adanet Documentation

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Package Reference

AdaNet: Fast and flexible AutoML with learning guarantees.

AdaNet is a lightweight TensorFlow-based framework for automatically learning high-quality models with minimal expert intervention. AdaNet builds on recent AutoML efforts to be fast and flexible while providing learning guarantees. Importantly, AdaNet provides a general framework for not only learning a neural network architecture, but also for learning to ensemble to obtain even better models.

This project is based on the *AdaNet algorithm*, presented in "AdaNet: Adaptive Structural Learning of Artificial Neural Networks" at ICML 2017, for learning the structure of a neural network as an ensemble of subnetworks.

AdaNet has the following goals:

- *Ease of use*: Provide familiar APIs (e.g. Keras, Estimator) for training, evaluating, and serving models.

- *Speed*: Scale with available compute and quickly produce high quality models.

- *Flexibility*: Allow researchers and practitioners to extend AdaNet to novel subnetwork architectures, search spaces, and tasks.

- *Learning guarantees*: Optimize an objective that offers theoretical learning guarantees.

The following animation shows AdaNet adaptively growing an ensemble of neural networks. At each iteration, it measures the ensemble loss for each candidate, and selects the best one to move onto the next iteration. At subsequent iterations, the blue subnetworks are frozen, and only yellow subnetworks are trained:

AdaNet was first announced on the Google AI research blog: "[Introducing AdaNet: Fast and Flexible AutoML with Learning Guarantees](https://ai.googleblog.com/2018/10/introducing-adanet-fast-and-flexible.html)".

This is not an official Google product.

CHAPTER 1

adanet

1.1 Estimators

High-level APIs for training, evaluating, predicting, and serving AdaNet model.

1.1.1 AutoEnsembleEstimator

1.1.2 Estimator

1.1.3 TPUEstimator

1.2 Ensembles

Collections representing learned combinations of subnetworks.

1.2.1 MixtureWeightType

1.2.2 WeightedSubnetwork

1.2.3 Ensemble

1.3 Evaluator

Measures `adanet.Ensemble` performance on a given dataset.

1.3.1 Evaluator

1.4 Summary

Extends `tf.summary` to power AdaNet's TensorBoard integration.

1.4.1 Summary

1.5 ReportMaterializer

1.5.1 ReportMaterializer

adanet.subnetwork

2.1 Generators

Interfaces and containers for defining subnetworks, search spaces, and search algorithms.

2.1.1 Subnetwork

2.1.2 TrainOpSpec

2.1.3 Builder

2.1.4 Generator

2.2 Reports

Containers for metadata about trained subnetworks.

2.2.1 Report

2.2.2 MaterializedReport

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