

Learning Graph Properties

A dive into the world of random graphs

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Nowadays, graphs are omnipresent in many fields, from Sociology to Mathematics and Chemistry to Computer Science. Many problems involving graph's representation suffer from huge computation time. On the other hand, the machine learning community tends to use graphs instead of tensors as an alternate representation for data. In this project, we aim to classify graph's invariants derived from their structural properties such as connectivity or cycle appearance. To do so, we created a tool capable of generating datasets of random graphs labeled with respect to a specific property. We also propose an approach to deal with unknown behavior of random graph's properties, by using sampling on the $G(n, p)$ model proposed by Edgar Gilbert in 1959, and analysed by Paul Erdős and Alfred Rényi between 1959 and 1960. Finally, we achieved between 72% and 84% of accuracy when classifying our datasets using neural networks and fitting it with the adjacency matrix representation of graphs.

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