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English summaries

Joan Bruna and Sebastià Xambó

Algorithmic learning and deep neural networks

In this article you will find a description of the nature of algorithmic learning and of its most relevant methods, as well as a presentation of the main mathematical ingredients that provide the basis for both the definition and study of models and for the analysis of the algorithms. You will also find an extensive bibliography and recommendations for further study.

Keywords: algorithmic learning, curse of dimensionality, neural networks, stochastic gradient descent, Vapnik-Chervonenkis dimension, Rademacher complexity, double descent, causality, explicability, hypercomplex networks.

MSC2010 Subject Classification: 68T01, 68Q32, 68T05, 62F15, 68W25, 82C32, 62M45, 65K10, 90C26, 93E35, 30G35.

Armengol Gasull

Conjectures

The aim of this paper is to introduce various mathematical conjectures which have the common feature of addressing issues that may be understood without being a professional mathematician. We will group them into three large blocks: those concerning prime numbers, those involving natural numbers, and a third more heterogeneous block, dealing with problems from various branches of Mathematics. In total we will introduce more than forty conjectures covered to a greater or lesser extent. We will also examine the possibility of using

conjectures as a motivational tool for high school and early university students, in order to present mathematics as a living and growing discipline.

Keywords: conjectures, number theory, prime numbers, open problems, popularization of mathematics.

MSC2010 Subject Classification: 00A05, 00A09, 00A27, 11A.