

Phase 3: Model selection & evaluation

The main goal in this phase is to obtain highest possible accuracy on the validation set after splitting the data into training set and validation set. Also, to experiment and find, what network size is needed to 'overfit' the entire dataset.

Pre- Requisites:

- Before working on this phase, please practice “Activities 5, 6, 7, and 8”.
- Refer [A recipe of supervised learning development](#)
- Refer the “[Instructions for Projects](#)” under Module 0
- For this phase, you need to split your data into training and validation.
- This is an extension of Phase 1 and Phase 2 , so build and perform below tasks on the same idea that you started your project with.

Tasks

- Shuffle your dataset
- Split the dataset into a training set and a validation set.
 - For small datasets, selecting a random 20%-30% of the rows as the validation set and leaving the rest as the training set.
- Check the accuracy of the base model on the validation set.
- Then you can gradually grow your model and investigate if larger models deliver higher accuracy on the validation set.
- Build a best fit/best performance neural network model with as high accuracy as possible and evaluate on the validation set.- Remember not to overfit your model at this stage.
- After that, build a neural network model to overfit the training set (to get almost 100% accuracy or as high as it is possible) and evaluate on the validation set.
- Build a model with model checkpointing and Early stopping and evaluate on the validation set.
- Plot learning curves to interpret various models.
- Observe and analyze how the learning plots look like in various scenarios.
- Additionally, you should also evaluate your models using various metrics.

Metrics for evaluating a binary classification model:

- Accuracy, precision, recall, F1-score
- ROC curve and area under the curve (AUC)

Metrics for evaluating a regression model

- MAE, MSE
- Residuals
- True vs prediction scatter plot

Report must include the following:

- As you explore various network architectures, please note the accuracies of these models to include in your report.
- You can summarize your findings in the form of a table and the table should contain the accuracy and loss on the training set and the validation set
- You can also include other parameters such as number of epochs, number of neurons, other parameters, etc.
- Also remember to select one model as your best performing model, i.e., the model that delivers highest accuracy on the validation set. Highlight this model in your report.
- Highlight the model on which you applied early stopping and model checkpoint.
- Your report should also include learning curves that you got for various models while doing the experiments.