Towards artificial neural network and blockchain conjunction: deep learning on-chain

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Abstract

Blockchain and deep learning are two promising technologies flourishing in recent years. They come from different domains and barely have practical connections to each other. Existing machine learning frameworks fail to provide trusted widely accepted models which can be trained collaboratively and often require costly retraining for new classes. Blockchain technology at current state is computationally slow and has significant economic burden which makes it difficult to use with machine learning. In this paper, we mediate between these two different technology domains and propose a novel approach for storing and training deep artificial neural networks directly on blockchain state transition machine, which allows to build trust in the model by exploiting soft security coming from economic costs and hard security of of blockchain cryptographic protocols.

1 Introduction

Nowadays blockchain technology is changing the landscape of many industries by providing new possibilities of automation, security, and trust. Success of the first cryptocurrency Bitcoin proved that a long term cryptographical dream can materialize and be a mean of decentralized cryptocurrency. A successor, Ethereum platform went further and provided a new type of decentralized computation and storage - blockchain based virtual computational machine which can be used to execute the code in the de-