

# Machine Learning

brick by brick

## Epoch 1

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Machine Learning Brick by Brick, Epoch 1: Using LEGO® to Teach Concepts, Algorithms, and Data Structures

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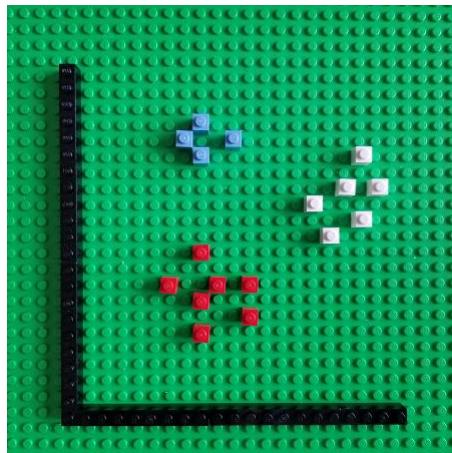
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# Preface

My interest in artificial intelligence goes back to school years when I was intrigued by pictures of a perceptron. When I started doing anomaly detection and analysis in 2003, I tried hands-on learning of Prolog (for memory dump analysis inference), expert systems (for software support), became familiar with neural networks (C++ implementation at that time). However, my own explorative data analysis approaches, especially for traces and logs, pushed me into human learning, and only recently, I caught up with the latest frameworks and approaches in machine learning. In November 2018, I invented a baseplate representation of chemical structures using LEGO®, and in January 2020, I got an idea to represent clustering using bricks. In the previous years, I used bricks to represent some simple data structures and even software logs, so all that fused into these series of short books (epochs) you are reading now.



For this epoch, I used the following books as a reference and inspiration:

- Neural Networks: A Systematic Introduction by Raúl Rojas
- Introduction to Deep Learning: From Logical Calculus to Artificial Intelligence by Sandro Skansi
- Artificial Intelligence Engines: A Tutorial Introduction to the Mathematics of Deep Learning by James V. Stone

Before we delve into hands-on internals of linear associative networks, we represent a 2-layer network with 3 neurons each and 9 interconnections, each having a different weight.

