# DL Lab 06

Difference Between Supervised, Semi-Supervised and Self Supervised Learning.

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| **Supervised Learning** | **Self-supervised learning** | **Semi-supervised Learning** |
| * The model is trained on labeled data | * The model generates its own labels from unlabeled data | * The model uses a small amount of labeled data and a large amount of unlabeled data. |
| * Requires large amount of labeled data. | * Requires only unlabeled data for training. | * Uses both labeled and unlabeled data for learning. |
| * All training data is labeled. | * No manual labels, labels are inferred from the structure of the data. | * Only a small portion of the data is labeled. |
| * Classification, regression, object detection etc. | * Pretext tasks for feature learning, contrastive learning. | * Image classification, and NLP with limited labels. |
| * Learns to map input target labels. | * Learns useful representations by predicting parts of the input. | * Learns from labeled data and uses unlabeled data to improve performance. |
| * High accuracy when sufficient labeled data is available. | * Reduces dependency on labeled data and can generalize better. | * Reduces the cost of labeling while improving performance with unlabeled data. |
| * Expensive and time-consuming to label large datasets. | * Harder to train and can be less intuitive. | * Less accurate than supervised learning if the labeled data is too sparse. |

Differences between Transductive Learning and Inductive

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| **Inductive Learning** | **Transductive Learning** |
| Learns a general model from training data to make predictions on unseen data. | Directly tries to make predictions on the given test data without learning a general model. |
| Generalizes from the training data to any potential test data. | Focuses only on making predictions for the specific test set provided. |
| The model can be applied to new, unseen instances. | The model is designed only for the given test data. |
| Learns a function that maps inputs to outputs (generalization). | Leverages both the training and test data together for prediction. |
| Aims to generalize to unseen data beyond the training set. | Does not generalize; it is concerned only with the given test set. |
| Can be applied to any new, unseen data. | Can yield more accurate predictions for a given test set. |
| May not always be as accurate on specific test sets as transductive methods. | Predictions are only for the current test set, not generalizable. |