

Explainable Similarity Detector

Das AMOS Projekt - WS 2021/2022

Explainable Similarity Detector

User Documentation

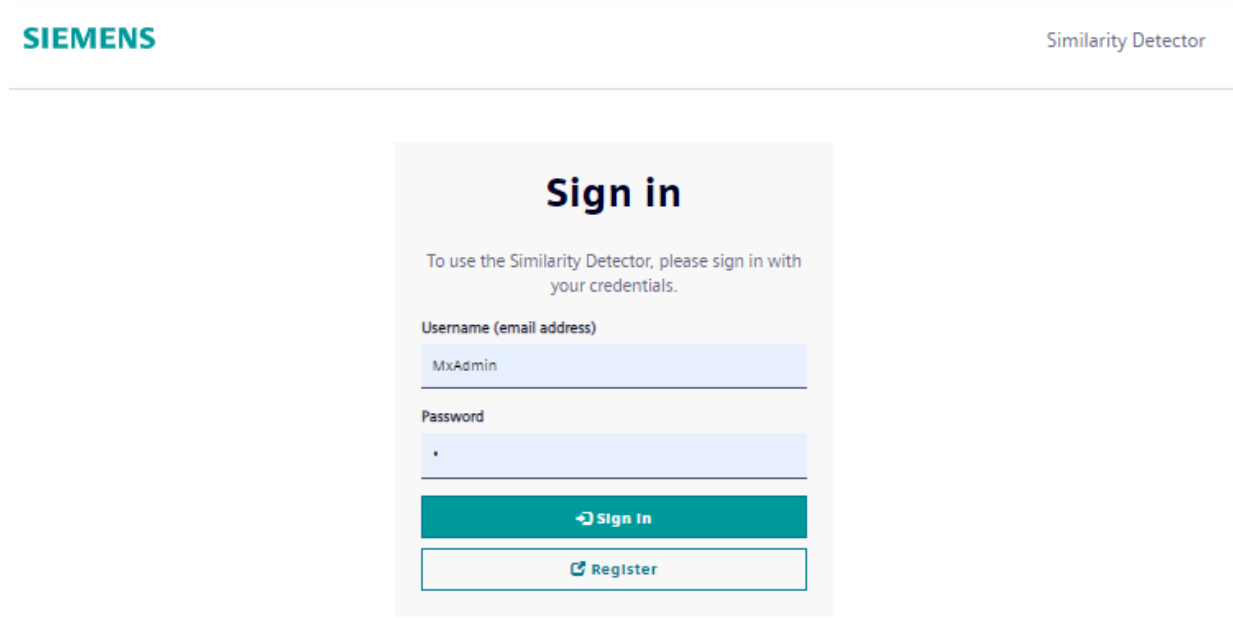
Project Team 06

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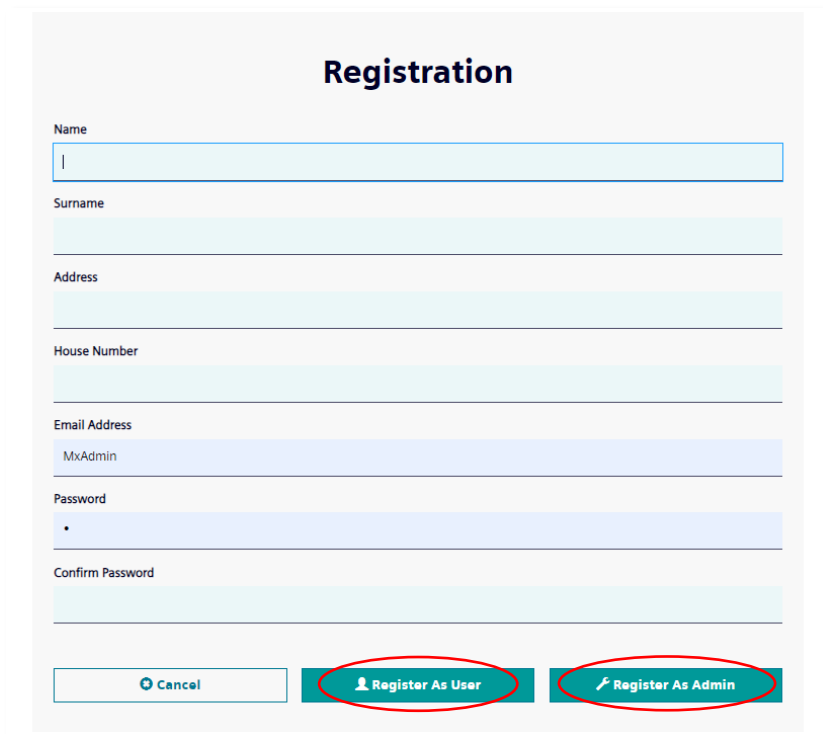
1. Sign In and User Account Creation

As the user clicks to get to the Explainable Similarity Tool he/she will first get asked to sign-in with his or her user credentials. If the user is new to the tool, the user needs to click on the **Register** Button.



The screenshot shows the 'Sign in' page of the Siemens Similarity Detector. The page has a white background with a light gray border. In the top left corner is the 'SIEMENS' logo in teal. In the top right corner is the text 'Similarity Detector' in a smaller teal font. The main content area is a light gray box with the title 'Sign in' in bold black text. Below the title is a subtitle: 'To use the Similarity Detector, please sign in with your credentials.' There are two input fields: 'Username (email address)' with the value 'MxAdmin' and 'Password' with a single dot. Below these fields are two buttons: a teal 'Sign In' button with a right-pointing arrow icon and a white 'Register' button with a teal right-pointing arrow icon.

On the **Registration** page the user is then asked to put in his/her credentials. The E-mail address will further be used as the username. The user is then asked to create a password and confirm it as well. After the new user has filled in all of his/her credentials, he/she then has to decide whether the/she wants to continue as a “regular” user or and administrator. Only the admin will have the full access to all pages and functionalities of the tool as it will be described further and the “regular” user will have a limited view.




























































The screenshot shows the 'Registration' page of the Siemens Similarity Detector. The page has a white background with a light gray border. The title 'Registration' is in bold black text. Below the title are several input fields: 'Name' (empty), 'Surname' (empty), 'Address' (empty), 'House Number' (empty), 'Email Address' (with the value 'MxAdmin'), 'Password' (with a single dot), and 'Confirm Password' (empty). At the bottom of the form are three buttons: a white 'Cancel' button, a teal 'Register As User' button with a user icon, and a teal 'Register As Admin' button with an admin icon. The 'Register As User' and 'Register As Admin' buttons are circled in red.

2. Similarity Search - Landing Page

After a successful log in , the user will land on the **Similarity Search** landing page. If the user signed-in as an administrator he/she will also see the tab for **Added Components** at the very top, as well as the **Sign Out** tab. If the user has a “regular” account he/she will only see the **Sign Out** tab next to the **Similarity Search** tab.

In the lower part, the user might see the results of the previous search presented in a table format.

Search Results			
Properties			
Component ID	Similarity Type	Difference In	
16	AIUpgrade	Product Height, Temp	  
17	AIUpgrade	Product Height	  
18	AIUpgrade	Product Height, Temp	  
19	AIUpgrade	Product Height, Temp	  
40	AIUpgrade	Product Height, Temp	  
41	AIUpgrade	Product Height	  
42	AIUpgrade	Product Height, Temp	  
43	AIUpgrade	Product Height, Temp	  
64	AIUpgrade	Product Height, Temp	  
65	AIUpgrade	Product Height	  
66	AIUpgrade	Product Height, Temp	  
67	AIUpgrade	Product Height, Temp	  
88	AIUpgrade	Product Height, Temp	  
89	AIUpgrade	Product Height	  
90	AIUpgrade	Product Height, Temp	  
91	AIUpgrade	Product Height, Temp	  
112	AIUpgrade	Product Height, Temp	  
113	AIUpgrade	Product Height	  
114	AIUpgrade	Product Height, Temp	  

3. Similarity Search - Filter Creation

On top in the very first part, the user can use the text fields to search for the specific components. Just with a partly description the search engine will be able to identify the according results. After the user clicks on the **Search Component** button, a popup open which displays the possible components that can be searched.

In the popup the user can click on one of the **Use** buttons to choose for which exact component he/she wants to find a similarity.

Below the text fields, the **Filter** area is displayed. If there haven't been any filters selected yet, nothing specific will be visible and the user needs to click on the down-side **arrow** button.

A **new filter tab** will open up and give the user the ability to add attributes that will have a filter/selection effect on the overall similarity search. With clicking on the **+** button, the filter will be added to the overall filter selection, as multiple filters can be combined to define the search result.

4. Similarity Search - Result Investigation

Finally if all desired filters are selected, through a click on the **Start Similarity Search** button the Similarity Search will start and accordingly the interaction with the backend and machine learning model.

SIMILARITY DETECTOR
New Similarity Search
 At this point, you can create a new search to find similar components. Use the filter function to narrow down the result set more precisely beforehand.

Component Type: Component Name:

Filters (1 applied)

New filter

Attribute: Operator: Value:

Currently added filters:

Attribute	Operator	Value
height	> (greater than)	10

filter query string: height_gte=10

The first column shows the unique ID of the similar component. In the second column **Similarity Type**. The different similarity types are displayed and sorted in the following order: A/Upgrade, A, A/Downgrade, B/Upgrade, B, B/Downgrade, C. In the third column, the attributes in which the found similar component differs to the original on, are displayed under **Difference In**.

Search Results

Properties

Component ID	Similarity Type	Difference In
5	A/Upgrade	Product Height, Temp

Through a click on the **Info** button, a new popup opens which shows the **Detailed View Component**.

Here all detailed attributes of both components are listed and are put next to each other in two columns. Now the user can really investigate both components and look at all the similarities and also, left-over differences.

Detailed View Component

Name	Component 1	Component 2
Component_PDF	https://assets.new.siemens.com/siemens/assets/api/uid:796202e2-ab97-44a-fa1cb-b28e56c44657/pdf/mc-b10077-01simaticmic-ro-drive-144.pdf	https://assets.new.siemens.com/siemens/assets/api/uid:796202e2-ab97-44a-fa1cb-b28e56c44657/pdf/mc-b10077-01simaticmic-ro-drive-144.pdf
DC_Rated_Voltage		1324.2029063684774
Depth	20.77306944152861	12.463841664917169
Height	37.88721650258231	22.32639543902172
Length	14.330450261311034	8.59827015678662
Maximum_Height		10.58449756588675
Maximum_Storage_Temperature	486.5612831647063	
Minimum_Storage_Temperature	60.421949905991205	
Name	Capacitor_23	Capacitor_5
Negative_Capacitance_Tolerance		-676.8814580508956
Number_Of_Reflow_Cycle	7.26632700674722	
Number_Of_Terminals	49.288381040183424	49.288381040183424
Positive_Capacitance_Tolerance		609.8663597918205
Price	0.06972	0.04359
V_Nominal	1777.5603939576615	2539.371991368088
Value	955324.6745059713	14011.428559420912
Voltage	1016.063835702906	2032.127671405812

Through a click on the **PDF** button, a linked PDF will be shown which displays the manufacturer description of the component.



5. Similarity Search - Adding New Component

At the very bottom, two more buttons are displayed.



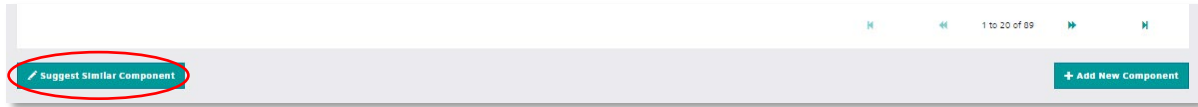
Through a click on the **Add New Component** button.

The user can add a new component and enter all attributes for it.

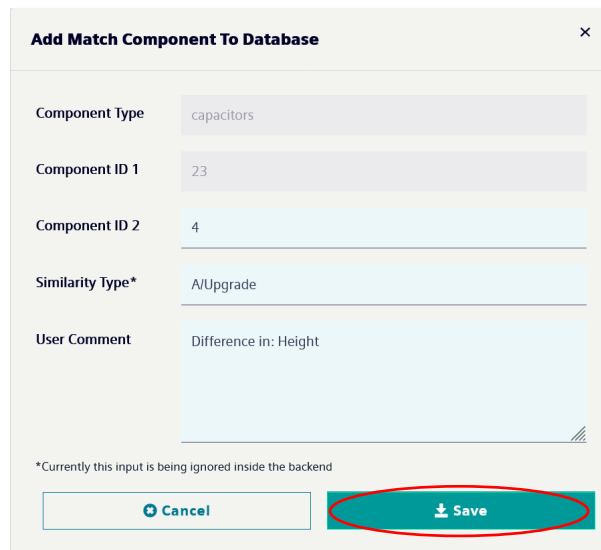
 A screenshot of the "Add Component" dialog box. It features a "Component type" dropdown menu set to "capacitors". Below this is a "Name" text field containing "test_capacitor". A series of input fields follow for "Number of terminals" (5.00), "Height" (10.00), "Voltage" (12.00), "Maximum dissipation factor" (3), "Dc rated voltage" (0.00), "Diameter" (20), "Ripple current" (0), and "Length" (0.00). At the bottom, there is a "Price" field with "0.20" and a "Component pdf" field. The "Save" button at the bottom right is highlighted with a red circle.

6. Similarity Search - Suggest Similar Component

Als the user can click on the **Suggest Similar Component** button.

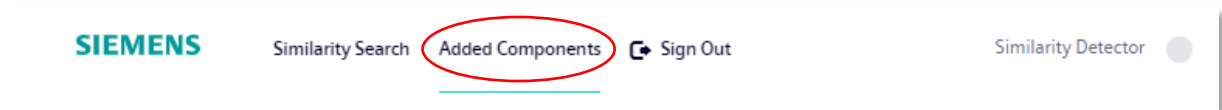


After clicking on the **Suggest Similar Component** button, the user can recommend a similarity from another already existing component to the searched component if his/her knowledge suggests this way. For this similarity he user can define a similarity type and leave an additional comment if necessary.

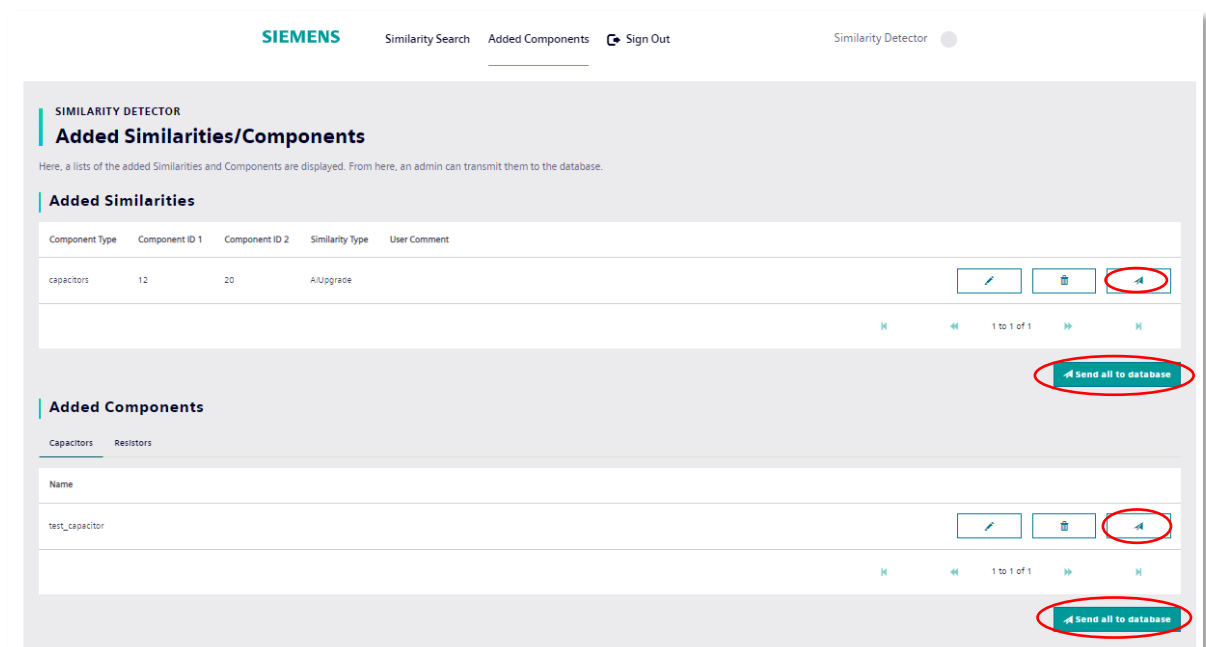
A screenshot of a dialog box titled 'Add Match Component To Database'. The dialog box has a light gray background and a close button (X) in the top right corner. It contains several input fields: 'Component Type' with the value 'capacitors', 'Component ID 1' with the value '23', 'Component ID 2' with the value '4', 'Similarity Type*' with the value 'A/Upgrade', and 'User Comment' with the value 'Difference in: Height'. At the bottom, there is a note: '*Currently this input is being ignored inside the backend'. Below the note are two buttons: 'Cancel' and 'Save'. The 'Save' button is circled in red.

7. Added Components – Database Verification

If the user is signed with an administrator role he/she now also has the opportunity to select the **Added Components** tab.



There, the user now has the ability to review all the added components and added/suggested similarities that were added/recommended by him/her or any other “regular” user previously. The administrator can decide if he/she wants to edit the added similarities and components again or deny/delete them. If the administrator approves the added similarities and components, he/she can either send them individually or collectively to the database by clicking on the according button.



Finally, the user can always leave the Explainable Similarity Detector tool properly at any point by clicking on the **Sign Out** button.

