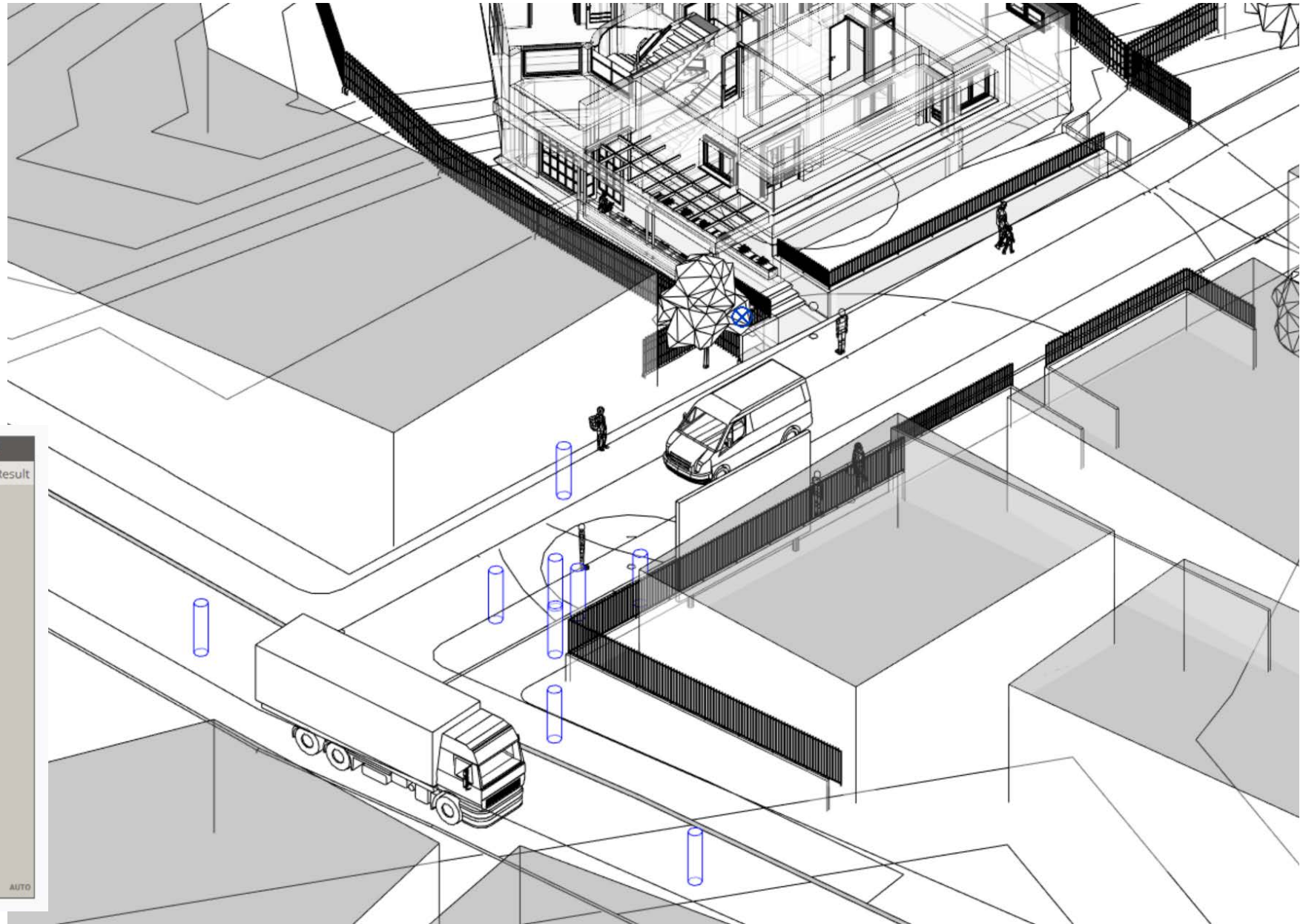
Start - End Checkpoint by Name

	Sequence Index			
Participant ID	0	1	2	3
694	car - street	street - tree	tree - entrance	entrance - balcony
712	car - street	street - tree	tree - entrance	entrance - balcony
730	car - street	street - tree	tree - entrance	entrance - balcony
700	car - street	street - tree	tree - entrance	entrance - balcony
714	car - street	street - tree	tree - entrance	entrance - balcony
722	car - street	street - tree	tree - entrance	entrance - backyard
721	car - street	street - tree	tree - entrance	entrance - balcony

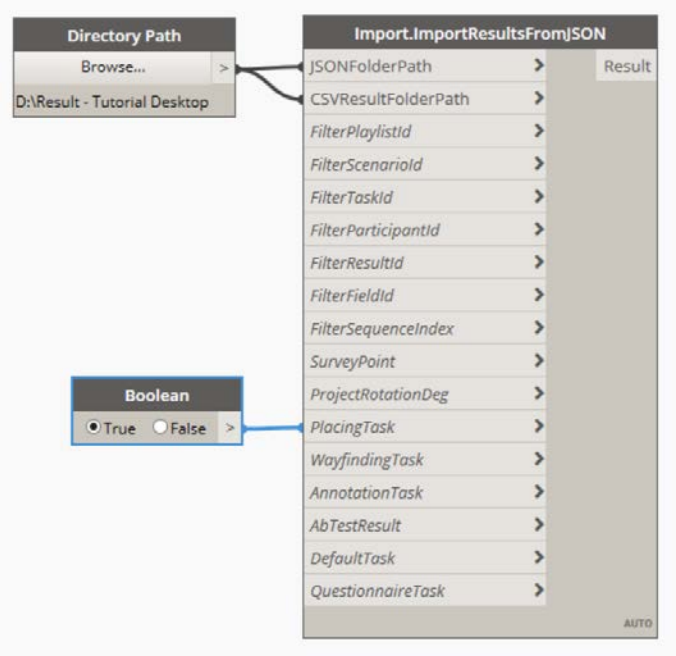
3.5 RESULT ANALYSIS: PLACING

Revit

Placing results are displayed as small pillars. The family VRRResultMarker can be modified.



<u>Recommendation</u>
Run the Dynamo script in manual mode.



3.6 RESULT ANALYSIS: ANNOTATION

Revit

Annotation results are displayed as small pillars. The family VRRResultMarker can be modified.

For an annotation form-field Selecting or Rating, a CSV file will be created for further analysis.

<u>Recommendation</u>
Run the Dynamo script in manual mode.