

## Phase 2: Building a NN model

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The main goal in this phase is to experiment and train different Neural Network Models and find out what network size is needed to get the highest accuracy.

### Pre- Requisites:

- Before working on this phase, please practice “Activities 3 and 4”.
- For this phase, please do not split your data into training and validation.
- This is an extension of Phase 1 , so build and perform below tasks on the same idea that you started your project with.
- Refer [A recipe of supervised learning development](#)
- Refer the “[Instructions for Projects](#)” under Module 0
- Refer the [Example Report](#). Please understand that these examples are only meant to be references and your focus should be on meeting the requirements mentioned above instead of preparing a report similar to these example reports.
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### Tasks

- Start building a basic model and then eventually grow your model. Steps to follow:
  - Build a model with only 1 layer (Base Model)
  - Build a model with an increased number of layers and number of neurons- You can try building 2-3 models of different sizes to compare the results.
  - Build a neural network model to overfit the training data (to get almost 100% accuracy or as high as it is possible). For this, train your model for as many epochs as needed, try increasing the number of neurons and layers to obtain as high accuracy as possible,
- Also, check the performances when:
  - Last layer activation is changed to linear/relu instead of sigmoid in case of Binary Classification
  - Last layer activation is changed to sigmoid instead of linear/relu in case of Regression

- While working on the project phase you will compare the performance (accuracy, loss, F1 score etc.) of various neural network models including a basic single layer model
  - 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.
- You can also include other parameters as well such as number of epochs, number of neurons, etc.
- Also remember to select one model as your best performing model, i.e., the model that delivers highest accuracy other than the Overfit model. Highlight this model in your report.