**ACTIVE LEARNING,TRANSFER LEARNING,STRUCTURED PREDICTION**

**ACTIVE LEARNING**

Active Learning is a methodology that can sometimes greatly reduce the amount of labeled data required to train a model. It does this by prioritizing the labeling work for the experts.

Instead of collecting all the labels for all the data at once, Active Learning prioritizes which data the model is most confused about and requests labels for just those. The model then trains a little bit on that small amount of labeled data, and then again asks for some more labels for the most confusing data.

By prioritizing the most confusing examples, the model can focus the experts on providing the most useful information. This helps the model learn faster, and lets the experts skip labeling data that wouldn’t be very helpful to the model. The result is that in some cases we can greatly reduce the number of labels we need to collect from experts and still get a great model. This means time and money savings for machine learning projects!

**TRANSFER LEARNING**

In Transfer Learning, the knowledge of an already trained Machine Learning model is applied to a different but related problem. For example, if you trained a simple classifier to predict whether an image contains a backpack, you could use the knowledge that the model gained during its training to recognize other objects like sunglasses.

With transfer learning, we basically try to exploit what has been learned in one task to improve generalization in another. We transfer the weights that a Network has learned at Task A to a new Task B.

The general idea is to use knowledge, that a model has learned from a task where a lot of labeled training data is available, in a new task where we don’t have a lot of data. Instead of starting the learning process from scratch, you start from patterns that have been learned from solving a related task.

Transfer Learning is mostly used in Computer Vision and Natural Language Processing Tasks like Sentiment Analysis, because of the huge amount of computational power that is needed for them.

It is not really a Machine Learning technique. Transfer Learning can be seen as a ‘design methodology’ within Machine Learning like for example, active learning. It is also not an exclusive part or study-area of Machine Learning. Nevertheless, it has become quite popular in the combination with Neural Networks, since they require huge amounts of data and computational power.

**STRUCTURED PREDICTION**

**Structured prediction** is a framework in machine learning which deals with structured and highly interdependent output variables, with applications in natural language processing, computer vision, computational biology, and signal processing. In the last 5 years, several applications in these areas achieved new breakthroughs by replacing the traditional feature-based linear models by more powerful deep learning models based on neural networks, capable of learning internal representations.