

mid Moulding
Innovation
Day 2023

Moldex3D 2023 API – CAE Automation

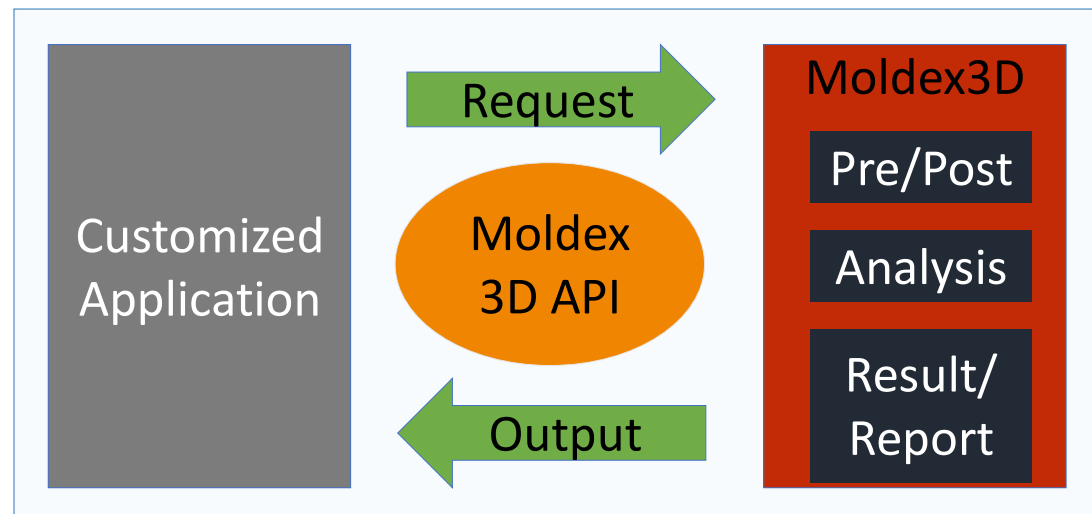
Ethan Chiu | 2023/06/20

Moldex3D



API

- Application Programming Interface



- Workflow

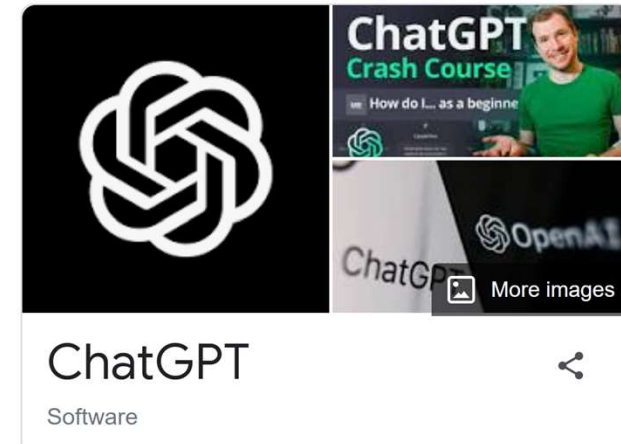
- Manual: Manipulate an Application via user interface
- API: (End User) > Programming > API > Manipulate Studio Application


What's API

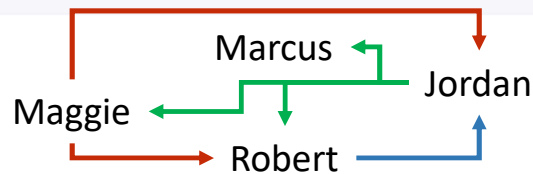


What's API

E what's is api

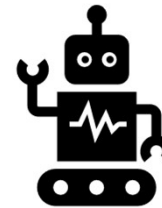


 API stands for Application Programming Interface. It is a set of protocols, routines, and tools used to build software applications, and it specifies how different software components should interact with each other. APIs allow different software programs to communicate and share data with each other, which makes it easier to create complex applications that leverage the functionality of multiple systems.



Benefits

- Automation
 - Reduce Manual effort
- Integration
 - with your system
 - for Product Lifecycle Management(PLM), ERP, MES
 - with other CAD/CAE software
 - for Optimization, Structure Analysis, AI simulation
 - IOT



Where can the Studio API be applied?



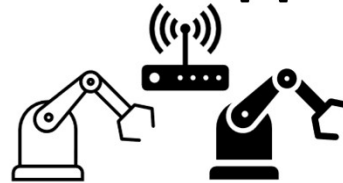
Web
PLM
System



Desktop
CAD/ CAE
Software



Cloud
Computing



IOT / Digital Twin
Injection Machine
Mold Temperature Controller
3D Scanner



AI



Report
Table,
Plot Figure

Studio API

Where can the Studio API be applied?

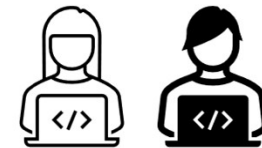
Automation

CAE Report x1000+

PROVIDE INJECTION
MOLDING ANALYSIS
REPORT

1000+

mold/year



Manpower and Time Cost



30 ~ 100+

X 1000+



0.5 ~ 4 HR

How Moldex3D uses Moldex3D API internal?

- Verification & Validation

1. Auto Test
2. Material Center
 - Material Digital Twin
3. Solver Team – Solver Accuracy
4. Molding Center
 - Digital Twin
 - Comparison – Real vs. Virtual (Digital)



“Hey Studio”

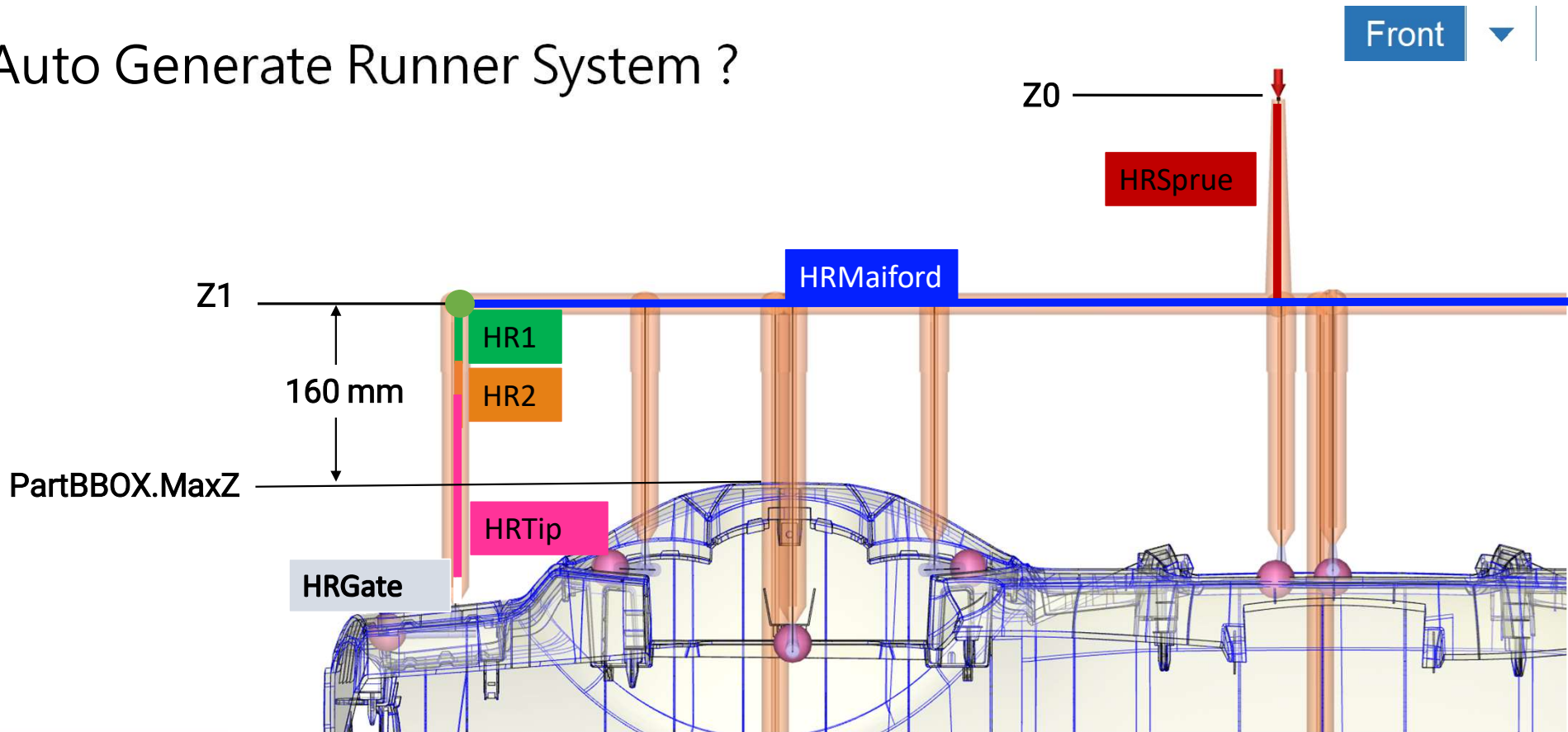


Run Script

Now! Build your first App/Plug-in

What can Studio APIs do for you?

- Auto Generate Runner System ?

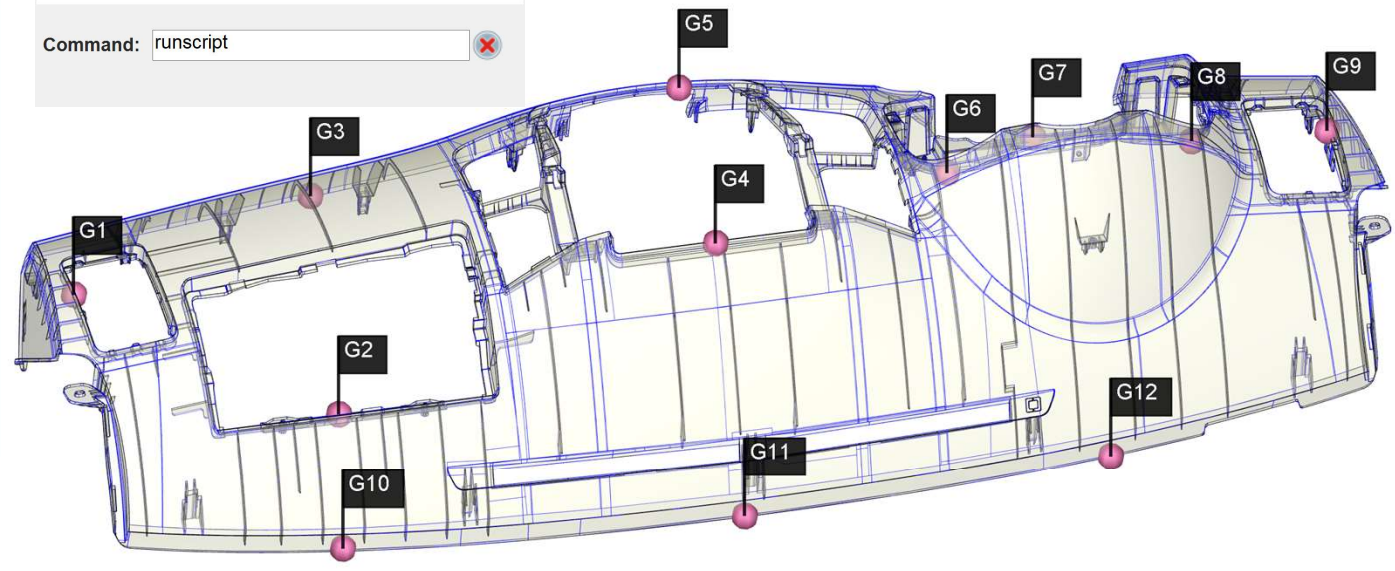


<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
<input type="checkbox"/> Value	<input type="checkbox"/> Value	<input type="checkbox"/> Coolant Inlet	<input type="checkbox"/> Valve Gate	<input type="checkbox"/> Controller ID	<input type="checkbox"/> Remark	<input checked="" type="checkbox"/> Ruler	<input type="checkbox"/> Weld Line	<input checked="" type="checkbox"/> Anchor Plane
<input checked="" type="checkbox"/> Location	<input type="checkbox"/> Location	<input type="checkbox"/> Heating Rod	<input type="checkbox"/> Sensor Node			<input checked="" type="checkbox"/> Coordinate		
Max/Min	Probe		ID	Legend	Graphics	Molding Defect	Reference Plane	

WCS Perspective

- Model
 - Part(1)
 - Probe Node(12)
 - Gate
 - G1
 - G2
 - G3
 - G4
 - G5
 - G6
 - G7
 - G8
 - G9
 - G10
 - G11
 - G12

Command line input
Command:



70.00 mm
54
357
163

Command < Close WIZARD >

<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
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WCS Perspective

Model

- Part(1)
- Probe Node(12)
 - Gate
 - G1
 - G2
 - G3
 - G4
 - G5
 - G6
 - G7
 - G8
 - G9
 - G10
 - G11
 - G12

Open

Look in: From Willie

Name	Date modified	Type
demo_rnr_script	11/5/2021 7:06 PM	File folder
AutoGenRunnerSystem.py	11/5/2021 11:00 AM	Python File
AutoGenRunnerSystemE.py	11/9/2021 1:49 PM	Python File

File name:

Files of type: Python File(*.py)

Open Cancel

Model(Model)

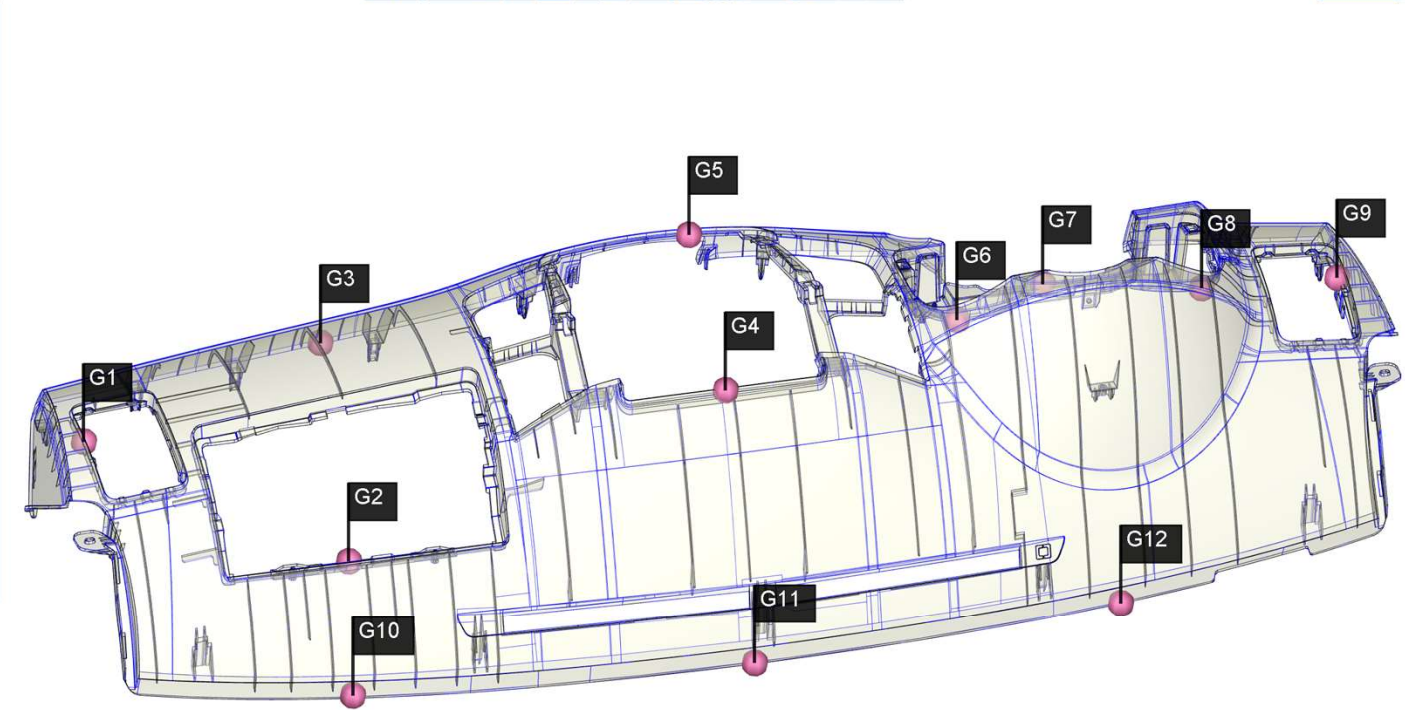
70.00 mm

<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
<input type="checkbox"/> Value	<input type="checkbox"/> Value	<input type="checkbox"/> Coolant Inlet	<input type="checkbox"/> Valve Gate	<input type="checkbox"/> Controller ID	<input type="checkbox"/> Remark	<input checked="" type="checkbox"/> Ruler	<input type="checkbox"/> Weld Line	<input checked="" type="checkbox"/> Anchor Plane
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Max/Min	Probe		ID	Legend	Graphics	Molding Defect	Reference Plane	

WCS Perspective

Model

- Part(1)
- Probe Node(12)
 - Gate
 - G1
 - G2
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 - G5
 - G6
 - G7
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 - G11
 - G12



Model(Model)

70.00 mm **Moldex3D**

54
357
163

Command < Close WIZARD >

<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
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Max/Min	Probe		ID	Legend	Graphics	Molding Defect	Reference Plane	

WCS Perspective

- Model
 - Part(1)
 - Cold Runner(1)
 - Curve 14
 - Probe Node(12)
 - Gate
 - G1
 - G2
 - G3
 - G4
 - G5
 - G6
 - G7
 - G8
 - G9
 - G10
 - G11
 - G12
 - Boundary Conditon...
 - Point 15 - Melt Inlet



```

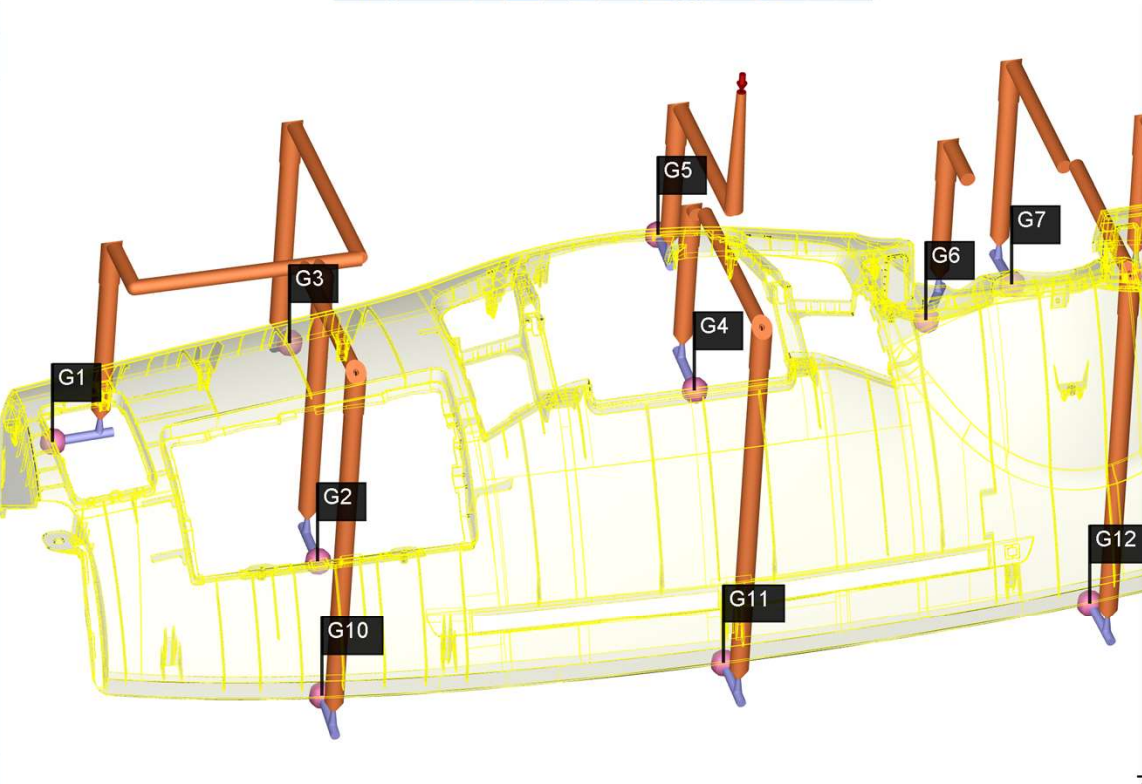
C:\Moldex3D\2022\Bin\MDXRunScript.exe
// typelib uuid: {3D9C4644-FC4E-478C-8B...}
// instance id: {8A058C09-5B39-4105-AC...}
// script file: D:\MDXWorkingFolder\Fro...
//////////////////////////////////////////////////////////////////
Imported module: <module 'module.run_sc...
Make Studio COM module: success
Get Studio instance: success
Run script ...
Get parts information...
Get cold runner gate position by probe
Stop runner preview joint update.
Create cold runner...
    
```

Command < Add pin gate >

<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
<input type="checkbox"/> Value	<input type="checkbox"/> Value	<input type="checkbox"/> Coolant Inlet	<input type="checkbox"/> Valve Gate	<input type="checkbox"/> Controller ID	<input type="checkbox"/> Remark	<input checked="" type="checkbox"/> Ruler	<input type="checkbox"/> Weld Line	<input checked="" type="checkbox"/> Anchor Plane
<input checked="" type="checkbox"/> Location	<input type="checkbox"/> Location	<input type="checkbox"/> Heating Rod	<input type="checkbox"/> Sensor Node			<input checked="" type="checkbox"/> Coordinate		
Max/Min	Probe		ID	Legend	Graphics	Molding Defect	Reference Plane	

WCS Perspective

- Model
 - Part(1)
 - Cold Runner(48)
 - Curve 17
 - Curve 18
 - Curve 19
 - Curve 23
 - Curve 24
 - Curve 25
 - Curve 29
 - Curve 30
 - Curve 31
 - Curve 35
 - Curve 36
 - Curve 37
 - Curve 41
 - Curve 42
 - Curve 43
 - Curve 47
 - Curve 48
 - Curve 49



```

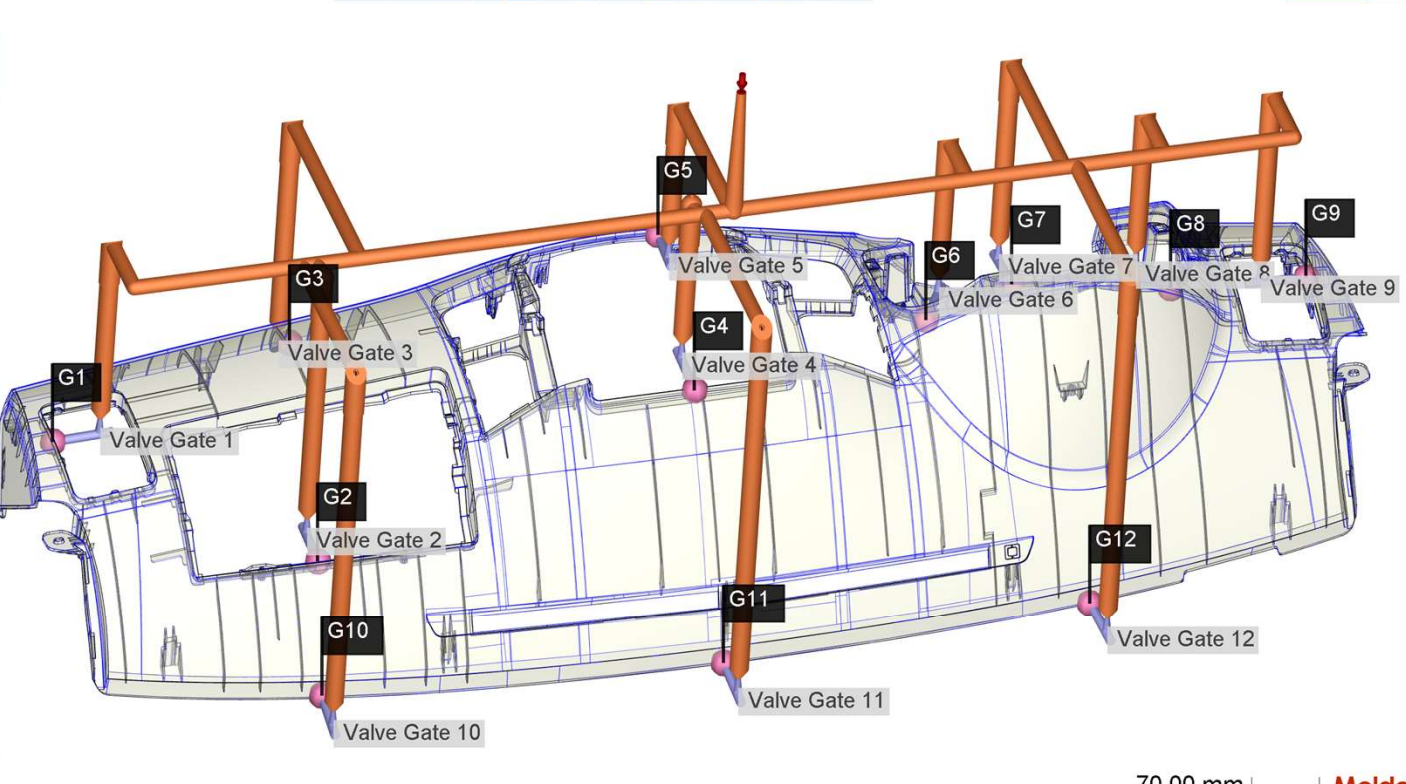
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// typelib uuid: {3D9C4644-FC4E-478C-8B...}
// instance id: {8A058C09-5B39-4105-AC...}
// script file: D:\MDXWorkingFolder\Fro...
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Imported module: <module 'module.run_sc...
Make Studio COM module: success
Get Studio instance: success
Run script ...
Get parts information...
Get cold runner gate position by probe
Stop runner preview joint update.
Create cold runner...
Create hot runner sprue...
Create melt entrance node...
Create hot runner tip...
Create hot runner manifold...
    
```

Command < Add pin gate >

<input type="checkbox"/> Name	<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Melt Inlet	<input type="checkbox"/> Gate	<input type="checkbox"/> Part	<input type="checkbox"/> Run ID	<input type="checkbox"/> Construction Plane	<input type="checkbox"/> Air Trap	<input checked="" type="checkbox"/> Flatness
<input type="checkbox"/> Value	<input type="checkbox"/> Value	<input type="checkbox"/> Coolant Inlet	<input checked="" type="checkbox"/> Valve Gate	<input type="checkbox"/> Controller ID	<input type="checkbox"/> Remark	<input checked="" type="checkbox"/> Ruler	<input type="checkbox"/> Weld Line	<input checked="" type="checkbox"/> Anchor Plane
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Max/Min	Probe		ID	Legend	Graphics	Molding Defect	Reference Plane	

WCS Perspective

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 - Curve 47
 - Curve 48
 - Curve 49



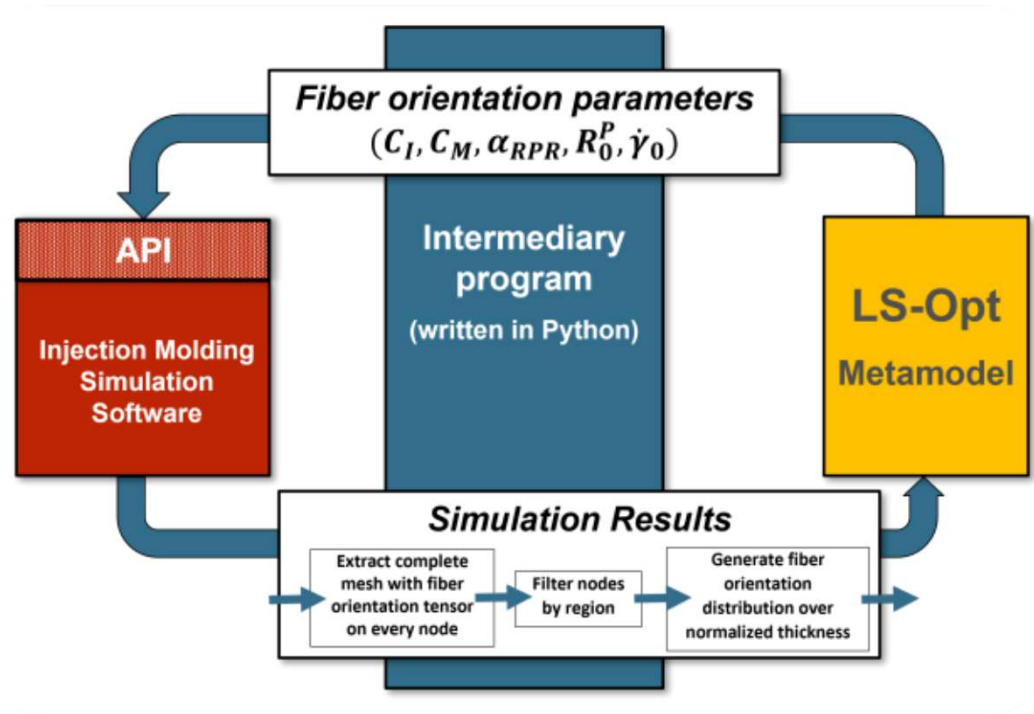
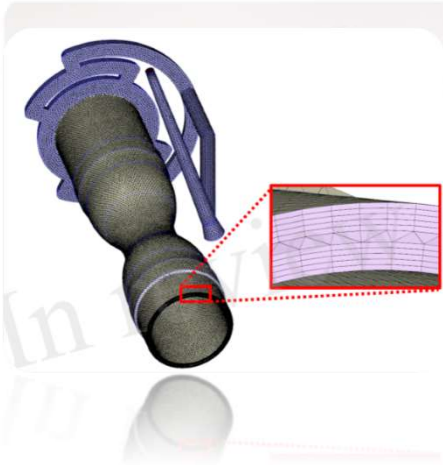
70.00 mm Moldex3D

54
357
163

Command < Run Script >

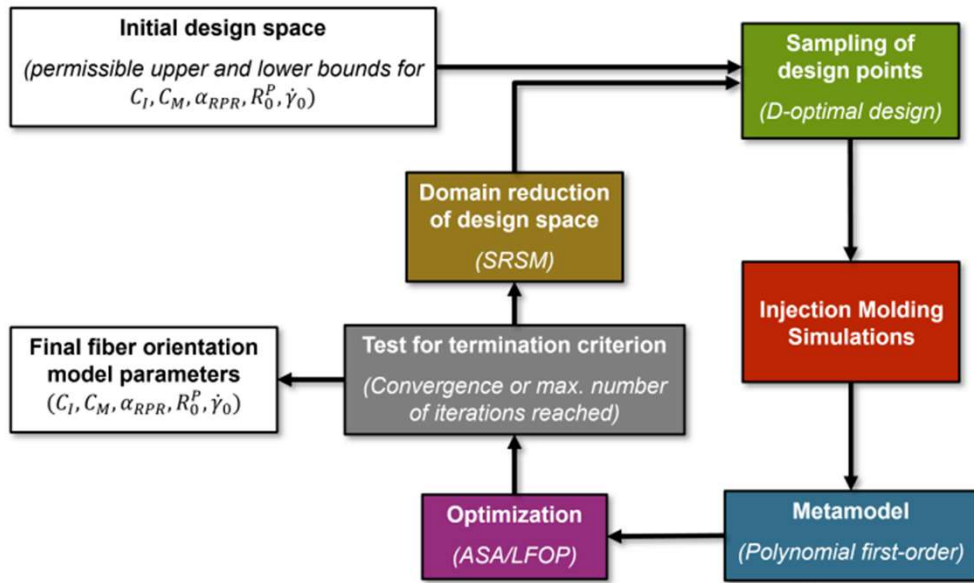
Fiber Orientation Parameters Optimization

Digital Twin-Driven Simulation for Fiber Orientation Parameters



Ref: Rienesl, Konrad, et al. "Determination of fiber orientation model parameters for injection molding simulations via automated metamodel optimization." *Frontiers in Materials* 10: 177.

Determination of fiber orientation model parameters for injection molding simulations



Automated Metamodel Optimization

IISO-model with 5 parameters

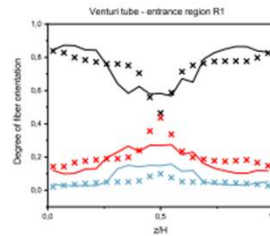


Figure 8a. Region R1

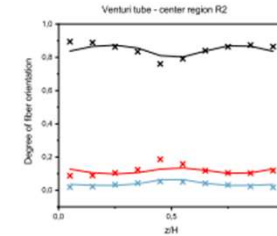


Figure 8b. Region R2

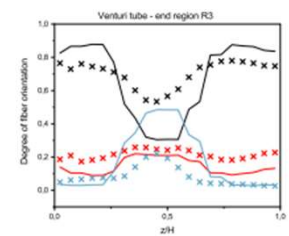


Figure 8c. Region R3

iARD-model with 3 parameters

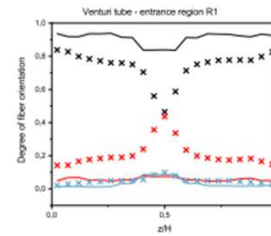


Figure 9a. Region R1

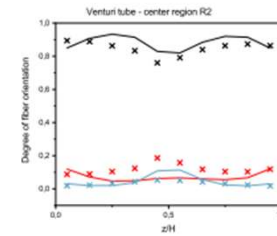


Figure 9b. Region R2

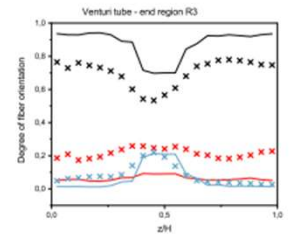


Figure 9c. Region R3

Ref: Rienesl, Konrad, et al. "Determination of fiber orientation model parameters for injection molding simulations via automated metamodel optimization." *Frontiers in Materials* 10: 177.

Moldex3D Hackathon 2023



徵求Coding英雄帖．激發你的熱血！



Vinci

Feature:

- By integrating information such as OneAI and Moldex3D API/Help, a chat robot can be established that can address problems encountered by users in use or design improvement; and can refer relevant personnel for problems that cannot be solved, and feedback back to the system according to the processing method Continue to improve.

Benefit:

- AI intelligent customer service, in addition to responding to the most popular topic of realization, also echoes the biggest pain point of mold flow analysis users. Knowing the analysis results, but how to interpret and propose improvement plans is the real test, and AI intelligent customer service It will completely overturn the past!





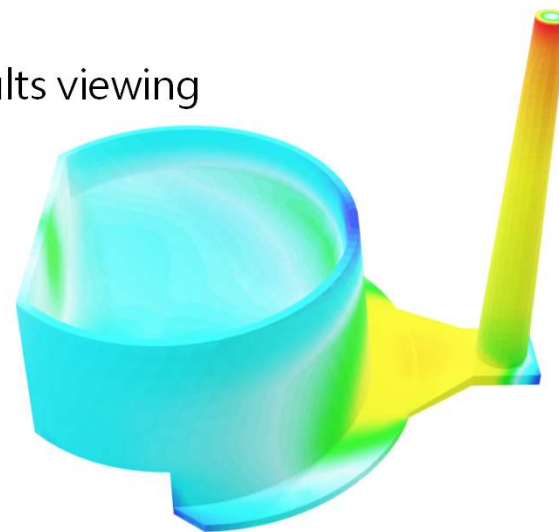
GLB Generator

Feature:

One-click conversion of the results to GLB, allowing users to view 3D results on Online GLB Viewer. It is easier to directly view the analysis results of Moldex3D on the browser, which can meet the needs of 3D PDF / PPT users .

Benefit:

- No need to install Moldex3D Studio or Moldex3D Viewer. One link, one QR Code, you can immediately view the analysis results in 3D. Quick promotion of Moldex3D
- Enable cross-platform results viewing





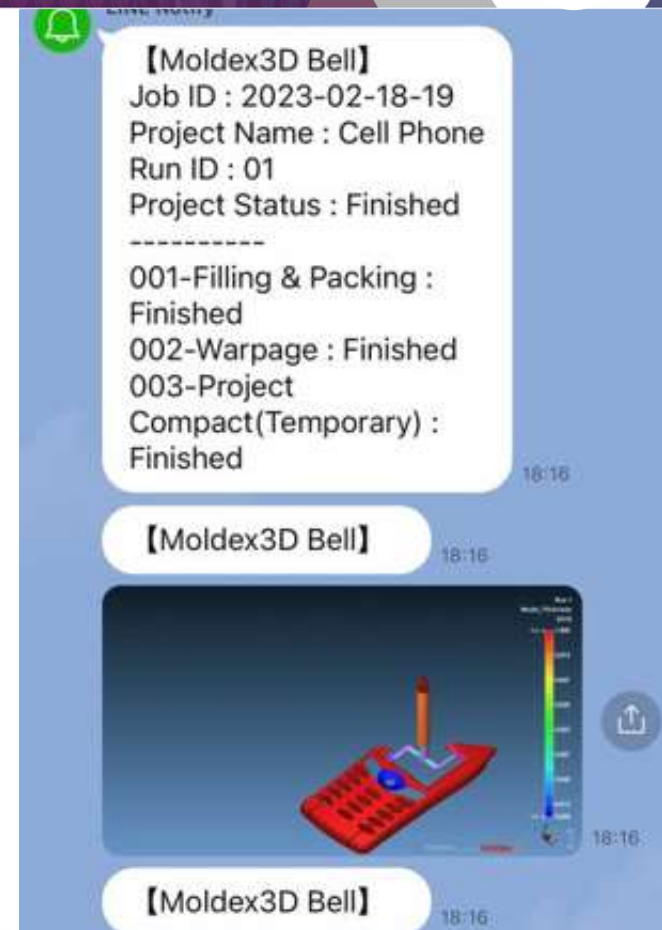
MDX Notification Bell

Feature:

- Integrate LINE and Teams, so that you don't have to go back to Moldex3D to check the progress all the time, just complete a few simple settings, and you can use your mobile phone to receive instant notifications, saving time for back-and-forth confirmation .









Benefit:

- Real-time notification of analysis progress, effectively and quickly grasp the latest information



Future Plan

Moldex3D App Store

	DPS Gate Size FREE / Moldex3D	21,290 
	DPS Cooling Temperature \$399 / Moldex3D	1,920 FREE 
	Auto Runner Template \$399 / Moldex3D	321 FREE 
	AI : Injection Process \$1,500 / Moldex3D	635 FREE 

Moldex3D

Thank you for your attention!

