Abstract

Design and Implementation of a Distributed Neural Network Platform Utilising Crowdsource Processing

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Neural networks are at the forefront of future technologies, with self-driving cars on the horizon, and complex classification algorithms controlling what we see in many parts of our daily life already. Neural networks and deep learning thrive on large datasets and large networks, both of which contribute to longer training times that impede model development and deployment in business and research endeavours.

The possibility to make use of these techniques are often out of reach for the majority of applications due to expensive Graphics or Tensor Processing Units needed, coupled with the long computational times. This project aims to alleviate this issue by distributing the training process across multiple willing users, forming an online distributed training network across loosely connected, heterogeneous systems.

This was achieved through the use of the TensorFlow library in tandem with a peer to peer file replication algorithm for data distribution across workers. Machines are initially connected to one another through a central match making server, and otherwise feature no future central architecture interaction. In testing the process was found to improve overall training accuracy by 3-6% per worker over the same number of data iterations, proving this method can allow for network training to converge quicker to the local minimum than a standard solitary machine system.