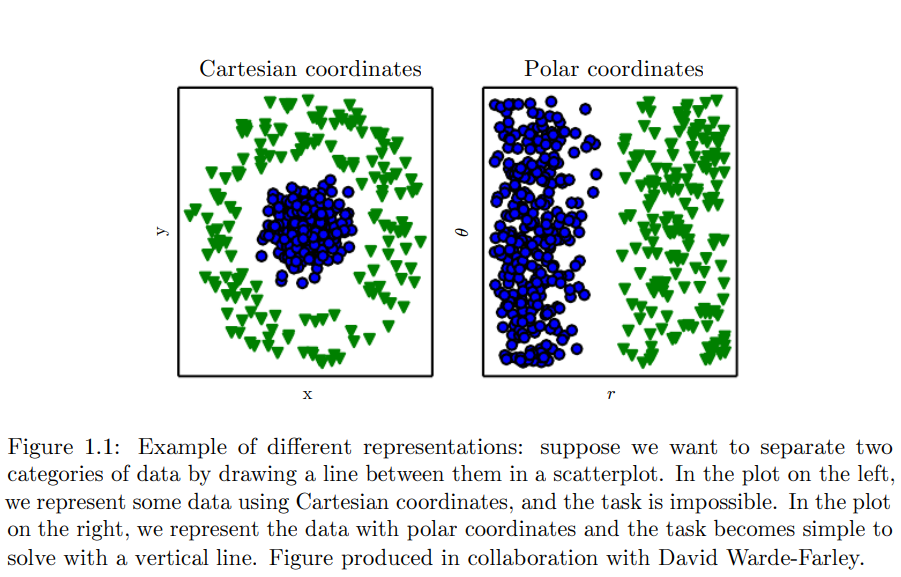
Ian Goodfellow – Deep Learning

# Introduction

Machine learning algorithms **logistic regression** can recommend cesarean delivery(kejsarsnitt), **naive Bayes** can separate spam e-mails.

The performance depends heavily on the **representation** of the data that is given. The information is, in simple ML cases, presented as **features**.

To choose the data representation, indexation and features carefully is really important. Some tasks may be unsolvable or take exponentially longer time if chosen wrongly. See picture below. 

When using **representation learning** you can detect the representation itself, hence not needing any predefined features. Usually renders better performance than hand designed representations. The quintessential example of a representation learning algorithm is the **autoencoder**. They are trained to keep as much info as possible but also make the new representation have various nice properties.

When designing features and algorithms we want to separate the **factors of variation**.

The quintessential example of a deep learning model is the feedforward deep network or **multilayer perceptron (MLP)**. A multilayer perceptron is just a mathematical function mapping some set of input values to output values.

Deep learning is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as a nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones

# Historical trends in deep learning

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