# Task 4: Metrics and Model Behavior — Beyond RMSE

**Weeks**: 8-9
**Title**: "Not All Errors Are Equal"

## Objectives:

- Go beyond basic metrics to understand model behavior
- Evaluate model confidence and failure regions
- Learn how to analyze predictions at a deeper level

## Deliverables:

- A report explaining different metrics and error analysis, one can apply to a model.
    - How can they be interpreted to help understand the model?
    - Can these analyses guide us into building a better model?
    - **Push a pdf report to the GitHub repo by 6 PM the Wednesday before next session**
- Update your notebook with error analysis and insights
    - **Push your code to the GitHub repo by 6 PM the Wednesday before next session**

## Description

You finished doubting your features, and you realized it was, just like the dataset beforehand, not short of nuances! Some features are useful, but not really that much. Some features are redundant. Some features are irrelevant. Some features are missing. Etc.
So, now you are noticing a pattern. Things have been taken for granted, but once you look deeper into it, you realize it should never have been the case.
And now you ask, what else is up for doubt?
You look at the numbers you reported for your model's performance. You used numbers for metrics like RMSE and $R^2$. But let's speak honestly from now on, do you really know what these numbers mean? And why did you decide to use these numbers and no other numbers? Is it really about numbers even? Are there other ways that one can understand the performance of their models beyond these numbers?

You decide that this will be your next endeavor!

- You will collect a report that explains to you the different ways one can use to look at their model's performance, including different evaluation metrics as well as error analysis.
- After providing a report with various techniques, you will pick up a subset of these techniques to examine the performance of the models you have already trained.
    - Are you arriving at the same conclusions as when you used RMSE and $R^2$ numbers only?