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Using Machine Learning to Predict the Next Command in Revit _ Part 4: Model Trainer Application Using ML.NET & Notepad++

By Jaime Rodriguez
TJR Network

November 25, 2020

Part 4 of 7 series Blog. Click here to go to Part 1.

The primary objective of this project is to develop a Revit plugin capable of predicting your next command and allowing you to execute it through a WPF form. This might sound like a fancy feature through I can tell you that it is much of a nuisance.

However, before diving into the Revit plugin, I decided to create a separate console application to handle model training predictions and evaluation. The rationale behind this choice is straightforward: console apps are easy to set up, lightweight, and allow you to focus on core functionality without distractions. In this blog, I'll explore how I trained a machine learning model for Revit use in a separate, dedicated app. I'll also share insights on how I plan to integrate this trained model into a Revit plugin called Appositionr for Revit software that allows rebuilding plugins without restarting Revit, working within a complex ecosystem, and much more. Stay tuned!

Once the console application is complete, it will serve as a proof-of-concept for the "difficult" part enabling me to quickly transition to creating the actual Revit plugin. It will work with much more familiar. The console application acts as a sandbox where you can train, test, and fine-tune your model. After achieving satisfactory performance, you can load the model into the Revit plugin.

Now, let's briefly explore how a typical ML.NET LightGBM model operates. I won't delve into the details of the boosted decision tree algorithm, as it's beyond the scope of this blog. It's a simple concept, it effectively demonstrates the capabilities of the tools, used in its development. With that in mind, the process generally involves two main phases: training and prediction.

Training: This is where the magic happens. You create a model by feeding it data, which the model uses to learn patterns and relationships within the data. This process can be integrated within the same application that makes predictions or handled separately. In our case, the training is done exclusively in the console application.

Prediction: Once the model is trained, it's saved as a file and can be loaded whenever predictions are needed. The trained model will be loaded into the Revit plugin, enabling it to predict the next command based on input data. Both the Revit plugin and the console application can make predictions using the model.

The first step involves splitting our data into training and testing datasets to evaluate prediction results. Open the file DATA-COMMAND.txt, cut the first 5,434 lines of text, paste them into a new file, and save it as DATA-COMMAND-TRAINING.txt. This will leave you with 1,000 lines for testing, which is a good rule of thumb. Now, we have all the files needed for this application:

- DATA-COMMAND-TRAIN.txt Used for training the model's accuracy.
- DATA-COMMAND.txt Used for training and batch training models.
- CMD_LIST_ADDITIONAL.txt Contains unique possible answers or unique Column 3 entries from our data.

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Command_Name,Count,Year,Month,Day,Hour,Minute,Second,Workspace,Document,Session
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