

# Machine Learning Fundamentals

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In this session, we will present a 'big picture' view of the field of machine learning with the aim of providing a framework for conceptualizing it ([cite:@goodfellow2016deep], [cite:@hastie2009elements]). We will first introduce the basics of learning algorithms, presenting the types of problems they aim to solve and categorizing them by learning process (supervised vs. unsupervised) and statistical approach considered (frequentist vs. Bayesian inference). Afterwards, we will present and attempt to visualize the 'problem space', a useful mental model for considering optimization problems in general. Lastly, we will touch on a number of key concepts in the field that may both (a) facilitate understanding, and (b) explain the field's trend toward deep learning algorithms.

## References:

- [1] I. Goodfellow, Y. Bengio, and A. Courville, \textit{Deep learning}. MIT press, 2016.
- [2] T. Hastie, R. Tibshirani, J. H. Friedman, and J. H. Friedman, \textit{The elements of statistical learning: data mining, inference, and prediction}, vol. 2. Springer, 2009.