

Deep Learning and the Prisoner's Dilemma: A Strategic Evaluation

Abstract:

This paper presents a high-level exploration of the behavior of Deep Learning models in complex environments through the lens of the Repeated Prisoner's Dilemma problem. The strategic acumen of multiple models including binary classification models, convolutional neural networks and recurrent neural networks are evaluated based on their performance in a Repeated Prisoner's Dilemma tournament. By evaluating this performance, it is found that the Deep Learning models studied lack the strategic abilities necessary to have success in dynamic situations. With the ubiquity of Deep Learning models in today's world, this paper serves as a warning against the use of such models in sufficiently complex situations – like the often convoluted and certainly dynamic real world.