**Feature engineering:**

Beside to existing features, an additional feature was created, which is *DAY\_OF\_WEEK*. It was derived from *DAY*, *MONTH*, *YEAR* and it represents the day of week at the date *DAY/MONTH/YEAR*.

Due to this feature addition, the response will be predicted more comprehensively. If this feature were not added, the model may have never recognized the pattern of weekdays, which causes a poor regression fit; or it would be costly in terms of parameter quantity to make the model catch this pattern.

Therefore, we can state that by adding the *DAY\_OF\_WEEK* feature, we obtain a better fit with smaller number of parameters, which are nodes and layers.

**Validation data:**

Training data was shuffled and a sample from it was separated as validation data.

**Model:**

* A regression model using multilayer perceptron is formed via *h2o* package.
* The regression formula can be represented as

*TRX\_COUNT ~ IDENTITY + REGION + DAY + MONTH + YEAR + DAY\_OF\_WEEK + TRX\_TYPE*

* Maximum iteration is determined as *200* via manually searching.
* *Adaptive learning* is applied. Its parameter is chosen as *0.99.*
* *5 hidden layers* are used and activation functions in hidden layers are chosen as “*rectifier*” assuming it will be advantageous in a multilayered structure.
* *Batch learning* was applied,in order to obtain a better fit and reduce the error, even if it causes longer training time.
* During the selection of hyperparameters, RMSE of validation prediction was considered. Also to evaluate the performance of the model, RMSE of a K-Nearest Neighbours model was used as a benchmark. (KNN model can be seen as commented in the code)