# A Tutorial on *IFCdiff* and *IFCdiff* viewer

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*IFCdiff* implements a content-based automatic comparison algorithm for detecting differences between two IFC files. In order to visualize the compared models and their differences. *IFCdiff* viewer can pop up two imported IFC models, where the matching building elements are highlighted with the same color. This enables users to check the visual differences and changes between IFC models quickly.

### Availability

The executable program for Windows platform and tested models are available from <a href="http://cgcad.thss.tsinghua.edu.cn/liuyushen/ifcdiff/">http://cgcad.thss.tsinghua.edu.cn/liuyushen/ifcdiff/</a>

### System Requirements

Source code was written to perform tracking differences or detecting changes between two IFC files, as well as visualizing the results.

The code was developed and tested using Microsoft Visual C++ 2010 on a Windows 8 system.

REQUIRED INSTALLATIONS: -Microsoft Visual C++ 2010 -MICROSOFT FOUNDATION CLASS (MFC) LIBRARY

### Data set

For showing how our algorithm works, we provided some examples. See <u>http://cgcad.thss.tsinghua.edu.cn/liuyushen/ifcdiff/.</u>

### **Operation IFC diff**

### 1. Execute IFCdiff.exe

A IFCdiff	- • •
Ignore GUID Ignore Owner History Info Ignore Order Change of Property	Set
Target File Source File	
File Name: Open File Name:	Open
Compare 0%	100%
	*
	-
<	4

### 2. Open two IFC files to be compared.

Target File: File Name→ Open. Source File: File Name→ Open For example, open 'FileA.ifc' and 'FileB.ifc'.

A IFCdiff	
Ignore GUID Ignore Owner History Info Ignore Order Change of Property S	Set
Target File Source File	
File Name: FileA.ifc Open File Name: FileB.ifc	Open
Compare 0%	100%
	*
•	

#### 3. Compare these two IFC files.

Click the button "Compare" to begin the comparison between two imported IFC files.

A IFCdiff	<b>x</b>
🗐 Ignore GUID 📄 Ignore Owner History Info 📄 Ignore Order Change of Property Set	
Target File Source File	
File Name:     FileA.ifc     Open     File Name:     FileB.ifc     Open	pen
Compare 0%	100%
<pre>#Target File Total Instances: 6780 #Target File Matching Instances: 3863 Similarity Rate: 56.9764%. #Missing Instances: 2917 Missing Rate: 43.0236%. #Added Instances: 2923 Addition Rate: 43.1121%.</pre>	*
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# 4. Compare two IFC files while ignoring GUID, Owner History Information, or Order Change of Property Set

To improve the robustness of our algorithm, the tool can complete the comparison while ignore GUID, Owner History Information, or Order Change of Property Set. The user can click the checkbox to ignore the corresponding items.

Ignore GUID       Ignore Owner History Info       Ignore Order Change of Property Set         Target File       Source File	
Target File Source File	
File Name:     FileA.ifc     Open     File Name:     FileB.ifc     Open	
Compare 0% 100	%
#Target File Total Instances: 6780 #Target File Matching Instances: 3863 Similarity Rate: 56.9764%. #Missing Instances: 2917 Missing Rate: 43.0236%. #Added Instances: 2923 Addition Rate: 43.1121%.	*
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## **Operation IFC diff viewer**

### 1. Execute "IFCdiff viewer.exe"

IFCdiff Viewer	
Ignore GUID     Ignore Owner History Info     Ignore Order Change of Propert       Target File     open     3DView       File Name     File Name	y Set Open 3DView Matching Instances
compare 0%	Source Item     Matching Item
Statistics         Similarity Rate(%):         #Matching Instances:         #Total Instances:	Addition Rate(%):

### 2. Open two IFC files to be compared.

Target File: File Name→ Open. Source File: File Name→ Open For example, open '**FileA.ifc**' and '**FileB.ifc**'.

	I	Cdiff Viewer			×
Ignore GUID Ignore Owner History Target File Open Open	Info Ignore Order Change	of Property Set	3DView	-Matching Instance	IC
File Name: FileA.ifc	File Name:	FileB.ifc		Source Item	Matching Item
compare 0%			100%		
Statistics					
Similarity Rate(%):	Missing Rate(%):	Addition Rate(%):			
#Matching Instances:	#Missing Instances:	#Added Instances:			
#Total Instances:					

### 3. Compare these two IFC files.

Click the button **Compare** to begin the comparison between two imported IFC files.

E IFCdiff Viewer		×
☐ Ignore GUID ☐ Ignore Owner History Info ☐ Ignore Order Change of Property Set		
Target File open 3DView Source File open 3DView	Matching Instance	95
File Name: FileA.ifc File Name: FileB.ifc	Source Item	Matching Item 🔺
	#92	#97
compare 0%100%	#4188	#4144
#022_TECCARTECIANDOINT(/ 20 200 246 701 2007 574)) #025_TECCARTECIANDOINT/( 20 200 246 701 2007 574))	#604	#607
#022-IFCCARTESIANPOINT((-26.390,-270./91,200/.3/4)), # #023-IFCCARTESIANPOINT((-26.390,-270./91,200/.3/4)), # #029-IFCCARTESIANPOINT((-28.390,-270./91,200/.3/4)), # #029-IFCCARTESIANPOINT((-28.390,-270./91,200/.3/4)),	#540	#543
#995=IFCCARTESIANPOINT((-28.399,-257.315,2087.574)); #998=IFCCARTESIANPOINT((-28.399,-257.315,2087.574));	#4636	#4592
#793=IFCCARTESIANPOINT((-30.19,-205.767,0.)); #796=IFCCARTESIANPOINT((-30.19,-205.767,0.));	#1052	#1055
#829=IFCCARTESIANPOINT((-30.19,-205.767,2087.574)); #822=IFCCARTESIANPOINT((-30.19,-205.767,2087.574)); #7207_IFCCARTESIANPOINT((-31.79,-205.767,2087.574));	#860	#863
#707=IFCCARTESIANPOINT((-31.751-241.528,087.574)): #750=IFCCARTESIANPOINT((-31.751-241.528,087.574)):	#988	#991
#865=IFCCARTESIANPOINT((-315.741,776.403,2087.574)); #868=IFCCARTESIANPOINT((-315.741,776.403,2087.574));	#561	#564
#900=IFCCARTESIANPOINT((-315.741,776.403,2100.)); #903=IFCCARTESIANPOINT((-315.741,776.403,2100.));	#4657	#4613
#1033=IFCCARTESIANPOINT((-32.315,-196.601,0.)); #1036=IFCCARTESIANPOINT((-32.315,-196.601,0.));	#917	#820
#1039=IFCCARTESIANPOINT((-32.515,-196.001,2067.574)) #1039=IFCCARTESIANPOINT((-32.515,-196.001,2067.574)) #709=IFCCARTESIANPOINT((-32.071.511.302.0.)) #709=IFCCARTESIANPOINT((-32.071.511.302.0.))	#120	#122
#828=FCCARTESIANPOINT((-33.071,-211.302,2087.574)); #831=IFCCARTESIANPOINT((-33.071,-211.302,2087.574));	#129	#132
#788=IFCCARTESIANPOINT((-34.139,-235.764,0.)); #791=IFCCARTESIANPOINT((-34.139,-235.764,0.));	#4223	#4101
#824=IFCCARTESIANPOINT((-34.139,-235.764,2087.574)); #827=IFCCARTESIANPOINT((-34.139,-235.764,2087.574));	#041	#644
#/91=IFCCARTESIANPOINT((-34.94/,-21/.252,0.)); #2927=IFCCARTESIANPOINT((-34.94/,-21/.252,0.)); #2927=IFCCARTESIANPOINT((-34.94/,-21/.252,0.));	#1153	#1156
#448=EFCCARTESIANPOINT((-3455-144, 1469)): #459=EFCCARTESIANPOINT((-3455494)244, 1469))	#833	#836
#461=IFCCARTESIANPOINT((-345.55,-144.,1609.)); #463=IFCCARTESIANPOINT((-345.549993294,-144.,1609.))	#961	#964
#429=TECCARTESTANPOINT((-345.55144180)): #431=TECCARTESTANPOINT((-345.549993294144180)): #	#857	#860
	#985	#988
Statistics	#128	#131
Similarity Rate(%): 55.9587% Missing Rate(%): 44.0413% Addition Rate(%): 42.5959%	#4224	#4180
	#640	#643
#Matching Instances: 3794 #Missing Instances: 2986 #Added Instances: 2888	#1152	#1155
	#960	#963
#Total Instances: 6780	<	
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In the main interface of *IFCdiff* viewer, the corresponding differences of two input IFC files are highlighted in the text boxes in the middle, the similarity metrics and a summary of the analysis are given at the bottom, and the matching data entities between two files are listed on the right.

# 4. Compare while ignoring GUID, Owner History Information, or Order Change of Property Set

IFCdiff Viewer		
□ Ignore GUID Ignore Owner History Info □ Ignore Order Change of Property Set		
Target File open 3DView Source File open 3DView	Matching Instance	es
File Name: FileA.lfc File Name: FileB.lfc	Source Item	Matching Item 🔷
	#91	#96
compare 0%100%	#603	#606
#007-TECCAPTECIANDOINT/( 1 422 211 952 1212 625)) # #000-TECCAPTECIANDOINT/( 1 422 211 952 1212 625))	#4699	#4646
984=IFCCARTESIANPOINT((-1.433,-311.853,1336.885)); #987=IFCCARTESIANPOINT((-1.433,-311.853,1336.885));	#539	#542
#960=IFCCARTESIANPOINT((-1.433,-311.853,2037.87)); #963=IFCCARTESIANPOINT((-1.433,-311.853,2037.87));	#4635	#4582
#959=IFCCARTESIANPOINT((-1.433,-311.853,298.225)); #962=IFCCARTESIANPOINT((-1.433,-311.853,298.225));	#1051	#1054
/80=IFCCARTESIANPOINT((-1.501,-200./01,0.)); ##83=IFCCARTESIANPOINT((-1.501,-200./01,0.)); #816=IFCCARTESIANDOINT((-1.51,-260.761,2087,574)); #810=IFCCARTESIANDOINT((-1.501,-200./01,0.));	#5147	#5086
796=IFCCARTESIANPOINT((-10.764,-190.861,0.)); #799=IFCCARTESIANPOINT((-10.764,-190.861,0.));	#859	#862
832=IFCCARTESIANPOINT((-10.764,-190.861,2087.574)); #835=IFCCARTESIANPOINT((-10.764,-190.861,2087.574));	#4955	#4902
<pre>#92=IFCCARTESIANPOINT((-1000,-1500.)); #93=IFCCARTESIANPOINT((-1000,-1500.));</pre>	#987	#990
100=IFCCARTESIANPOINT((-1000,-100.35,0.)); #103=IFCCARTESIANPOINT((-1000,-100.35,0.)); 104=IFCCARTESIANPOINT((-1000,-180.55,1500)); #103=IFCCARTESIANPOINT((-1000,-180.55,1500));	#560	#563
+99=IFCCARTESIANPOINT((-1000,-225,0.)); #102=IFCCARTESIANPOINT((-1000,-225,0.));	#4656	#4603
103=IFCCARTESIANPOINT((-1000.,-225.,1500.)); #106=IFCCARTESIANPOINT((-1000.,-225.,1500.));	#816	#819
91=FCCARTESIANPOINT((-1000,0.)); #90=FCCARTESIANPOINT((-1000,0.)); 192=FCCARTESIANPOINT((-1000,0.0.)); #101=FCCARTESIANPOINT((-1000,0.0.));	#4912	#4859
96=FCCARTESIANPOINT((-100,,0,.), #199=FCCARTESIANPOINT((-100,,0,.), 96=FCCARTESIANPOINT((-100,,0,.)):	#128	#131
635=IFCCARTESIANPOINT((-1001.319,-181.281,1988.166) #638=IFCCARTESIANPOINT((-1001.319,-181.281,1988.166)	#640	#643
634=IFCCARTESIANPOINT((-1001.319,-181.281,99.408)); #637=IFCCARTESIANPOINT((-1001.319,-181.281,99.408));	#4736	#4683
636=IFCCAR IESIANPOIN ((-1001.319,-268.719,1988.166) #637=IFCCAR IESIANPOIN ((-1001.319,-268.719,1988.166) #637=IFCCAR IESIANPOINT ((-1001.319,-268.719,09.408)) * #640=IFCCAR IESIANPOINT ((-1001.319,-268.719,09.408)) *	#1152	#1155
	#832	#835
Statistics	#4928	#4875
Similarity Data(%): 72 2004% Missing Rata(%): 26 6116% Addition Reta(%): 26 616%	#960	#963
Addition Rate(%): 25.1660%	#856	#859
#Matching Instances: 4975 #Missing Instances: 1804 #Added Instances: 1706	#4052	#4800
	#084	#097
#Total Instances: 6779	#904	#90/
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Similar to *IFCdiff*, *IFCdiff viewer* can also achieve the comparing results while ignoring GUID, Owner History Information, or Order Change of Property Set by clicking the corresponding checkbox.

#### 5. Click the button 3dView to see corresponding 3D models.

By clicking the button **3DView** of each file, the viewers of 3D models will pop up, where the matching building elements are highlighted with the same color. This facilitates users to locate the differences of these two IFC files in model level.

IFCdiff Viewer		
Ignore GUID     Ignore Owner History Info     Ignore Order Change of Property Set       Target File     open     3DView   Source File Open	– Matching Instanc	es
File Name: FileB.ifc	Source Item #92	Matching Item ^ #97
compare 0% 1004 #988=IFCCARTESIANPOINT((-1.433,-311.853,1212.625));	% #4188 #604	#4144 #607
#985=IFCCARTESIANPOINT((-1.433,-311.853,1336.885)); #961=IFCCARTESIANPOINT((-1.433,-311.853,2037.87)); #960=IFCCARTESIANPOINT((-1.433,-311.853,2097.27)); #960=IFCCARTESIANPOINT((-1.433,-311.853,2097.25));	#540 #4636 #1052	#543 #4592 #1055
#781=IFCCARTESIANPOINT((-1.561, 260.761,0.)); #817=IFCCARTESIANPOINT((-1.561, 260.761,0.87.574)); #879=IFCCARTESIANPOINT((-1.561, 260.761,2087.574)); #797=IFCCARTESIANPOINT((-10.764, -190.861,0.));	#1032 #860 #988	#863 #991
#833=IFCCARTESIANPOINT((-10.764,-190.861,2067.574)); #93=IFCCARTESIANPOINT((-1000,-1500.)); #101=IFCCARTESIANPOINT((-1000,-1500.)); #101=IFCCARTESIANPOINT((-1000,-1500.));	#561 #4657	#564 #4613
#105=IFCCARTESIANPOINT((-1000,-180.55,1500.)); #109=IFCCARTESIANPOINT((-1000,-225,0.)); #109=IFCCARTESIANPOINT((-1000,-225,0.)); #104=IFCCARTESIANPOINT((-1000,-225,0.)); #104=IFCCARTESIANPOINT((-1000,-225,0.));	#817 #129	#820 #132
#10+=1rCCARTESIANPOINT((-1000,-22:3,1300.)); #92=IFCCARTESIANPOINT((-1000,-0.)); #99=IFCCARTESIANPOINT((-1000,-0.)); #10=IFCCARTESIANPOINT((-1000,-0.));	#4225 #641	#4181 #644
#9/=IFCCAR IESIANPOINT((-100.,1500.)); #636=IFCCARTESIANPOINT((-101.319,-181.281,1988.166) #635=IFCCARTESIANPOINT((-101.319,-181.281,99.408)); #638=IFCCARTESIANPOINT((-101.319,-181.281,99.408));	#1153 #833 #061	#1156 #836 #064
#637=IFCCARTESIANPOINT((-1001.319,-268.719,1988.166) #638=IFCCARTESIANPOINT((-1001.319,-268.719,994.08)): < < > > < < > > < < > > < > > < > > < > > < > > < >	#901 #857 #985	#904 #860 #988
Statistics Similarity Rate(%): 55,9587% Missing Rate(%): 44,0413% Addition Rate(%): 42,5050%	#128 #4224	#131 #4180
#Matching Instances: 3794 #Missing Instances: 2986 #Added Instances: 2888	#640 #1152	#643 #1155
#Total Instances: 6780	#960 <	#963 🗸

