

Session 2.3 and 2.4

How to Train Your Model with Project Refinery

Matt Jezyk, Tesla (Formerly Autodesk)

Class Description

Project Refinery is an Autodesk generative design tool for the architecture, engineering and construction industry that gives users the ability to explore, analyze, and optimize their Dynamo and Revit designs.

Creating parametric options is easier than ever, but creating 'good' options is still quite hard. Creating good design options starts by asking the right questions, and then by embedding your custom design logic into code. This lab will feature pragmatic end-to-end workflows for architectural design option generation and evaluation using Project Refinery in Dynamo for Revit. We will teach you how to code 'Evaluators' and train your model using Project Refinery.

About the Speaker:



Matt Jezyk works as the Sr. Staff Software Engineer at Tesla in the group that designs and builds the 'Gigafactories'. He develops software to smooth out the design, fabrication and construction process. Matt's group is responsible for developing smart factories for upcoming Tesla products.

Prior to his current role, Matt was the Senior Engineering Manager for AEC Generative Design at Autodesk. He has been in the AEC industry for 23+ years and has spent the past 20 years developing Autodesk Revit and various other design



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tools. Matt helped build Revit Architecture and Revit Structure and led the team at Autodesk responsible for developing Dynamo (computational design) and Project Refinery (optimization and generative design). Dynamo is now being used around the world and has an amazing community of users who now teach these techniques at many events and conferences.

Matt's group also has explored new ways of building by connecting computational and generative design directly to digital fabrication tools and robots. Examples of this have been shown in the BUILD space in Boston and presented at conferences like ACADIA, SmartGeometry and Robots in Architecture

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Session Outline

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Creating parametric options is easier than ever, but creating 'good' options is still quite hard. Creating good design options starts by asking the right questions, and then by embedding your custom design logic into code. This lab will feature pragmatic end-to-end workflows for architectural design option generation and evaluation using Project Refinery in Dynamo for Revit. We will teach you how to code 'Evaluators' and train your model using Project Refinery.

We will focus on these workflows and focus on the Evaluators for each:

1. **3Box Massing Study Simple** – a simple workflow to explain concepts.
2. **2d Hill Climbing** – showing how to create define a goal or objective function and create Evaluators using either Dynamo nodes, DesignScript, Python or C# code
3. **Massing Study Complex** - retail and office distribution and configuration for a building on an urban site.
 - a. We will also show how to take an evaluator from a different project (**StealthyRoofscales**) and apply it to this one.
4. **Solar Analysis** – Using Simulation Results
5. **Office furniture layout** – desk layouts in a Revit room that provide the most desks but also the most private desks while maximizing desk area per person and minimizing unutilized space.

At the end of this session, participants will be able to:

1. Frame a design problem in terms of goals and constraints
2. Learn how to write psuedocode to help define the logic before writing final code
3. Develop new custom code in multiple programming languages (Dynamo, DesignScript, Python, and C#)
4. Test the custom logic in a larger generative workflow